

FINAL Environmental Impact Statement: Otter Tail to Wilkin Carbon Dioxide Pipeline Project

The human and environmental impacts of constructing and operating the Otter Tail to Wilkin pipeline and associated facilities.

July 2024

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Sources

Much of the information used to prepare this environmental impact statement comes from the routing permit application and the scoping environmental assessment worksheet. Additional sources include new information provided by the applicant, field visits, geospatial analysis, and the work of consultants.

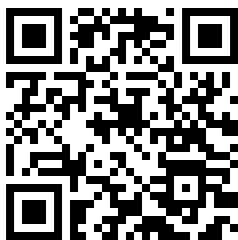
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Alternative Formats

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Additional Information



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Executive Summary

Summit Carbon Solutions, LLC (applicant) must obtain a pipeline routing permit from the Minnesota Public Utilities Commission (Commission) before it can construct the Otter Tail to Wilkin Carbon Dioxide (CO₂) Pipeline Project (project).

What is this document?

This document is an environmental impact statement. The Commission will use the information in this document to inform its decision about issuing a permit for the project. Your comments on this document can help the Commission make its decision.

This environmental impact statement (EIS) contains an overview of the resources affected by the project. It also discusses potential human and environmental impacts and mitigation measures. Energy Environmental Review and Analysis (EERA) staff within the Department of Commerce (Commerce) prepared this document as part of the environmental review process.

In February 2024, EERA staff held three in-person meetings and one virtual meeting to solicit comments on the draft EIS. Written comments on the draft EIS were accepted through February 23, 2024. EERA staff have responded to substantive comments in this final EIS.

Where do I get more information?

For additional information don't hesitate to contact Commerce or Commission staff.

If you would like more information or if you have questions, please contact Commerce staff, Andrew Levi at andrew.levi@state.mn.us or (651) 539-1840, or the Commission public advisor, Sam Lobby at publicadvisor.puc@state.mn.us or (651) 201-2251.

Additional documents and information, including the routing permit application, can be found on the State of Minnesota eDockets system at <https://www.edockets.state.mn.us/EFiling/search.jsp> by searching "22" for year and "422" for number.

Information is also available on the Commerce webpage:
<https://eera.web.commerce.state.mn.us/web/project/14959>.

What does the applicant propose to construct and why?

The project consists of a carbon dioxide (CO₂) capture facility and 28.1 miles of pipeline that would transport captured CO₂.

The applicant proposes to construct and operate approximately 28.1 miles of 4-inch-diameter, carbon steel pipeline and associated facilities for the transport of CO₂ from the Green Plains Ethanol Plant (ethanol plant). The project would extend from the ethanol plant near Fergus Falls in Otter Tail County, Minnesota, west to the Minnesota-North Dakota border near Breckenridge in Wilkin County, Minnesota. In addition to the pipeline facilities, the project would include a CO₂ capture facility at the ethanol plant and access roads. The capture facility would use an average of about 13 million gallons of water per year sourced from an existing well at the ethanol plant. Electricity usage for the capture facility would be approximately 38.5 million kilowatt hours per year.

The project is designed to capture approximately 0.19 million metric tons per annum (MMTPA) of CO₂ generated by the ethanol plant and transport it by pipeline to the North Dakota border. The CO₂ would ultimately be injected into permanent underground sequestration facilities in North Dakota. The project would reduce the carbon intensity of the ethanol produced and thereby improve the ethanol plant's ability to compete in low carbon fuel standard (LCFS) markets.

The applicant proposes to construct the pipeline from August to October 2025 and the capture facility from August 2025 to March 2026, contingent on receipt of required permits and authorizations.

What permits are needed?

The project requires a routing permit from the Commission.

Before constructing the project, the applicant needs a pipeline routing permit from the Commission. A routing permit determines where the project would be located and how impacts must be mitigated. If the Commission grants a routing permit, various other federal, state, and local permits and approvals might be required for activities related to construction and operation of the project. The applicant must obtain these other permits before construction begins.

What alternatives does this EIS study?

In its final scoping decision, the Commission identified the following alternatives to be addressed in the EIS: no action, alternative routes, alternative technologies, modified designs or layouts (pipe diameter), modified scale or magnitude (reduced throughput), and alternatives incorporating reasonable mitigation measures.

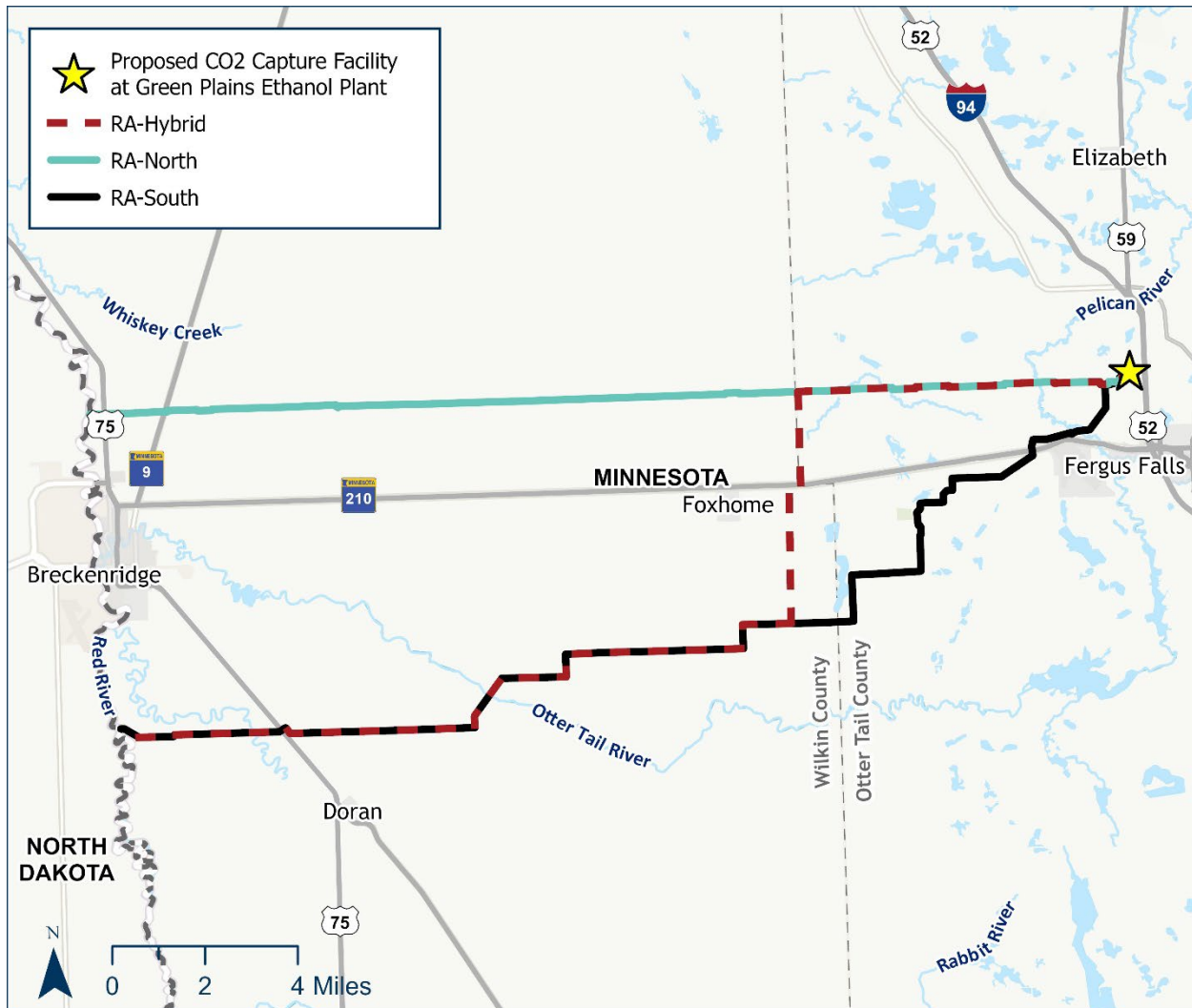
No Action

Under the no action alternative, the Commission would not issue a pipeline routing permit and the project would not be constructed. Impacts, both adverse and beneficial, associated with construction and operation of the project would not occur. Ethanol production might increase, decrease, or remain the same without the project.

Alternative Routes

This EIS studies and compares three alternative pipeline routes, one of which is the applicant's proposed pipeline route. An alternative route represents an alternative path for the pipeline between the ethanol plant and the Minnesota-North Dakota border near Breckenridge. The three alternative routes are shown in **Figure ES-1**.

Figure ES-1 Proposed Alternatives



Route Alternative – North (RA-North) is 23.0 miles long. It parallels roadways from the ethanol plant straight west to the North Dakota border just north of Breckenridge. This route would not connect with the proposed MCE Project pipeline system in North Dakota. However, the connection point remains undefined because the applicant has not obtained a permit for the pipeline in North Dakota.

Route Alternative – Hybrid (RA-Hybrid) is 29.1 miles long. This route is the same as RA-North between the ethanol plant and 100th Street where it turns south to connect with Route Alternative – South (RA-South) before continuing west along the same path as RA-South.

Route Alternative – South (RA-South) is 28.1 miles long and is the applicant’s proposed route. This route parallels roadways in a general southwest direction until it meets County Road 58, which it parallels west to the North Dakota border south of Breckenridge.

Alternative Technologies

The EIS analyzes two alternative technologies that could reduce the carbon intensity of the ethanol produced at the ethanol plant: (1) a suite of agricultural practices to be implemented by farmer

producers, and (2) a suite of energy use and efficiency changes to be implemented by the ethanol plant. These alternative technologies could reduce the carbon intensity of the ethanol produced through lowered greenhouse gas (GHG) emissions and increased sequestration of CO₂ in soil.

Modified Designs or Layouts and Modified Scale or Magnitude

The EIS analyzes whether a modified design or layout (alternative pipeline diameter of 3 inches or 6 inches) or modified scale or magnitude (reduced throughput) would result in a significant environmental benefit over the project. Increasing the pipeline diameter to 6 inches would lower the operating pressure, and the impacted distance from a potential rupture would increase by 33 percent. Decreasing the pipeline diameter to 3 inches would require increasing the operating pressure. The impacted distance from a potential rupture would decrease by 24 percent, and the smaller diameter would pose challenges for pipeline inspection. Permanent reductions in throughput would result in operational parameter changes that could impact the ability to safely operate the pipeline and perform in-line pipeline integrity inspections. Reducing throughput velocity would have a limited effect on the potential rupture release volume and would not decrease the likelihood of a rupture happening. The EIS finds that neither alternative provides significant environmental benefits relative to the project. Therefore, these alternatives were not studied in detail in this EIS.

Alternatives Incorporating Reasonable Mitigation Measures

The EIS incorporates into its analysis reasonable mitigation measures identified through agency, Tribal, and public comments received during scoping and on the draft EIS. Suggested mitigation measures are addressed under the relevant resource sections.

What potential impacts were identified?

The project would impact human and environmental resources.

A potential impact is the anticipated change to an existing condition caused either directly or indirectly by the construction and operation of a proposed project. Potential impacts can be adverse or beneficial, and short or long term. Short-term impacts are generally associated with construction. Long-term impacts extend beyond the end of construction and are generally associated with operation of the project. Permanent impacts extend beyond project decommissioning and reclamation. Impacts vary in duration and size, by resource, and across locations. Potential impacts can be mitigated by avoiding, minimizing, or correcting the effect. Mitigation measures are described in Chapter 5 and Chapter 8.

Human Settlement

Aesthetics

Aesthetic impacts are subjective. Thus, potential impacts are unique to the individual and can vary widely. Potential impacts along each alternative route are expected to be minimal to moderate during construction. RA-North would have several more residences with at least a partial view of the construction workspace compared to RA-Hybrid. RA-South would have several fewer residences with at least a partial view of the construction workspace compared to RA-Hybrid. For those residences with at least a partial view of the construction workspace, visual impacts would be noticeable during construction, but would be short term. The pipeline would be underground and not visible during project operation. Mainline valves (MLV) would create long-term aesthetic impacts within a small viewshed. The capture facility would be located at the ethanol plant and its impact would be incremental to the viewshed. Aesthetic impacts from project operation would be negligible to minimal, with no noticeable difference among the route alternatives.

Cultural Resources

Cultural resources contribute to the principles that form the foundation for community unity. These principles can pull from heritage, local resources, and common experiences/events and can include work and leisure pursuits, land use, Tribal-identified cultural resources, and native Minnesota plants and wildlife of Tribal significance. Cultural resources impacts are subjective. Thus, potential impacts are unique to the individual or community and can vary widely. Agricultural operations, which can have contemporary cultural value, would be impacted temporarily along each of the route alternatives, but agricultural operations could resume once construction is complete. The project could temporarily impact hunting activities and the habitats of plants and wildlife of Tribal cultural interest during construction and until restoration of disturbed areas is complete. Overall, potential impacts on cultural resources during construction and operation of the project are anticipated to be minimal and would be similar for all route alternatives, though landowners with property within the construction workspace would experience this impact to a greater extent.

Environmental Justice

An environmental justice (EJ) assessment identifies disadvantaged communities that have been historically marginalized and overburdened by pollution and evaluates if a project would disproportionately affect these communities. Census Tract 9609, which is crossed by all three route alternatives, was identified by the MPCA screening tool as an EJ area of concern. Potential impacts along each of the route alternatives are expected to be minimal for EJ communities during construction. Local roadways would experience a short-term, minimal increase in traffic during construction activities. Construction would use horizontal direction drill (HDD) and boring techniques at road crossings to limit impacts on local traffic. Residents within Census Tract 9609 and the other census tracts crossed by the project might experience intermittent, short-term noise from construction equipment for up to 30 days. Operation of the capture facility and pipeline facilities would not generate noticeable noise. The project would not result in significant impacts on air quality during construction or operation. Overall, EJ impacts from construction and operation of the project would not result in disproportionate adverse impacts for EJ areas of concern and are similar across the three route alternatives.

Land Use and Zoning

Land use in the route width for each alternative, and in the area of the project generally, is predominantly agriculture. Project construction would have a short-term, minimal to moderate impact on land use within the construction workspace, where agricultural land would be taken out for production for one growing season. Pipeline operation would have a long-term, minimal impact on land use. An operational right-of-way (ROW) would be created, but agriculture (the most prevalent land use) could continue. Landowners could not plant trees or build structures within the operational pipeline ROW. The project would be compatible with local and regional land use plans. Overall, impacts on land use and zoning are anticipated to be minimal and the same for each of the three route alternatives.

Noise

Heavy equipment needed to construct the pipeline would have an intermittent and short-term impact on noise levels in the vicinity of the project. Except for HDDs and some hydrostatic testing activities, construction would be limited to daytime hours. Noise from HDDs would be noticeable but temporary, typically lasting 5 to 6 days or more, depending on the length and depth of the drill path. Construction equipment noise would be expected to decrease to levels below state daytime standards within 500 to 1,600 feet. The project is expected to conform to state noise standards. Compared to the other route alternatives, RA-South would have fewer noise sensitive receptors (NSR) close to the construction workspace but more NSRs within 0.5 mile of an HDD entry. Noise from the operation of the capture

facility is not expected to result in a perceptible increase in the sound levels experienced at NSRs near the capture facility and would not be distinguishable from the noise already produced at the ethanol plant. Operation of the pipeline facilities would not have a noticeable impact on ambient sound levels. Because the project is expected to conform to state noise standards, and the applicant would use barrier walls as needed for mitigating noise from HDDs, overall, for each of the three route alternatives, noise impacts would be temporary, minimal, and short term.

Populated Areas

Populated areas are defined for this analysis as incorporated areas and census-designated places. There would be no impacts on defined populated areas because no populated areas are within 1,600 feet of the route width for any of the three route alternatives. The EIS describes potential impacts on the human environment, regardless of whether they would or would not occur within defined populated areas.

Property Values

A property's value is influenced by a complex interaction of characteristics such as size, location, and improvements. The value of a tract of land is related to many tract-specific variables, including the utilities and services available or accessible, the current land use, and the values of adjacent properties.

Construction-specific impacts on property values would be temporary (less than 6 months), and the applicant would be responsible for any construction-related damages and for returning affected property to its original condition. Impacts on property values during construction would be temporary but could be significant for landowners attempting to sell their properties during project construction. During project operation, landowners could continue activities within the pipeline easement on their property with some restrictions, such as planting trees or building structures.

Although no studies related to the impacts of CO₂ pipelines on property values have been identified, studies for natural gas pipelines have not shown that the proximity of a pipeline affects the sale price or value of residential properties. The applicant states it would indemnify landowners for losses resulting from the applicant's use of easements, which would include increases in property insurance, if incurred. Therefore, impacts on insurance availability and the cost of insurance are anticipated to be minimal. Overall, impacts on property values are anticipated to be minimal, lessen with distance from the pipeline, and be similar for all three route alternatives. However, impacts on specific properties could vary widely.

Public Health and Safety

Construction of the project would have negligible impacts on public health and safety. The presence of construction personnel and equipment could temporarily increase demand for local public services. As with any major construction project, worker health and safety concerns exist. Normal operation of the project would not impact public health and safety. Operational impacts on health and safety would be a concern primarily in the event of an accidental release of CO₂. Depending on the extent and location of a CO₂ release, public health and safety impacts are expected to range between minimal and significant. Local first responders would receive training and equipment related to a potential release; training and equipment would be funded by the applicant. Aerial dispersion modeling and computational fluid dynamics modeling were conducted to estimate the extent of a CO₂ plume in the event of a rupture. Potential impacts on public health and safety are expected to be negligible to minimal, short term, and similar for all three route alternatives. Accident conditions are discussed below under "What are the risks and potential impacts of a CO₂ release?"

Public Services and Infrastructure

Public services and infrastructure include emergency services, hospitals, school districts, and public utilities that serve residents and business. The presence of additional construction personnel could affect law enforcement agencies, fire protection services, and health care facilities in the communities adjacent to the project for all route alternatives. Local emergency services would be able to manage these minor increases during the 6 months of construction. There are no anticipated impacts on schools, public transit, or railroads. Impacts on roads would be minimal and primarily from increased construction traffic. A temporary increase of water use, sewage, and solid waste is anticipated due to the influx of construction workers and materials. The existing utilities would be sufficient to handle the temporary increase. Water for operating the capture facility would be supplied by an existing well at the ethanol plant. During operation, electrical service would be supplied to the capture facility through existing service lines, and the project is not anticipated to require additional power generation capacity. The applicant indicated it would be responsible for all costs associated with the infrastructure upgrades and operation of the capture facility. Public services and infrastructure impacts are anticipated to be short term, negligible to minimal, and similar across the three route alternatives.

Recreation

Recreational facilities could be affected by construction-related impacts on aesthetics, noise, and air quality. All three route alternatives would cross the King of Trails Scenic Byway (US Highway 75). RA-Hybrid and RA-South would cross the Otter Tail River, a state-designated water trail. The project could temporarily impact these recreational resources during construction due to the presence of equipment in the viewshed, generation of dust, removal of vegetation in the viewshed, and increased noise. RA-South would pass through the Fergus Falls Fish & Game Club's Orwell property. The applicant would continue to communicate with the club to minimize visual and noise impacts during construction. RA-North would not cross the Otter Tail River or the Orwell property and would be anticipated to have fewer impacts on recreation than the other two route alternatives. Operation of the project would not cause visual or noise impacts on recreational resources. Recreation impacts are anticipated to be short term and minimal to moderate.

Socioeconomics

Socioeconomics assesses overall social and economic character of an area and the project's effects on the well-being of current and future residents of the affected community. Most impacts would be beneficial. Construction would result in a temporary increase in local population associated with the workers and associated spending from lodging, transportation, and food. The nearby cities have adequate housing and infrastructure to support the additional workers for all three route alternatives. Local labor would also be used, increasing employment in the surrounding area. The applicant estimates the total cost for the project to be \$69.75 million for RA-North, \$70.12 million for RA-Hybrid, and \$66.75 million for RA-South, with a construction payroll of \$37,411,000. The project would increase tax revenues, benefiting the counties and state. Socioeconomic impacts are anticipated to be minimal, short term to long term, and similar across the three route alternatives.

Tribal Treaty Rights

Lands in the local vicinity of the project were ceded to the United States government in two 1851 treaties, and neither treaty that ceded lands within the project area established government-recognized usufructuary hunting or gathering rights within the ceded lands. Therefore, potential impacts on Tribal treaty rights along each of the three route alternatives during construction and operation of the project are expected to be negligible.

Economies

Agriculture

Short-term agricultural impacts would be minimal across the three route alternatives. Long-term agricultural impacts would also be minimal. Agricultural land, including prime farmland, is found across the three route alternatives in similar acreages. During construction, lands would not be available for agricultural production. Easement agreements can compensate landowners for lost crops due to construction. Following construction of the pipeline, agricultural land would be restored, and agricultural activities could resume. Crop production could be reduced in areas disturbed by construction, resulting in long-term impacts from disturbance to soils. Anticipated impacts would be similar across the three route alternatives.

Industrial

Industrial economies encompass industrial property and businesses. An ethanol plant is located at the east end of the three route alternatives. No other industrial facilities exist within the route width of the three alternatives. Construction of the pipeline and capture facility might result in temporary localized traffic delays for workers and delivery of raw materials and products to and from the ethanol plant. Impacts during operation of the pipeline and capture facility are not anticipated. Impacts would be short term and negligible across the three route alternatives.

Tourism

Tourism includes traveling to a destination for recreation or relaxation related activities. Otter Tail and Wilkin Counties offer a variety of recreational opportunities as their primary tourist attraction, such as nature preserves, hiking trails, biking trails, fishing, hunting, snowmobiling, boating, canoeing, kayaking, and swimming. Tourism opportunities are similar for the three route alternatives. Construction would result in temporary and minimal noise, dust, and visual impacts within the local vicinity that could be experienced by tourists in the area. The pipeline facilities would be almost entirely underground during operation and create minimal visual impacts on surrounding areas. The carbon capture facility would be adjacent to the ethanol plant and compatible with its surrounding viewshed. Once construction is finished and the project is in operation, it is not expected to cause any noise or dust impacts on adjacent tourism areas. The project's impacts on tourism economies would be negligible during operation. Impacts on tourism across the three route alternatives would be similar—short term and negligible to minimal.

Archaeological and Historic Resources

Archaeological Resources

Archaeological resources or unrecorded historic cemeteries identified within the project area, but outside the route width, are not expected to be impacted by the project. Known archaeological resources were identified within the route widths for all route alternatives, but none have been determined to be Eligible for or Listed in the National Register of Historic Places (NRHP).

Archaeological potential is based on proximity to waterbodies and the number of previously identified archaeological resources in the project area (area within 1 mile of the route width). Of the three route alternatives, RA-South crosses or is near the most waterbodies, increasing its overall archaeological potential, which is evidenced by the number of sites identified by the applicant's survey. Overall, RA-South has the greatest potential, and RA-North has the lowest potential for archaeological resources to be present. If the previously identified archaeological sites within the route widths that have not been evaluated for the NRHP are determined to be Eligible for listing in the NRHP, construction of the project

could result in moderate, permanent adverse impacts from direct construction activities. If previously identified archaeological resources are determined Not Eligible for listing in the NRHP, construction of the project could result in negligible impacts from direct construction activities.

Historic Architectural Resources

Historic architectural resources identified within the project area of the route alternatives, but outside the route width, are not expected to be impacted by the project. Historic architectural resources were identified within the route widths for all alternatives, but none have been determined to be Eligible for or Listed in the NRHP. Construction of the project would result in negligible impacts on the previously identified Not Eligible historic architectural resources in the project area.

Natural Environment

Air Quality and Greenhouse Gas Emissions

Air quality and GHG emission impacts from the project could contribute to increased levels of air pollution in Minnesota. The project would capture and sequester the biogenic CO₂ produced by the ethanol fermentation process at the ethanol plant. The EIS analyzes air pollutant and GHG emissions from fossil fuel sources that would be used during construction and operation. By capturing and sequestering CO₂ underground, the project would provide a net benefit to GHG emissions because the CO₂ sequestered from ongoing annual operations would outweigh construction and operation emissions. This benefit would vary depending on the capture rate and final end use of the captured CO₂.

Construction impacts would include emissions from construction equipment and vehicles as well as temporary changes in land use along the pipeline ROW. Operational impacts would include emissions from operation of the pipeline and the CO₂ capture facility, including equipment leaks. Construction emissions for the route alternatives would be directly proportional to their lengths. In other words, RA-North would have somewhat lower construction emissions and RA-Hybrid would have somewhat higher emissions compared to RA-South. Operational impacts on air quality would be minimal and would not differ depending on the route alternative.

Climate Change

Climate change is expected to result in increasing temperatures and a greater frequency and intensity of extreme weather events. In Minnesota, climate models have identified the potential for increased rainfall, heat, localized flooding, and persisting drought conditions. The project would contribute to a beneficial effect on climate change, because it would capture and store CO₂ emissions from the ethanol plant.

Concerns were raised during scoping and in comments on the draft EIS that the captured CO₂ from this project would be used for enhanced oil recovery (EOR). Commenters noted that EOR could contribute to further fossil fuel extraction and GHG emissions and defeat the stated purpose of injecting CO₂ into Class VI wells for permanent sequestration. The applicant has indicated that it does not propose or plan to use CO₂ transported by the project for EOR. For the CO₂ to be used in EOR, another pipeline would need to be constructed to transport the CO₂ to an oil and gas field where it is needed. CO₂ from the ethanol plant might contribute to further fossil fuel extraction; the extent of any contribution is highly uncertain. It would be speculative to conclude whether the availability or absence of CO₂ from the ethanol plant would have a significant effect on future oil production and the long-term climate impact of the project.

The pipeline would be buried underground with sufficient cover to protect it from flooding during operation of the project. Any MLVs located in floodplains would be constructed in accordance with floodplain permitting requirements. Drought conditions might require contingency water sources. All route alternatives would face similar impacts resulting from climate change. These impacts would generally be short term and negligible to minimal for construction and negligible for operations.

Geology and Topography

The surficial geology in the area of the project is unconsolidated deposits consisting of till and sandy/silty glacial lake sediment from Pleistocene continental glaciation. Bedrock is generally deeper than 50 feet. The topography in the project area is relatively flat with localized areas of steeper slopes occurring adjacent to waterbodies. No mineral resources are within the construction workspaces for any of the three route alternatives. The risk to the project facilities from geologic hazards such as earthquakes and landslides is low. The applicant would consult with geotechnical engineers and develop a Phase I Geohazard Assessment (and Phase II and Phase III assessments, if needed) for the project to comply with the recommendations of PHMSA Advisory Bulletin 2022-01.

Surface contours would be restored after construction; however, differential settling could occur, causing crowning or subsidence (low areas). The applicant would monitor for and rectify areas of crowning or subsidence caused by settling. With these measures, impacts on geology and topography would be short term and minimal. Impacts would not vary among the route alternatives.

Public and Designated Lands

The only direct impact on public and designated lands would be at one Waterfowl Production Area (WPA), which would be crossed by all three route alternatives. Impacts on the wetland associated with this WPA are not expected. The route width of RA-South would partially overlap with two other WPAs; however, the WPAs would be outside of the construction workspace. Potential project impacts on public and designated lands for all three route alternatives would be short term and negligible.

Rare and Unique Resources

Most vegetation cover occurring along all route alternatives does not provide suitable habitat for rare and unique species. Potential impacts for all three route alternatives would be unique to individual listed species, could vary widely, and would be highly localized and limited to specific habitats. No federally listed species are expected to be directly taken. Indirect impacts on federally listed species would be negligible and could be avoided by following USFWS guidance. No bald or golden eagle nests would be removed or disturbed. There is a potential for take of marbled godwits or their nests, which would be lessened or avoided by conducting surveys ahead of construction. Because this species is already rare, the potential for additional loss of nests during construction and operational maintenance may have a greater local impact. There is also a potential for direct take of four state-listed plants. The loss of individuals from local populations of state-listed plant species could also have a long-term, minimal impact on the population. Potential for take of state-listed plants would be lessened or avoided by conducting surveys ahead of construction as needed. Overall, for each of the three route alternatives, impacts on rare and unique species would be localized, negligible to minimal, and short term.

Soils

Soils in the project area consist mainly of well to poorly drained loams and clays. The route alternatives generally share similar soil characteristics. During construction, vegetation clearing, topsoil removal, and trenching would expose soils and increase the potential for erosion, compaction, and mixing of topsoil with subsoil. The applicant would minimize these impacts by complying with required permits and

implementing the applicant's Minnesota Environmental Construction Plan and Minnesota Agricultural Protection Plan. With these measures, most impacts on soils during construction would be minimal and temporary but some impacts could be long term. Impacts on soils during operation would be negligible.

Frost heave has the potential to cause movement or deformation of pipelines. However, for frost heave to occur, soil freezing must occur below the pipeline, pressing upward on it from below. The minimum depth of the pipeline would be below the maximum depth where soil freezes in this region, except under potentially extreme conditions. The applicant would develop a Phase I Geohazard Assessment for the project that is designed to comply with the recommendations in PHMSA Advisory Bulletin 2022-01. The bulletin advises operators to identify areas surrounding a pipeline that may be prone to large earth movement, including but not limited to slope instability, subsidence, frost heave, soil settlement, erosion, earthquakes, and other dynamic geologic conditions that may pose a safety risk. Impacts would be similar across all three route alternatives.

Vegetation

Vegetation in the construction workspace for the three route alternatives is dominated by cultivated crops. Vegetation associated with developed areas is also prevalent along all three route alternatives. Impacts on agricultural vegetation during construction and operation are lowest for RA-North, due to its shorter length. Agricultural impacts along RA-South and RA-Hybrid are about equal. Otherwise, the relative percent of cover and distribution of non-agricultural vegetation types is similar among all three route alternatives. Impacts on vegetation would result almost entirely from removal and crushing during construction. Indirect impacts include possible introduction of invasive species.

Removal of woody vegetation in forested areas would be long term due to longer regeneration time for woody cover. Forested areas comprise less than 1 acre total for each of the route alternatives. Overall, construction impacts on vegetation are expected to be short term and minimal for all route alternatives, and operational impacts on vegetation would be long term and minimal due to routine maintenance.

Water Resources

None of the three route alternatives would cross lakes, or waters with federal or state designations related to high resource value. The route alternatives would cross a similar number of drainage ditches. RA-North would cross fewer rivers and streams than RA-Hybrid and RA-South. Perennial streams would be crossed using trenchless construction methods, and other waterbodies with flow at the time of construction would be crossed using an isolated dry-trench construction method. Potential impacts on surface waters during construction would be short term and minimal for all route alternatives. Floodplain impacts would be short term and negligible during construction for all three route alternatives.

While there are wells within 1 mile of the route width for all three route alternatives, the majority are outside of the construction workspaces of RA-North and RA-South, and no wells are within the construction workspace of RA-Hybrid. The applicant is coordinating with DNR on a groundwater investigation in the beach ridge system area to define existing conditions and inform construction practices. EERA staff recommends the applicant develop a plan for construction in this area with measures to minimize the potential for an aquifer breach. Construction activities would have temporary, minimal, and localized impacts on groundwater.

Construction of the pipeline would require about 125,000 gallons of water, most of which would be used for hydrostatic testing. This water would come from either groundwater or surface water sources. During operation, the capture facility would require about 13 million gallons per year, which could come

from an existing well at the ethanol plant. For perspective, the ethanol plant withdrew 174 million gallons from its well in 2022, so the capture facility use would represent about a 7 percent increase in water withdrawal from the well. Water supply appropriations would be regulated by DNR-issued permits that would have conditions to minimize impacts on groundwater resources. The applicant would provide a contingency plan that identifies potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of water withdrawals following DNR request, when necessary. DNR would review permit applications and would not issue a permit if the amount of water to be withdrawn would adversely affect the aquifer or other users. In case of drought, DNR would follow its Minnesota Statewide Drought Plan, which provides a framework and staged approach for implementing drought response actions. Therefore, no long-term impacts on water resources are expected during project operation.

Wetlands

Based on the National Wetlands Inventory, most wetlands in the ROI for each route alternative are emergent, with lesser amounts of forested and riverine wetlands. The number of wetland acres within the ROI is much higher for RA-South because the route width for this alternative is increased in one area to allow for additional study and the potential need to make modifications to the alignment, while a similar increase was not included for RA-Hybrid and RA-North. The acreage of wetlands that would be within the construction ROW is relatively small for all three route alternatives, ranging from 0.7 acre for RA-North to 2.7 acres for RA-South. Direct wetland impacts would occur within the construction ROW during pipeline construction.

Impacts on forested wetlands would be slightly higher for RA-Hybrid relative to RA-North and RA-South. Wetland impacts would be minimal and short term in emergent wetlands, and minimal to moderate and longer term in forested wetlands. Indirect impacts on wetlands would be comparable among all three route alternatives and would be negligible to minimal and long term during operation of the project. Wetland impacts would be minimized through implementation of standard best management practices and conditions required under the state and federal permits for work in wetlands. Overall, wetland impacts would be similar among the three route alternatives.

Wildlife and their Habitats

For all three route alternatives, the majority of wildlife species present are common generalist species well-adapted to disturbed habitats and human activities. Wildlife species range from larger mammals to smaller reptiles, amphibians, and invertebrates. Fish, aquatic amphibians, and aquatic invertebrates could be present in intermittent and perennial streams crossed by the route alternatives. Larger, more mobile wildlife species would likely avoid portions of the route width during construction. Smaller, less mobile wildlife species and/or species in burrows could be inadvertently injured or killed by construction equipment. Habitat loss or degradation would be minimal, as most of the route width for all three route alternatives is agricultural land. Areas of higher habitat quality comprise less than 5 percent of the construction workspace and less than 4 percent of the operational ROW for any of the route alternatives.

Perennial waterbodies would be crossed by HDD, thereby avoiding impacts on aquatic wildlife, although localized, short-term impacts could occur in the event of an inadvertent release of drilling mud. Impacts on ground-nesting birds could occur as part of clearing and trenching activities, and raptor nests if present, may need to be relocated. Impacts on the overall viability of local avian species populations would be short term and negligible.

Overall, potential impacts on wildlife would be comparable across all three route alternatives. Impacts on wildlife populations would be localized, short term, and negligible. Impacts on freshwater species are expected to be minimized by the use of HDD techniques and sediment controls. Operation of the project would have long-term, minimal impacts on wildlife and their habitats.

What are the risks and potential impacts of a CO₂ release?

The piping and aboveground facilities associated with the project must be designed, constructed, operated, and maintained in accordance with the Pipeline and Hazardous Materials Safety Administration (PHMSA) Minimum Federal Safety Standards. Pipeline design, installation, and operation would incorporate measures to minimize the risks of an accidental release. To further reduce the potential for an accidental release, the applicant has committed to additional measures that would exceed current PHMSA safety standards. PHMSA is currently in the process of updating its CO₂ pipeline safety standards.

There are two types of accidental releases discussed in this EIS: leaks and ruptures. Leaks can occur from a small opening, crack, or hole in a pipeline. A rupture occurs when the pipeline breaks open or bursts. Based on PHMSA's data for accidental pipeline releases, rupture is the least common form of CO₂ pipeline accident.

Pipeline leaks create a significantly lower hazard than pipeline ruptures. Leaks can be detected during routine pipeline inspections, and are not necessarily hazardous, depending on their location and size. In the vicinity of a leak, liquid CO₂ will escape and immediately vaporize and expand. Leaks would have negligible to minimal impacts, depending on the resource.

The initial release associated with a rupture of a CO₂ pipeline transporting pressurized liquid can be explosive in the immediate area. Like a leak, in the vicinity of a rupture, liquid CO₂ will escape and immediately vaporize and expand. Because CO₂ is denser than air, a plume can settle into lower-lying areas, displacing oxygen. The CO₂ plume can flow for a distance from the pipeline. This distance is impacted by a variety of factors, including wind speed, temperature, and pressure.

An accidental release of CO₂ from a rupture could expose humans and terrestrial and aquatic animals to dangerous levels of CO₂ resulting in asphyxiation (unconsciousness or death) from CO₂ gas, blast injury, or exposure to very cold solid CO₂. Vegetation in contact with a CO₂ plume would likely be frozen. Impacts on vegetation might be short term (row crops) or long term (trees). A pipeline rupture could damage previously unidentified buried archaeological and cultural resources. A large release of CO₂ into a stream or wetland could temporarily acidify water or soil in the immediate vicinity. If a rupture occurs, impacts on resources would be minimal to significant, depending on the extent and location. Impacts would be similar across the three route alternatives.

Dispersion modeling was conducted to determine the extent and duration of a release of CO₂ during a potential pipeline rupture. Using conservative assumptions, the maximum distance at which CO₂ concentrations from a pipeline rupture could reach levels that are immediately dangerous to life and health was calculated to be 617 feet. The distance at which CO₂ concentrations could reach the maximum time-weighted average concentration to which a person could be exposed over a 15-minute period without injury was calculated to be 701 feet. The impact distance at which CO₂ concentrations could reach levels that could cause mild respiratory stimulation of some people was calculated to be 910 feet. The applicant is required to develop a plan that follows federal guidelines to respond to any emergency on the pipeline, including an accidental release of CO₂.

A 2020 CO₂ pipeline rupture near Satartia, Mississippi, caused 45 people to be taken to the hospital and 200 people to be evacuated. No fatalities occurred, and the PHMSA Failure Investigation Report did not identify any harm to wildlife or water resources from the CO₂ release. The cause of the rupture was a landslide caused by heavy rains. In addition to being the main factor in causing the rupture, the steep topography in the area also prevented the CO₂ vapor from dispersing rapidly. Several additional factors contributed to the accidental release and emergency response issues, including failure to: (1) consider geohazards, (2) correctly model the impacts of a release on Satartia, (3) include Satartia in the pipeline operator's public awareness program and emergency response plans, and (4) inform emergency providers of the presence of the CO₂ pipeline.

The CO₂ pipeline that ruptured near Satartia was 24 inches in diameter compared to the 4-inch-diameter pipeline proposed for this project. Topography in the area of the proposed project is relatively flat, so landslides would not pose a risk to the pipeline. The applicant of the proposed project has conducted its release modelling after an updated advisory bulletin from PHMSA, ensuring similar mistakes in the dispersion modelling were avoided. Furthermore, the applicant would implement public and emergency response awareness programs and comply with new PHMSA regulations for CO₂ pipelines once established. EERA staff acknowledges that the timing of PHMSA's planned updates to its CO₂ pipeline safety regulations is unknown, meaning pipeline construction might not incorporate these regulations. However, the applicant has committed to measures that would exceed current PHMSA safety standards.

What's next?

You can provide comments during the public hearings on the adequacy of the final EIS. You can also provide comments on a routing permit for the project. After the public hearings, the administrative law judge will prepare a report for the Commission with findings, conclusions, and recommendations. The Commission is anticipated to make a pipeline routing permit decision for this project in the fourth quarter of 2024.

Now that the final EIS is complete and has been made available, a public comment period on the adequacy of the EIS is now open. Public comments regarding (1) the adequacy of the final EIS and (2) a routing permit for the project will be accepted through September 11, 2024, at 4:00 p.m. Public hearings concerning the project will be held in August 2024. Notice of the public hearings and associated comment period will be issued separately.

An administrative law judge (ALJ) will preside over the hearings. Interested persons will have the opportunity to speak at the hearings, ask questions, and submit comments. The ALJ will provide the Commission with a written report summarizing the public hearing and comment period, and any spoken or written comments received (ALJ Report). In the ALJ Report, the ALJ will also provide the Commission with proposed findings of fact, conclusions of law, and recommendations regarding a routing permit for the project. The record developed during the environmental review process—including all public input received during the public hearing and comment period—will be considered by the Commission when it makes a routing permit decision.

The Commission will consider the entirety of the project record, including environmental review completed through the EIS process, and will determine whether to issue a pipeline routing permit. A pipeline routing permit decision for this project is anticipated in the fourth quarter of 2024.

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Appendix L: Minnesota Unanticipated Discoveries Plan

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Appendix N: Applicant's Draft Emergency Response Plan

Appendix O: Comments on the Draft EIS and Responses

Acronyms and Abbreviations

°F degrees Fahrenheit

AC/DC alternating current/direct current

AD Report Aerial and Thermal Dispersion Report

ALJ administrative law judge

Allied Allied Solutions, Inc.

ANSI American National Standards Institute

API American Petroleum Institute

APP Agricultural Protection Plan

applicant Summit Carbon Solutions, LLC

AQI Air Quality Index

ASME American Society of Mechanical Engineers

BMP best management practice

BWSR Board of Water and Soil Resources

CARB California Air Resources Board

CDP census-designated place

CFD computational fluid dynamics

CFR Code of Federal Regulations

CH₄ methane

CI score carbon intensity score

CO carbon monoxide

CO₂ carbon dioxide

CO₂e carbon dioxide equivalents

Commerce Department of Commerce

Commission Minnesota Public Utilities Commission

CRP Conservation Reserve Program

CRU Cultural Resource Unit

CSW Permit Construction Stormwater Permit

CURE Clean Up the River Environment

dB decibels

dBA decibels on the A-weighted scale

DDGS dried distiller's grains with solubles

DNR Department of Natural Resources

DOE United States Department of Energy

DPM diesel particulate matter

EAW environmental assessment worksheet

ECP Environmental Construction Plan

EERA Energy Environmental Review and Analysis

EIS environmental impact statement

EJ environmental justice

EOR enhanced oil recovery

EPA	United States Environmental Protection Agency
EQB	Environmental Quality Board
ethanol plant	Green Plains Ethanol Plant
FEMA	Federal Emergency Management Agency
gCO₂e/MJ	grams of CO ₂ e per megajoule of energy
GHG	greenhouse gas
GRE	Great River Energy
REET	Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation
HAP	hazardous air pollutant
HDD	horizontal directional drill
I-94	Interstate 94
IMU	internal measurement unit
IPaC	Information for Planning and Consultation
kgCO₂e/MMBtu	kilograms of CO ₂ e per Metric Million British thermal units
kWh	kilowatt hours
LCA	life cycle analysis
LCFS	low-carbon fuel standard
LGU	Local Government Unit
MBS	Minnesota Biological Survey
MCE	Midwest Carbon Express
MDA	Department of Agriculture
MDH	Department of Health
Minn. R.	Minnesota Rule
Minn. Stat.	Minnesota Statute
MLV	mainline valve
MMTPA	million metric tons per annum
MnDOT	Department of Transportation
MnRISKS	Minnesota Statewide Screening of Health Risks from Air Pollution
MP	milepost
MPCA	Minnesota Pollution Control Agency
MS 433	Mississippi Highway 433
MWh	megawatt hour
N₂O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NHIS	Natural Heritage Information System
NIMS	National Incident Management System
NLCD	National Land Cover Database
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPRM	Notice of Proposed Rulemaking
NRHP	National Register of Historic Places
NSR	noise sensitive receptors

NWI	National Wetlands Inventory
PHMSA	Pipeline and Hazardous Materials Safety Administration
PM	particulate matter
PM_{2.5}	particulate matter equal to or less than 2.5 microns in diameter
PM₁₀	particulate matter equal to or less than 10 microns in diameter
ppm	parts per million
project	Otter Tail to Wilkin Carbon Dioxide (CO ₂) Pipeline Project
psi	pounds per square inch
psig	pounds per square inch gauge
RA-Hybrid	Route Alternative – Hybrid
RA-North	Route Alternative – North
RA-South	Route Alternative – South
ROI	region of influence
ROW	right-of-way
SBS	Sites of Biodiversity Significance
SDS	State Disposal System
SGCN	Species in Greatest Conservation Need
SHPO	State Historic Preservation Office
SO₂	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasure
SSM	Startup, shutdown, and malfunction
SSURGO	Soil Survey Geographic Database
tpy	tons per year
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
VMP	Vegetation Management Plan
VMPWG	Vegetation Management Plan Working Group
VOC	volatile organic compound
WMA	Wildlife Management Area
WPA	Waterfowl Production Area

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Chapter 1 Introduction

The Department of Commerce (Commerce) prepared this environmental impact statement (EIS) on behalf of the Minnesota Public Utilities Commission (Commission) for the Otter Tail to Wilkin Carbon Dioxide (CO₂) Pipeline Project (project). The project is proposed by Summit Carbon Solutions, LLC, referred to herein as the applicant.

The vertical line in the margin identifies text that is new or modified in the final EIS and differs materially from corresponding text in the draft EIS. Changes were made to address public comments on the draft EIS.

1.1 What does the applicant propose to construct?

The project consists of a CO₂ capture facility and 28.1 miles of pipeline that would transport captured CO₂.

The applicant proposes to construct and operate approximately 28.1 miles of 4-inch-diameter¹ carbon steel pipeline and associated facilities for the transport and sequestration of CO₂ from the Green Plains Ethanol Plant (ethanol plant). The project would extend from the ethanol plant near Fergus Falls in Otter Tail County, Minnesota, west to the Minnesota-North Dakota border near Breckenridge in Wilkin County, Minnesota. Associated facilities would include:

- a CO₂ capture facility at the ethanol plant;
- a pipeline pig/inspection tool launcher at the ethanol plant;
- five mainline valves (MLV) and an impressed current cathodic protection system within the pipeline operational right-of-way (ROW);
- temporary and permanent access roads.

The project is designed to capture approximately 0.19 million metric tons per annum (MMTPA) of the CO₂ generated by the ethanol plant.

1.2 What is the project's purpose?

In summary, the project's purpose is to capture CO₂ from the ethanol plant and transport it to the North Dakota border, enhancing the marketability of the ethanol produced at the ethanol plant.

As stated in the Commission's September 26, 2023, *Order Approving Scope of Environmental Review and Denying Stay*, the purpose of the project is to "capture and transport [CO₂] from the Green Plains ethanol plant via pipeline to permanent underground sequestration facilities in North Dakota and reduce the carbon-intensity score of ethanol produced at the Green Plains ethanol plant and enhance its marketability in low-carbon fuel standard markets."²

The applicant has a CO₂ offtake agreement with the ethanol plant. The project would offer the ethanol plant a viable option to capture, transport, and permanently store its CO₂ emissions and continue to be competitive with other ethanol facilities that can capture and permanently store CO₂. Because the project would capture the ethanol plant's CO₂ for permanent sequestration, the carbon intensity score, or carbon footprint, of the ethanol plant's ethanol would be reduced by an estimated 40 percent, improving the ethanol plant's ability to compete in low-carbon fuel standard (LCFS) markets.

The pipeline would be part of a larger applicant-proposed CO₂ pipeline network, referred to as the Midwest Carbon Express (MCE) Project. While the project reviewed in this EIS ends at the Minnesota-North Dakota border, the pipeline itself would continue into North Dakota and interconnect with the larger MCE pipeline system to transport the CO₂ to a sequestration area in North Dakota. There, the CO₂ would be stored underground in saline formations using federal Class VI injection wells permitted by the state of North Dakota, which has primary enforcement authority for these types of wells in North Dakota.

The Commission considered whether to study the full MCE project in this EIS but determined that analysis of solely the proposed project was appropriate.³

1.3 What is the public's role?

Minnesota needs the public's help to make an informed decision.

During scoping, you told us your concerns about the project so that we could collect the right facts. At the upcoming public meetings and hearings, you can tell us what those facts mean and if you think we have represented them correctly. Your help in pulling together the facts and determining what they mean will help the Commission make informed decisions regarding the project.

1.4 What is the State of Minnesota's role?

The Commission will make a permit decision that is informed by this EIS as well as public meetings, public hearings, and comment periods.

Before constructing the project, the applicant needs a pipeline routing permit from the Commission. A routing permit determines where the project would be located and how impacts must be mitigated. Additionally, if the Commission grants a routing permit, other state, federal, and local permits might be required. The applicant must obtain these other permits before construction begins.

To ensure a fair and robust airing of the issues, the Commission follows an environmental review and permitting process when considering routing permit applications.⁴ On February 6, 2023, the Commission determined the routing permit application⁵ was complete and required that an EIS be prepared in accordance with Minnesota Rules 4410 and 7852.⁶ The Commission subsequently approved the scope of the EIS.⁷

Energy Environmental Review and Analysis (EERA) staff within Commerce prepared this EIS. An EIS contains an overview of affected resources and discusses potential human and environmental impacts and mitigation measures. EERA has prepared this final EIS based on public comments.

1.5 How is this document organized?

The EIS is organized to address the matters identified in the Commission's scoping decision.

This EIS addresses the matters identified by the Commission in its September 26, 2023, *Order Approving Scope of the Environmental Review and Denying Stay*.⁸ The scoping decision is based on public input gathered at four public meetings and during an associated comment period (see **Appendix A**). The EIS is organized as follows:

- **Chapter 1 Introduction** provides a brief overview of this document and the project.

- **Chapter 2 Project Information** describes the project—its design, construction, operation, and decommissioning.
- **Chapter 3 Regulatory Framework** describes the necessary authorization from the Commission and required approvals from federal and state agencies, local units of government, and others with permitting authority for actions related to the project.
- **Chapter 4 Alternatives** describes alternative pipeline routes and alternatives to the project itself, including a no action alternative, that were included in the scoping decision.
- **Chapter 5 Potential Impacts and Mitigation for Alternative Routes** discusses the environmental setting and details potential human and environmental impacts and mitigative measures for the three alternative pipeline routes.
- **Chapter 6 Potential Impacts and Mitigation for Other Alternatives** details alternative technologies to the project itself and discusses potential human and environmental impacts and mitigative measures for these technologies.
- **Chapter 7 No Action Alternative** discusses potential human and environmental impacts from not constructing the project.
- **Chapter 8 Accidental Release of CO₂** assesses the impacts of an unanticipated release of CO₂ in the event of a pipeline rupture based on the rupture analysis contained in **Appendix G**.
- **Chapter 9 Unavoidable Impacts and Irreversible and Irrecoverable Commitments of Resources** identifies impacts that cannot be avoided and commitments of resources that would be impossible or very difficult to redirect to a different future use or that would not be recoverable for later use by future generations.
- **Chapter 10 Cumulative Impacts** summarizes the potential cumulative effects of the project with other projects in the environmentally relevant area.
- **Chapter 11 Application of Route Selection Criteria** applies input from the public and the information available in the routing permit application, the scoping environmental assessment worksheet (EAW), and this EIS to the routing factors listed in Minnesota Rule 7852.2000.
- **Chapter 12 List of Preparers** lists the names of the people who prepared this EIS.

Consistent with the scoping decision, the EIS does not consider the following:

- Any alternative not specifically identified for study in the scoping decision.
- The two additional MCE Project pipelines proposed for south-central Minnesota.
- Easements and acquisition of land for the pipeline.
- The appropriateness of federal and state policies regarding carbon capture and ethanol. The EIS may reference these policies; however, the EIS will take no position for or against these policies.
- The appropriateness of United States Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) regulations and related standards for CO₂ pipelines. The EIS may reference certain PHMSA standards; however, the EIS will not address the adequacy of these standards.

1.6 What's next?

Your input on the draft EIS has been incorporated into this final EIS. Public hearings will be held with an associated public comment period. An administrative law judge (ALJ) will consolidate public comments, prepare a report, and make recommendations for the Commission to consider. The Commission will then review the record and decide whether to grant a routing permit.

Now that the final EIS has been issued, an ALJ with the Office of Administrative Hearings will hold public hearings in the project area with an associated comment period to allow the public to comment on the project. Comments on the adequacy of the EIS can also be submitted during this public comment period. The ALJ will consolidate comments from the public, other interested stakeholders, and government agencies into a written report. The ALJ will submit this report and recommendations to the Commission. The record developed during this process—including all public input—will be available to the Commission when it makes a routing permit decision. More information on this process is provided in Chapter 3.

The Commission is expected to make a routing permit decision in winter 2024.

1.7 Where do I get more information?

For additional information, don't hesitate to contact Commission or Commerce staff. If you would like more information or if you have questions, please contact the Commission public advisor: Sam Lobby (publicadvisor.puc@state.mn.us), (651) 201-2251 or Commerce staff: Andrew Levi (andrew.levi@state.mn.us), (651) 539-1840.

Project documents, including the routing permit application and scoping EAW can be found on eDockets at <https://www.edockets.state.mn.us/EFiling/search.jsp> by searching "22" for year and "422" for number. Information is also available on the Commerce webpage: <https://eera.web.commerce.state.mn.us/web/project/14959>.

¹ A 4-inch nominal diameter pipeline has an outside diameter of 4.5 inches.

² Commission. September 26, 2023. *Order Approving Scope of Environmental Review and Denying Stay*. [eDockets No. 20239-199149-01](#).

³ Commission. September 26, 2023. *Order Approving Scope of Environmental Review and Denying Stay*. [eDockets No. 20239-199149-01](#).

⁴ See generally [Minnesota Statute 216G](#) and [Minnesota Rule 7852](#).

⁵ Summit Carbon Solutions. September 12, 2022. Route Permit Application. [eDockets No. 20229-189023-02](#) and [20229-189023-03](#) and appendices.

⁶ Commission. February 6, 2023. *Order Accepting Application, Requiring Environmental Impact Statement, and Denying Petition; Notice and Order for Hearing*. [eDockets No. 20232-192950-01](#).

⁷ Commission. September 26, 2023. *Order Approving Scope of Environmental Review and Denying Stay*. [eDockets No. 20239-199149-01](#).

⁸ Department of Commerce, Energy Environmental Review and Analysis. October 5, 2023. Final Scoping Decision. [eDockets No. 202310-199403-01](#).

Chapter 2 Project Information

Chapter 2 describes how the project would be designed, constructed, operated, maintained, and decommissioned. Unless otherwise noted, the sources of information for this chapter are the routing permit application, the scoping EAW,¹ and supplemental information provided by the applicant (see **Appendix I**).

The applicant is designing the project but would hire contractors to construct the pipeline, restore the ROW, and other activities. Because the applicant would direct the work of the contractors, the EIS refers to the applicant as the entity that would conduct all project activities.

2.1 Applicant's Proposed Project

The applicant would construct and operate a CO₂ capture facility at the ethanol plant in Fergus Falls and an approximately 28-mile-long, 4-inch-diameter pipeline to transport the captured CO₂ west across Otter Tail and Wilkin Counties to the Minnesota-North Dakota border and the Bois de Sioux River. The ethanol plant produces CO₂ as part of its fermentation process; this is the CO₂ that would be captured by the project. The applicant indicates the project would capture and transport 524 metric tons of CO₂ per day—approximately 0.19 MMTPA assuming a 355-day operational year and a 100 percent capture rate. The CO₂ capture rate is discussed in more detail in Section 2.3.1.

Following construction, the applicant indicates that land would be restored to pre-construction conditions and would remain suitable for farming, pasturing, and other activities. Structures and trees within the operational ROW would be restricted. Permanent roads would also be established to access aboveground MLV sites.

The project would connect to a larger CO₂ system known as the MCE Project. The MCE Project would include approximately 2,000 miles of pipeline for the capture and transportation of CO₂ from 32 ethanol plants across five states to permitted underground sequestration facilities in North Dakota (see **Figure 2-1**). The MCE Project is in the permitting phase across the five-state footprint. In North Dakota, the applicant is submitting supplemental information and preparing for additional hearings as part of the reconsideration process before the North Dakota Public Service Commission. The applicant expects to submit additional routing permit applications in the future. The applicant anticipates having permits in hand to begin construction of portions of the project by first quarter 2025 and plans to begin operation by late 2026. Following publication of the draft EIS, the applicant provided the following updates related to the MCE Project:

- In Iowa, the Iowa Utilities Board hearings are now complete, and the Board approved the project in Iowa on June 25, 2024.²
- In South Dakota, the applicant plans to submit a permit application to the South Dakota Public Utilities Commission in Q2 2024. South Dakota's permitting process is anticipated to take up to 1 year to complete.
- In North Dakota, the applicant has submitted supplemental information and anticipates a final hearing will be scheduled in Q2 2024 as part of the reconsideration process before the North Dakota Public Service Commission.
- In Nebraska, permitting is underway and occurs at the county level.
- On January 29, 2024, the applicant announced a strategic partnership with POET, LLC to add 17 of POET's biorefining facilities in Iowa and South Dakota to the applicant's pipeline network.

Following construction, the applicant indicates that land would be restored to pre-construction conditions and would remain suitable for farming, pasturing, and other activities. Structures and trees within the operational ROW would be restricted. Permanent roads would also be established to access aboveground MLV sites.

As noted above, the CO₂ captured by the proposed project would be transported to North Dakota for permanent storage approximately 1 mile underground in secure geologic formations across three CO₂ storage facilities. The captured CO₂ would be injected into the Broom Creek Formation, a sandstone reservoir and saline aquifer. Although the sequestration facilities are not part of the project analyzed in this EIS, the following information is provided to help the reader understand the potential for leakage and monitoring and maintenance requirements at the sequestration facilities.

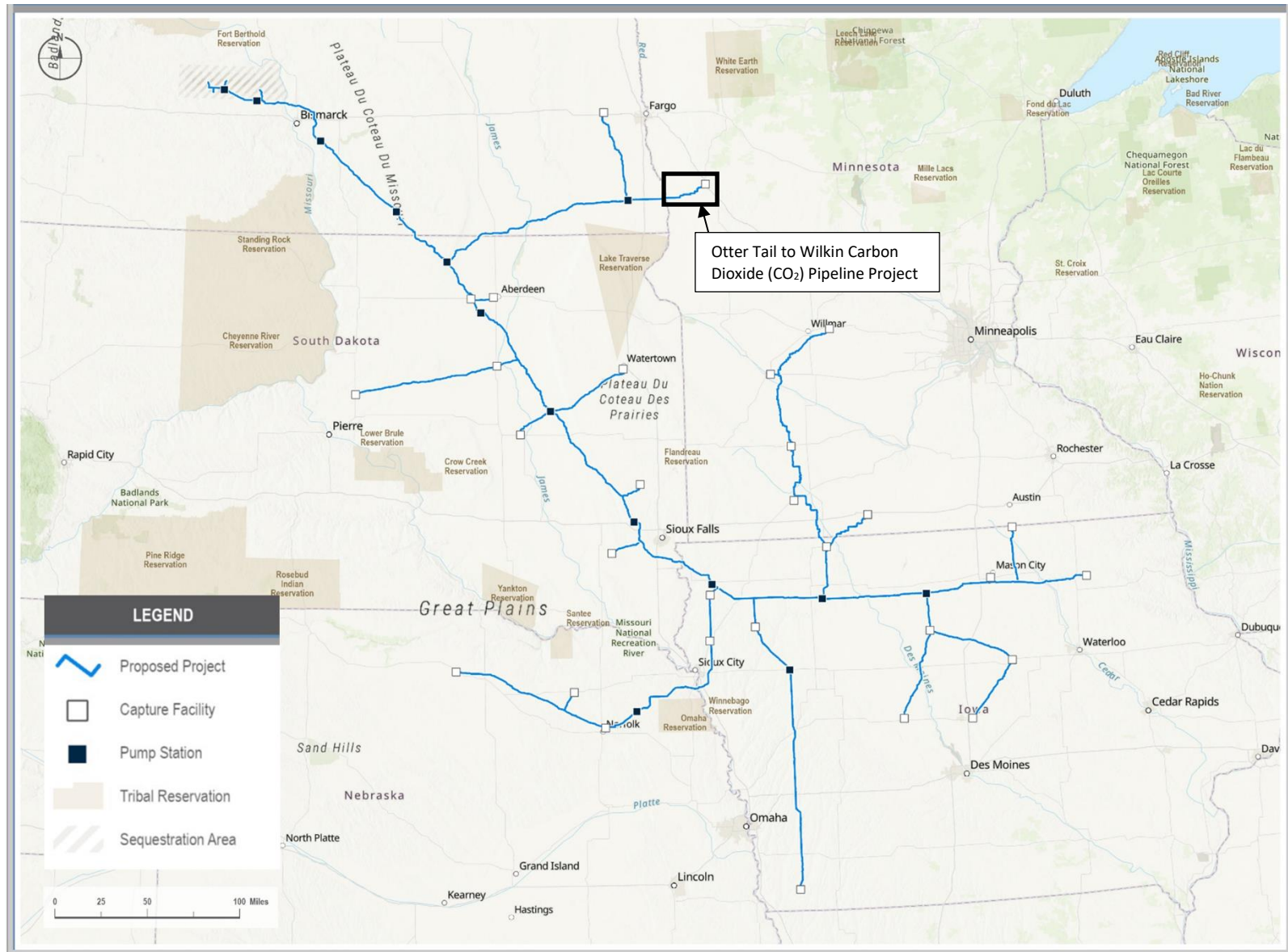
A detailed evaluation of site geology and reservoir characteristics for the proposed storage facilities is provided in draft CO₂ storage facility permits issued by the North Dakota Department of Mineral Resources Oil and Gas Division.³ The Broom Creek Formation and its CO₂ storage potential have been the subject of numerous studies conducted by the North Dakota Geological Survey, the U.S. Geological Survey, and the Energy & Environmental Research Center. The studies gave the formation a superior rating for quality, depth, impermeable upper and lower confining zones, and expansive areal extent. The applicant collected data and completed a detailed characterization of the injection and confining zones, using seismic surveys and stratigraphic wells, to confirm that the injected CO₂ would remain permanently stored in the subsurface.

As a condition of the storage facility permits, the storage operator is required to properly operate and maintain all storage facilities with effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. Additional conditions require the storage operator to prepare, maintain, and comply with a testing and monitoring plan; establish mechanical integrity prior to commencing injection and maintain mechanical integrity after injection; and comply with leak detection and reporting requirements.

The applicant's testing and monitoring plan for the storage facilities includes: (1) a plan for analyzing the captured CO₂ stream, (2) leak detection and corrosion-monitoring plans for surface facilities and all wells associated with the geologic CO₂ storage project, (3) a well logging and testing plan, (4) an environmental monitoring plan to verify the injected CO₂ is contained in the storage reservoir, and (5) a quality assurance and surveillance plan.

The applicant's post-injection site care and facility closure plan, included in the draft CO₂ storage facility permits, describes the activities that would follow the cessation of CO₂ injection to achieve final closure and issuance of a certificate of project completion from North Dakota. The post-injection testing and monitoring data would be used to determine that the injected CO₂ plume is stable.

Figure 2-1 Overview of Proposed Midwest Carbon Express Project



2.2 Route Width and Right-of-Way Requirements

A route is the location of a pipeline between two end points. The width of the route, or route width, is typically wider than the actual ROW needed to construct and operate the pipeline. This extra width provides flexibility when constructing the pipeline but is not so wide that it is impossible to determine where the pipeline would be constructed, which makes it possible to analyze potential impacts. The route width is a temporary designation. Construction and operational ROW are needed for construction and safe operation of the pipeline. These ROW must be located within the route width.

The applicant requested a 500-foot route width for most of its proposed route. However, in some areas the requested route width is wider, up to 1,808 feet, allowing for additional route study and the potential need to make modifications to the pipeline alignment.

The applicant generally proposes a construction workspace width of 100 feet in uplands and 75 feet at crossings of wetlands and waterbodies. This is where construction activities would occur. The construction workspace must be within the route width. Some locations, such as at waterbody and road crossings, would require additional temporary workspace for specialized construction methods. Additional temporary workspace is typically used to stage equipment near waterbody, wetland, road, railroad, and foreign utility crossings, steep slopes, and for staging equipment and materials for specialized construction methods. The construction workspace would be reduced to 50 feet wide at horizontal directional drill (HDD) or bore crossings of waterbodies, roads, and railroads.

The applicant is not proposing to use any construction or staging yards for the project. The applicant states that it would use construction yards in North Dakota to support construction of the project. Some equipment would be used and occasionally parked within existing disturbed areas at the ethanol plant; however, this location would not serve as a formal construction yard. If construction yards are determined to be necessary, the applicant states that it would obtain all permits and authorizations for yards prior to use. The applicant would use temporary roads to access the construction workspace and permanent access roads to access aboveground facilities during operation. The maps in **Appendix B** show the proposed construction workspace configurations at each of these features.

The applicant would retain a 50-foot-wide operational ROW centered over the pipeline for inspection and maintenance access during operation. The widths of the construction workspace and operational ROW could be reduced due to land restrictions. **Appendix B** contains an overview map and detailed maps of each route alternative that show route widths, construction workspaces, and the operational ROW. Although two of the alternative routes have not undergone the same level of engineering design as the route proposed by the applicant, EERA staff have coordinated with the applicant to develop footprints of the construction workspace in sufficient detail to allow a reasonable comparison of impacts among the three route alternatives.

2.3 Engineering and Design

2.3.1 Capture Facility

The CO₂ capture facility would be constructed at the ethanol plant.

The CO₂ capture facility constructed at the ethanol plant would collect the CO₂ gas produced during the ethanol fermentation process and then would compress, dehydrate, and cool the CO₂ to a dense phase so that it could be transported through the pipeline. High purity CO₂ (that is, greater than 96 percent

CO₂) would be captured from the ethanol fermentation process near ambient temperature and pressure. The facility would be connected to the vent from the existing CO₂ fermentation scrubber.

The applicant states that the proposed project would be capable of capturing 100 percent of the CO₂ emitted by the ethanol plant's CO₂ scrubber stack while the capture facility is operational. Other CO₂ emissions from the ethanol plant, such as fired heater emissions and yeast growth emissions, are not intended or designed to be captured by the Project. Overall, the system is designed to capture greater than 95 percent of CO₂ emissions from ethanol. This design rate includes any losses at the capture site as well as pipeline transportation and geological storage.

Commenters questioned whether the project would be able to capture 100 percent of the ethanol plant's emissions. Chapters 5 and 6 evaluate scenarios where the CO₂ capture rate is lower—namely, 70 percent, 40 percent, and 10 percent.

The capture facility would consist of piping, valves, vessels, electrical and instrumentation components, dehydration equipment, compressors, a cooling system, a pump, metering equipment, and other components. The compressors, associated vessels, and pump would be housed in a structure; the blower, scrubbers, compressor intercoolers/aftercooler, and dehydration equipment would be outdoors. The outdoor area containing capture facility equipment would be graveled. All outdoor vessels and pipes would have heat tracing and insulation. Electricity, provided via underground cable from an existing Lake Region Electric Cooperative substation adjacent to the ethanol plant, would be the only source of power. The applicant estimates that operation of the project would use approximately 38,501,733 kilowatt hours (kWh) of electricity per year. The capture facility would include instrumentation to allow metering as well as on-site and remote operation. **Appendix C** shows the layout of the CO₂ capture facility.

2.3.2 Pipeline

Pipeline construction practices are similar for all route alternatives. The pipeline facilities also include MLVs, pipeline inspection facilities, and cathodic protection systems to prevent corrosion.

The project includes a 4-inch-diameter high-strength steel pipeline that would cross approximately 28.1 miles (10.8 miles in Otter Tail County and 17.3 miles in Wilkin County). The pipeline would originate at milepost (MP) 0.0 at the capture facility and would transport the captured CO₂ west to the Minnesota-North Dakota border at the Bois de Sioux River at MP 28.1 (see **Figure 2-1** and the overview map in **Appendix B**). All route alternatives would also originate at MP 0.0 and similarly would transport captured CO₂ west to the Minnesota-North Dakota border. The pipeline would have an operating pressure range between 1,200 and 2,150 pounds per square inch (psi).

The applicant states that the pipeline would be constructed of high-strength carbon steel pipe that meets the American Petroleum Institute (API) 5L Pipe Specification. API 5L is the industry standard specification for the seamless and welded steel line pipes used in pipeline transportation systems. It would be manufactured in the United States using a high-frequency longitudinal welded process. The proposed pipeline and associated facilities would be designed, constructed, inspected, tested, and operated in accordance with applicable requirements and regulations, including the USDOT PHMSA regulations in Title 49 Code of Federal Regulations (CFR) Part 195, Transportation of Hazardous Liquids by Pipeline; American Society of Mechanical Engineers (ASME) Standard B31.4, Pipeline Transportation Systems for Liquids and Slurries; API Standard 1104, Welding Pipelines and Related Facilities; and other standards, practices, and guidelines referenced by USDOT and ASME.

The applicant would apply an external fusion-bonded epoxy coating to the pipeline prior to installation to protect against corrosion. HDD crossings would also have an abrasion-resistant overcoat installed as a secondary coating prior to installation. In addition, the applicant would install an impressed current cathodic protection system (cathodic protection system) and electrical mitigation along the pipeline as further described in Section 2.3.2.2.

2.3.2.1 Mainline Valves

The applicant proposes to construct five MLVs along the project: one at the capture facility (MP 0.0), one at MP 4.8, one on each side of the Otter Tail River (MPs 18.8 and 20.4), and one east of the Bois de Sioux River (MP 27.8). The purpose of an MLV is to isolate segments of the pipeline to contain the dense phase CO₂ during both normal and abnormal operations. MLVs would be 4-inch-diameter sectionalizing block valves constructed within a graveled 50-foot-wide by 50-foot-long footprint within the operational ROW.

The applicant indicates that spacing intervals between the MLVs were designed in accordance with PHMSA requirements⁴ and take into account CO₂ release dispersion modeling, risk assessments, the potential to impact populated areas and sensitive environmental areas, and other topographic and environmental considerations. The applicant would be able to operate all MLVs remotely. All remotely operated valves would be either solar powered or utility powered and connected to the applicant's control center in Ames, Iowa, through the most reliable public communications network available. MLVs and other aboveground facilities would be surrounded by a locked chain-link fence to limit physical access.

2.3.2.2 Inspection and Corrosion Protection Facilities

A pipeline internal inspection tool (commonly referred to as a “pig”) launcher would be installed at the beginning of the pipeline within the CO₂ capture facility to allow the applicant to insert internal inspection tools that can travel down the pipeline and gather information regarding pipeline integrity.

The applicant would install a cathodic protection system designed to protect the pipeline from corrosion. In addition, the applicant would install alternating current/direct current (AC/DC) mitigation systems within the operational ROW where necessary to protect the pipeline and the cathodic protection system from corrosive electromagnetic voltage and stray current from nearby electric powerlines. The cathodic protection system would have some minor aboveground components that would be designed and constructed to minimize long-term surface impacts. These components would be located within the fenced area of the MLV sites.

2.3.2.3 Access Roads

Existing public roads and private driveways would be used to access the pipeline construction workspace. In addition, the applicant would build four temporary access roads to access the construction workspace where existing public roads do not exist, and four permanent access roads, as listed in **Table 2-1**. Temporary access roads would be 30 feet wide and would be restored after use. Permanent access roads would be 20 feet wide.

Four of the permanent access roads would be new and would extend to the MLVs along the pipeline. The fifth permanent access road is an existing road that would be upgraded and would extend to the MLV collocated with the CO₂ capture facility. These permanent access roads would be used both during construction and operation. The permanent roads would be designed to applicable standards.

Table 2-1 Access Roads

County	Access Road Name	Milepost	Length (feet)	Acres
Temporary Access Roads				
Otter Tail	TAR-MNL-321-MP.0-1	0.0	1,466	1.0
Otter Tail	TAR-MNL-321-MP3.3-1	3.3	2,030	1.4
Wilkin	TAR-MNL-321-MP19.5-1	20.0	76	<0.1
Wilkin	TAR-MNL-321-MP24.0-1	24.6	20	<0.1
Total			3,591	2.5
Permanent Access Roads				
Otter Tail	PAR-MNL-321-MP.0-1	0.0	1,292	0.9
Otter Tail	PAR-MNL-321-MP4.8-2	4.8	20	<0.1
Wilkin	PAR-MNL-321-MP18.1-1	18.7	45	<0.1
Wilkin	PAR-MNL-321-MP19.7-1	20.3	34	<0.1
Wilkin	PAR-MNL-321-MP26.9-1	27.4	74	<0.1
Total			1,465	1.0

Note: The sum of addends might not total due to rounding.

2.4 Construction

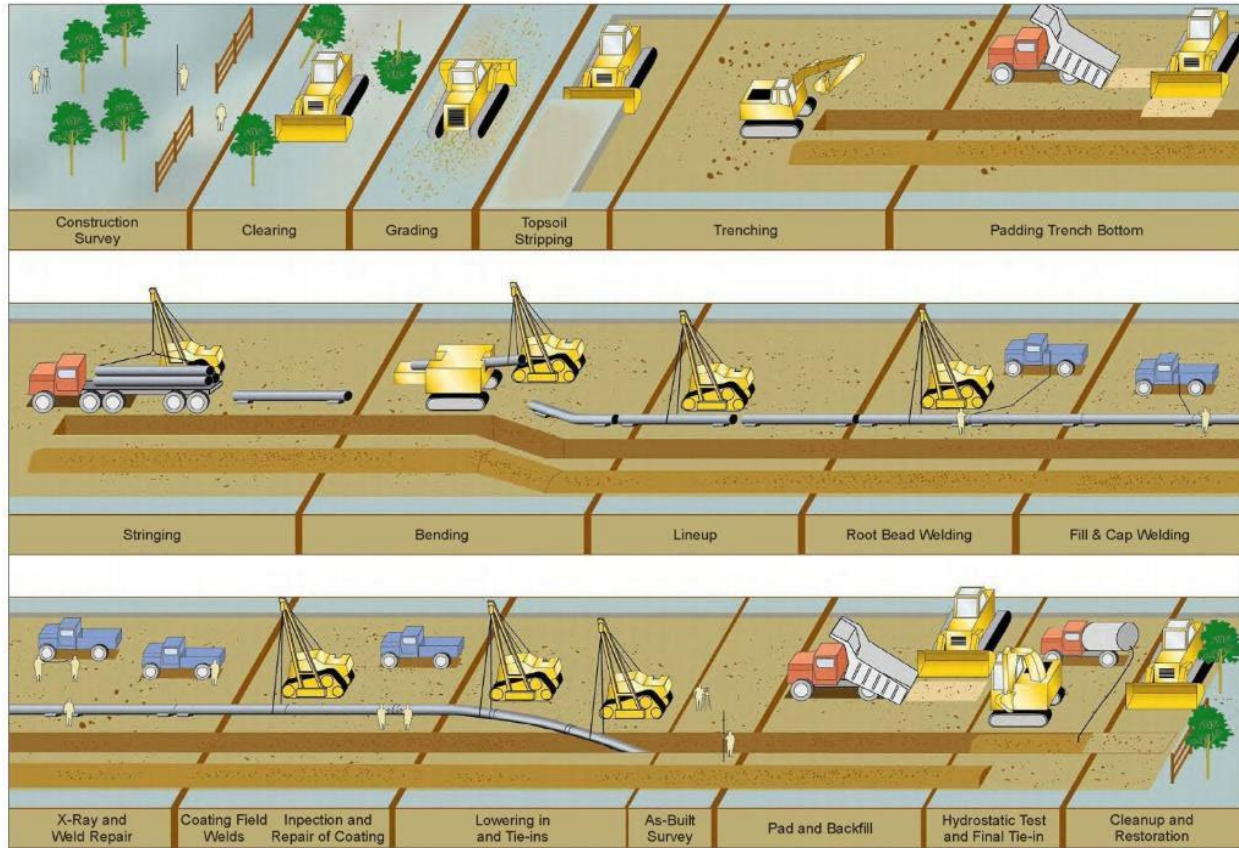
Pipeline construction practices would be similar for all route alternatives.

Workers would drive personal or company vehicles directly to the project and would park in designated areas, such as along the construction workspace or on landowner property with landowner permission. The need for parking and the decision of where workers would park would vary over time depending on the location and accessibility of the work area and the available space within the construction workspace.

Figure 2-2, provided by the applicant, shows the typical pipeline construction sequence. The project would be constructed using the following high-level steps:

- Construction surveying and staking
- Clearing, grading, and site preparation
- Topsoil segregation
- Stringing, bending, welding, coating, and inspecting pipe
- Trenching and lowering in the pipeline, or completing trenchless crossings
- Backfilling the trench
- Hydrostatic testing and final tie-in
- Restoration and revegetation

Figure 2-2 Typical Pipeline Construction Sequence



Construction procedures are described further in the following sections. Additional details can be found in the applicant's Minnesota Environmental Construction Plan (ECP), provided as **Appendix D**, and in the applicant's Minnesota Agricultural Protection Plan (APP), provided as **Appendix E**. These plans include generally recognized best management practices (BMP) and project-specific procedures that would be implemented to minimize and mitigate construction impacts. Chapter 5 analyzes the effects of the project and proposed mitigation measures.

2.4.1 Construction Surveying and Staking

The applicant would coordinate with Gopher State One Call to determine the locations of existing underground utilities before beginning any ground-disturbing activity. Construction/civil survey crews would flag/stake the pipeline centerline and exterior boundary of the construction workspace, associated facilities, and access roads. Access points from existing public roads would be marked and flagged, and fences would be cut and gated with landowner permission to control access to the construction workspace. Drain tile and irrigation systems would also be marked.

Environmental survey crews or environmental inspectors would place signage at wetland and waterbody boundaries as well as any other locations where environmental constraints or restrictions are required. Sections 2.4, 3.1, 4.1, and 5.1 of the applicant's Minnesota ECP (see **Appendix D**) describe requirements for staking and signing the construction workspace and sensitive resources prior to construction.

2.4.2 Clearing, Grading, and Site Preparation

Following civil surveys, the construction workspace would be cleared of vegetation. The applicant's environmental inspectors would inspect the clearing and grading activities to ensure construction activities stay within the authorized limits of disturbance.

The applicant would conduct all clearing and grading work in accordance with applicable permits and landowner requests. Agricultural areas with crops present would be mowed or disced to ground level unless the landowner requests to remove the crops themselves. Tree stump removal and grading activities would be limited to areas directly over the pipeline trench or where needed to ensure a safe and level work area. Bushes and trees would be disposed off-site, burned, or chipped and spread over the construction workspace outside of wetlands and active agricultural fields.

The applicant would establish a travel lane within the construction workspace, which might include the use of construction mats when crossing wetland areas. Bridges, when permitted, would be installed at waterbody crossings to create a single travel lane along the construction workspace.

No ground disturbance would occur between the entry and exit of HDDs. In these areas, the applicant would limit any vegetation clearing to trimming using hand tools where necessary to place the HDD guidewires or to access a water source to withdraw water for HDD operations or hydrostatic testing of the pipeline.

The applicant would install temporary erosion control measures and would maintain redundant sediment control measures immediately after clearing and prior to initial ground disturbance at wetlands and waterbodies within 50 feet of the construction workspace and where stormwater flows to a wetland or waterbody. Sediment barriers would be installed at the following locations:

- The base of slopes where wetlands, waterbodies, or roads are at a lower elevation
- The edge of construction workspaces adjacent to a wetland, waterbody, or road
- Between topsoil/subsoil stockpiles and streams or wetlands, as needed and if adequate, and where separation cannot be achieved
- Dewatering or discharge locations where required

Temporary erosion control measures and sediment barriers would remain in place and would be maintained or replaced until the area is revegetated.

The applicant would control fugitive dust on the ROW and access roads during construction by spraying water from water trucks. The applicant indicates water would not be applied in quantities that would cause runoff from the ROW or access roads.

2.4.3 Topsoil Segregation

The applicant would segregate topsoil after clearing is complete and during trenching activities according to the applicant's Minnesota ECP and Minnesota APP. Topsoil would be segregated in wetlands according to the requirements of the United States Army Corps of Engineers (USACE) Section 404 Utility Regional General Permit authorization.

Topsoil and subsoil piles would be placed so that at least 1 foot of separation would be maintained between the piles to prevent mixing. If a 1-foot separation gap could not be maintained, a physical barrier such as a silt fence, geotextile fabric, or a thick layer of mulch would be used. The applicant would apply a soil tackifier to the soil stockpiles to control dust in windy conditions.

2.4.4 Stringing, Bending, Welding, Coating, and Inspecting Pipe

The applicant would string (lay parallel to the trench) the pipe segments on temporary supports within the construction workspace either before or after trenching. Once pipe segments are in place along the trench, the applicant would align the pipe lengths and fabricate bends. Welding of the joints would be performed in accordance with 49 CFR Part 195; API Standard 1104, Welding of Pipelines and Related Facilities; and applicant or contractor welding specifications. All welds would be inspected with non-destructive methods (that is, real-time radiography and/or ultrasound) to ensure there are no defects, and the welds would be epoxy coated for corrosion protection.

2.4.5 Trenching and Lowering in the Pipeline

Trenching would be completed using a trenching machine, backhoe, or similar equipment. Bedrock is not expected to be encountered, so no blasting would be needed. The applicant would deposit subsoil adjacent to the trench within the construction workspace separate from the topsoil, as discussed in Section 2.4.3. If groundwater were to accumulate in the open trench, it would be pumped out and discharged to a dewatering structure or filter bag as required by applicable permits.

The trench would be deep enough to comply with the minimum depth of cover requirements described in USDOT PHMSA requirements, agricultural area standards at Minnesota Statute 216G.07, and/or landowner agreements. The applicant would install the pipeline to allow for a minimum depth of cover of 54 inches, measured from the ground surface to the top of the pipe. The minimum depth of cover would be increased to 60 inches at waterbody and drainage ditch crossings as well as at private road crossings as measured at the bottom of the road ditch. The Department of Transportation (MnDOT) has indicated that it would require a minimum depth of cover of 10 feet below the lowest part of the road surface in MnDOT ROW. The depth of cover would also be increased if requested by local, state, or federal agencies in areas adjacent to wetlands or waterbodies or in sensitive habitat.

At locations constructed using trenchless methods (HDD and bore, see Section 2.4.8), the pipeline would typically be installed deeper, resulting in greater depth of cover. The applicant would complete an as-built survey to ensure that the depth of the pipeline would meet state and federal requirements before the trench is backfilled.

The applicant would limit the amount of excavated open trench in uplands to a maximum of 15 days of anticipated welding production, or 15 miles. In areas where the project would cross waters of the United States (where the USACE Section 404 Utility Regional General Permit would apply), the amount of open trench would be limited to 5,280 linear feet. Site-specific activities that are typically conducted with separate crews, such as HDDs, bores, and MLV installation, might be performed independent of open trench work. To allow the passage of wildlife and livestock and to facilitate natural drainage patterns, spoil piles would be placed with gaps that align with the breaks of strung pipe that are lying along an open trench. Temporary bridges might also be constructed over the open trench to allow the passage of wildlife and livestock.

Prior to lowering in the pipe, the trench would be visually inspected to ensure that it is free of rock and other debris that could damage the pipe or the pipe coating, and the trench bottom would be padded with sandbags or clean fill if needed to protect the pipeline. Completed sections of pipe would be lifted off the temporary supports by side boom tractors or similar equipment and lowered into the trench. Tie-in welding and pipeline coating would be conducted within the trench to join the newly lowered-in section with the previously installed sections of pipe. These welds would be inspected.

2.4.6 Backfilling the Trench

After lowering in the pipeline, the trench would be backfilled with the previously excavated material, using the subsoil first. Any damaged drain tiles would be repaired before backfilling the trench. Disturbed areas would be regraded to restore original surface contours. Topsoil that was segregated as described in Section 2.4.3 would be spread over the trench line and other construction workspaces after hydrostatic testing and decompaction of the subsoil is complete.

2.4.7 Hydrostatic Testing and Final Tie-in

To comply with PHMSA pipe testing requirements listed in 49 CFR Part 195, Subpart E, the applicant would conduct hydrostatic testing of the pipeline after backfilling but before topsoil is spread. The completed pipeline would be tested in two segments. Hydrostatic testing involves filling installed segments of the new pipeline with water, which would be appropriated from surface water, municipal, or groundwater sources, and then raising the internal pressure and holding that pressure for the PHMSA-specified period. The applicant does not plan to add chemicals or other additives to hydrostatic test water.

The applicant would perform hydrostatic pre-tests on pre-built HDD segments while the pipe is laid aboveground within the construction workspace, prior to installation. HDD segments would be tested again after installation and tie-in as part of the overall hydrostatic testing.

After hydrostatic testing is complete, the pipeline would be depressurized and the water discharged according to applicable Minnesota Pollution Control Agency (MPCA) discharge permits and the applicant's Minnesota ECP. The hydrostatic test water would be completely removed from the pipeline using a series of pig runs, which would be propelled by compressed air. The applicant would discharge the water back to the source from which the water was appropriated, or to an upland area using an agency-approved method. At the two hydrostatic test locations, pipe segments would be welded together to create one contiguous pipeline. These welds would be inspected.

2.4.8 Trenchless Construction

Some features, such as highways, railroads, and certain waterbodies, would be crossed using trenchless construction methods. Trenchless construction methods include HDD and conventional bores.

The typical HDD construction method includes staging the drilling equipment on one side of the feature being crossed (the HDD entry) and the welded pipeline segment for the crossing length on the other side (the HDD exit). After the borehole is drilled, the pipeline segment is pulled back through the hole using the drill rig. No travel lanes would be constructed between an HDD entry and exit. The applicant would construct each HDD waterbody crossing in accordance with a site-specific plan. A typical configuration for an HDD crossing is shown in Figure 14 of Appendix A to the Minnesota ECP (see **Appendix D**).

Table 2-2 shows the locations of the five HDDs proposed for the project along with the anticipated minimum depth of cover at the lowest point of the feature being crossed. The actual depths of the HDDs could be greater. For example, the geotechnical investigation report for the Otter Tail River crossing indicates an estimated HDD depth of 46 feet below the bottom of the river channel.

Table 2-2 Horizontal Directional Drills

Feature Crossed	Entry Milepost	Exit Milepost	Length (feet)	Minimum Cover at Lowest Point (feet)
Pelican River	2.0	1.8	940	25
Otter Tail Valley Railroad / State Highway 210	3.3	3.2	394	20
Otter Tail River	19.8	19.2	3,525	25
BNSF Railway / US Highway 75	24.6	24.5	420	20
Bois de Sioux River	28.0	—	752	25

Note: The HDD exit for the Bois de Sioux River is outside the project area in North Dakota.

Drilling fluids and additives used for the HDD would be non-toxic to the aquatic environment and humans. The applicant would develop a contingency plan to address an inadvertent release of drilling fluid at the ground surface should one occur during an HDD. The contingency plan would include instructions for monitoring during the HDD and mitigation if there is an inadvertent release. Containment, response, and clean-up equipment would be available on-site prior to beginning the HDD to ensure a timely response if there is an inadvertent release.

The applicant would dispose of drill cuttings and drilling mud without additives, or drilling mud with additives that are approved by the Minnesota Department of Health (MDH) or that meet NSF International / American National Standards Institute (ANSI) Standard 60, Drinking Water Treatment Chemicals - Health Effects, by spreading the material over the construction ROW in an upland location approved by the applicant and the landowner. Drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet NSF/ANSI Standard 60 would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA. In all cases, the applicant could choose to contain and then dispose of the drilling mud at a waste management facility that is authorized to accept drilling mud. The applicant would be responsible for tracking and disposing of waste material from the construction workspace.

The bore method uses a smaller footprint than a conventional HDD rig, and the borehole is drilled from either an entry pit or the surface of the ground. Construction workspace on either side of the feature to be crossed is used to establish the pit, if needed, and to provide area to string and stage the pipe and equipment. In some instances, based on length, depth, and diameter, pressurized water or drilling mud may be used to hold the hole open. A typical configuration for a guided bore crossing is provided as Figure 13 of Appendix A to the Minnesota ECP (see **Appendix D**).

2.4.9 Winter Construction

Currently, the applicant's proposed schedule does not include winter construction. If constructing the pipeline in frozen conditions through agricultural lands becomes necessary, the applicant proposes the following mitigation measures to minimize potential impacts on agricultural lands:

- **Minimize topsoil stripping in frozen conditions.** Frozen conditions can preclude effective topsoil stripping. When soil is frozen beyond the depth of the topsoil, topsoil cannot be efficiently separated from the subsoil without pulling subsoil and mixing it with topsoil. If topsoil stripping

must proceed under these conditions, topsoil would be removed from the area of the trench only. A ripper (deep tillage device or scarifier) would be used to break up the frozen topsoil over the trenchline, and a backhoe would remove the topsoil layer and store the material in a separate pile. The ripper would extend to the depth of topsoil or to a maximum depth of 12 inches, whichever is less.

- **Minimize final clean-up activities in frozen conditions.** Frozen conditions can preclude effective topsoil replacement, removal of construction debris, removal of excess rock, decompaction of soil as required, final grading, and installation of permanent erosion control structures. If seasonal or other weather conditions preclude final clean-up activities, the trench would be backfilled and stabilized, and temporary erosion control measures would be installed until restoration can be completed. Frozen topsoil would not be placed back into the trench until thawing had occurred to prevent settlement of soil in the trench. If topsoil/subsoil piles would remain throughout the winter, these piles would be stabilized by methods approved by the Department of Agriculture (MDA). Backfill operations would resume when the ground was thawed, and the subsoil would be compacted (as needed) prior to final clean-up activities. The applicant would be required to monitor these areas until final restoration is complete.

In the unlikely event that hydrostatic testing must occur in the winter, the applicant would consider adding an anti-freeze additive, such as glycol, to prevent freezing. All additives would be subject to review and approval by relevant regulatory agencies. The applicant has prepared a winter construction plan that would be implemented if necessary (see **Appendix F**).

2.4.10 Capture Facility Construction

The applicant's Minnesota ECP would also be applied to construction at the CO₂ capture facility. The applicant would implement relevant measures, such as installing temporary erosion control measures and sediment barriers, and implementing fugitive dust controls.

Work at the site would begin with grading and excavation, installation of pilings, and concrete work. Approximately 1 month after civil works begins, steel work, pipe spooling, and electrical work would begin. These items would be fabricated and installed at the capture facility. Major equipment would then be brought in and set in place, and the compressor and pump buildings would be erected. The greatest number of employees would be on-site at this time. Upon completion of steel work, piping, and electrical work, commissioning activities would start with a planned duration of 1 month, followed by start-up of the capture facility. Overall, construction duration of the capture facility (mobilization to demobilization) would take 5 to 6 months, according to the applicant.

2.5 Restoration

Restoration practices would be similar for all route alternatives.

After pipeline construction and hydrostatic testing, the applicant would de-compact subsoil, re-spread topsoil over the construction workspace, and perform final grading to restore pre-construction contours. Final grading would also remove any remaining debris or construction material before seeding and mulching. The applicant would install temporary and permanent stabilization measures such as slope breakers, mulching, and seeding where appropriate; rebuild fences removed for pipeline installation or install permanent gates; and return the land as close as practicable to its pre-construction use. Disturbed areas would be seeded with seed mixes appropriate to the existing land use or left unseeded if in active agricultural fields (according to landowner requests).

Any excess subsoil remaining after the backfilling process and any remaining construction debris would be removed and disposed of at an approved location. Temporary erosion control measures such as silt fence, temporary slope breakers, and coir logs and wattles would be removed once perennial vegetative cover or vegetation similar to natural terrain is established with a density of 70 percent when compared to the background vegetative cover, or areas are stabilized and permanent erosion control measures installed, if necessary.

The applicant would conduct post-construction monitoring in accordance with requirements in state permits and landowner agreements. Monitoring would continue in both wetland and upland areas until revegetation efforts are determined to be successful.

2.6 Operation and Maintenance

Operation and maintenance practices would be similar for all route alternatives.

The applicant would be responsible for the operation, maintenance, and, when necessary, repair of the CO₂ capture facility and pipeline facilities. The applicant states that the operational ROW would be maintained free of woody vegetation over 15 feet tall as part of its vegetation maintenance program.

Maintenance would involve mowing or tree/shrub removal in non-cultivated areas. Minnesota's Buffer Law requires perennial vegetative buffers of up to 50 feet adjacent to lakes, rivers, and streams and buffers of 16.5 feet adjacent to ditches. Therefore, post-construction vegetation maintenance would be limited adjacent to waterbodies to promote the growth of the riparian buffer. At these locations, the applicant would limit vegetation maintenance along a 10-foot-wide corridor centered over the pipeline to facilitate visual inspection of the pipeline and to allow for corrosion and leak surveys. Additionally, vegetation between HDD entry and exit points would not be routinely cleared or mowed.

The applicant indicates that the project would meet or exceed state and federal safety requirements and, at a minimum, would be operated and maintained in accordance with PHMSA's regulations in 49 CFR Part 195.

The applicant has stated that it would be responsible for 100 percent of costs in case of an accident (see the response to Supplemental Information Inquiry #13 in Appendix I).

2.6.1 Normal Operations and Routine Maintenance

The applicant states that during normal operating conditions, the pipeline would operate between 115 degrees Fahrenheit (°F) and 30°F. The CO₂ captured from the ethanol fermentation process at the ethanol plant would be near ambient air temperature. The CO₂ would then be compressed and dehydrated into a supercritical state. During this process, the temperature would be between 90°F and 115°F. Then the CO₂, once in a supercritical state, would be sent into the pipeline where it would cool to the ground ambient temperature.

The operational ROW would be patrolled and visually inspected every 2 weeks, weather permitting, and not less than 26 times annually. Patrols would check for abnormal conditions/appearances or dangerous activity such as unauthorized excavation or construction.

The applicant explains that its staff at a control center in Ames would continuously monitor and control pipeline operations. A supervisory control and data acquisition system would communicate with all field sites and provide real-time status along the project as part of the larger MCE Project. Data such as pressure, temperature, and flow would be monitored to ensure pipeline operation is within established

operating parameters. Control center personnel would be able to remotely shut down the capture facility and isolate pipeline segments via the project's MLVs if abnormal operating conditions are observed. The applicant points out that the control center would have redundant communication methods, using the best option relative to reliability for primary communications and the next best option for secondary communications.

The applicant would deploy a leak detection system consisting of a real-time hydraulic model of the pipeline system that runs in parallel with instrument monitoring of pressure and volume. If the behavior of the pipeline does not match the hydraulic model, the system would notify the control center that an analysis is needed. Alarms would alert pipeline controllers when this analysis detects a potential leak profile. The applicant would develop operations and maintenance procedures for control center and field personnel prior to beginning operations. These operations and maintenance procedures would include both normal and abnormal operating conditions.

2.6.2 *Abnormal Operations*

The applicant indicates that the project would comply with federal emergency response requirements set forth in 49 CFR Section 195.402(e). The applicant would finalize an Emergency Response Plan before placing the project in service. Field personnel would be trained in emergency response procedures and would coordinate with local first responders and local authorities to conduct training to ensure preparedness. The applicant would conduct public education outreach programs, including damage prevention programs. The applicant indicates the programs would meet or exceed industry standards and regulatory requirements concerning public awareness of pipelines and pipeline operations.

Potential incidents vary in type, scope, size, and risk. The Emergency Response Plan would provide guidance and structure for a coordinated response to an emergency. The National Incident Management System's Incident Command System would be used to manage the applicant's emergency response activities. The applicant's staffing levels would be adjusted to meet specific response team needs based on incident size, severity, and type of emergency. Local agencies and first responders would be trained on the applicant's final Emergency Response Plan and could fill roles during a coordinated response effort.

2.7 Decommissioning

Project decommissioning practices would be similar for all route alternatives.

The design life of the project is 25 years. However, the anticipated physical life would likely extend beyond this time. Should the project reach the end of its economic or physical life, it would be decommissioned as described in the applicant's decommissioning plan. If the ethanol plant continues to operate beyond the life of the proposed project, its CO₂ emissions would not be captured.

The decommissioning plan, submitted with the applicant's routing permit application, provides a description of the decommissioning process, risks, and estimated costs. The applicant states that it would provide financial assurance to the Commission in the amount of total net decommissioning costs defined in Section 4 of the decommissioning plan, currently \$4 million. The decommissioning costs would be updated in accordance with Section 6 of the decommissioning plan, starting 10 years after the project is commissioned. According to the decommissioning plan, financial assurance would be in the form or combination of a letter of credit, corporate guaranty, performance bond, surety bond, or another form reasonably satisfactory to the Commission. The decommissioning plan would be updated every 5 years.

The applicant states that the decommissioning plan is intended and designed to minimize risks to public safety, the environment, and current and future land use. The applicant states that it would decommission the project in accordance with industry standards, including ASME B31.4.

The decommissioning process calls for abandoning the pipeline in place and removing all capture facility components and aboveground associated facilities, including access roads. The applicant might abandon some portions of the pipeline by removal, depending on landowner agreements and local authority requirements.

Prior to beginning decommissioning, the project would be isolated from the larger CO₂ system using existing MLVs. Once isolated, the project would be depressurized. Because CO₂ is itself an inert gas, purging with another inert gas, such as nitrogen, would not be necessary. Electrical connections would be de-energized, locked out, and tagged out.

The applicant would coordinate with the ethanol plant to determine the schedule and extent of the capture facility equipment removal. For purposes of this EIS, it is assumed that all the capture facility equipment and appurtenances would be removed, including piping, blowers, scrubbers, compressors, coolers, dehydrator, pump, and launcher.

The applicant would remove all pipeline surface appurtenances (for example, MLVs, aboveground portions of the cathodic protection system) from the operational ROW and would properly dispose of all materials. The pipeline would be cut at 54 inches or lower below ground surface in multiple locations, depending on final engineering design. The cut pipeline would then be capped or grouted with cement for segmentation. The cathodic protection system would be turned off, and the above grade facilities associated with the cathodic protection system and AC/DC mitigation equipment would be removed. Electrical service equipment such as utility connections or batteries would be removed from the site. Equipment that is no longer fit for service would be disposed of through regional salvage or disposal companies.

The BMPs in the applicant's Minnesota ECP and Minnesota APP would be applied during decommissioning.

Following decommissioning, pipeline segments abandoned in place would degrade over time and could serve as potential conduits for groundwater or cause minor subsidence when they collapse.

2.8 Cost and Accessibility

As of October 2023, the total engineering cost estimate for the project is \$66.75 million. **Table 2-3** provides the applicant's cost estimates for construction of the pipeline and the capture facility. These estimates are engineering estimates and are anticipated to reflect actual costs within 15 percent.

Table 2-3 Engineering Cost Estimate

Work Item	Pipeline Cost ^a (\$)	Capture Facility Cost ^a (\$)
Planning/Permitting	2,500,000	500,000
ROW Acquisition	8,500,000	—
Engineering	500,000	1,750,000
Procurement	2,500,000	10,500,000
Construction	21,500,000	16,500,000
Closeout	1,500,000	1,000,000
Total	37,000,000	29,750,000

^a Estimate accuracy: +/- 15%

2.9 Schedule

As of June 2024, the applicant proposes to construct the pipeline from August to October 2025, and to construct the capture facility from August 2025 to March 2026, contingent on receipt of required permits and authorizations. The applicant states that it does not plan to construct the pipeline during the winter.

¹ Scoping Environmental Assessment Worksheet (EAW) for the Otter Tail to Wilkins Carbon Dioxide Pipeline Project. April 11, 2023. <https://eera.web.commerce.state.mn.us/eera/web/file-list/15002>.

² Iowa Utilities Commission. 2024. IUB approves Summit Carbon's hazardous liquid pipeline application with modifications. June 25. Accessed July 14, 2024. <https://iuc.iowa.gov/press-release/2024-06-25/final-decision-issued-pipeline>.

³ North Dakota Department of Mineral Resources Oil and Gas Division, Draft Storage Facility Permits, Case Nos. 30869, 30873, and 30877.
<https://www.dmr.nd.gov/dmr/sites/www/files/documents/Oil%20and%20Gas/Class%20VI/Summit/SCS%20%231/C30869.pdf>.
<https://www.dmr.nd.gov/dmr/sites/www/files/documents/Oil%20and%20Gas/Class%20VI/Summit/SCS%20%232/C30873.pdf>,
<https://www.dmr.nd.gov/dmr/sites/www/files/documents/Oil%20and%20Gas/Class%20VI/Summit/SCS%20%233/C30877.pdf>

⁴ PHMSA requirements for CO₂ and other liquid pipelines are found in 49 CFR Part 195, available at <https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195?toc=1>.

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Chapter 3 Regulatory Framework

Chapter 3 describes the necessary authorizations from the Commission, including the environmental review process, and highlights the criteria the Commission must consider when making a pipeline routing permit decision. This chapter also discusses required approvals from federal and state agencies, local units of government, and others with permitting authority for actions related to the project.

3.1 What Commission approvals are required?

A certificate of need is not required. A pipeline routing permit is required.

In Minnesota, no person may construct a “large energy facility” without a certificate of need from the Commission. The project does not meet this definition because it would not transport natural gas, synthetic gas, or any other energy source, and it is not more than 50 miles long in Minnesota.¹

A routing permit is required for the project in accordance with Minnesota Statute 216G.02 because the pipeline is designed to operate at a pressure of more than 275 psi and carry a gas. Minnesota Statute 216G.02 defines “gas” as “natural gas, flammable gas, carbon dioxide, gas that is toxic, or gas that is corrosive, regardless of whether the material has been compressed or cooled to a liquid or supercritical state.”

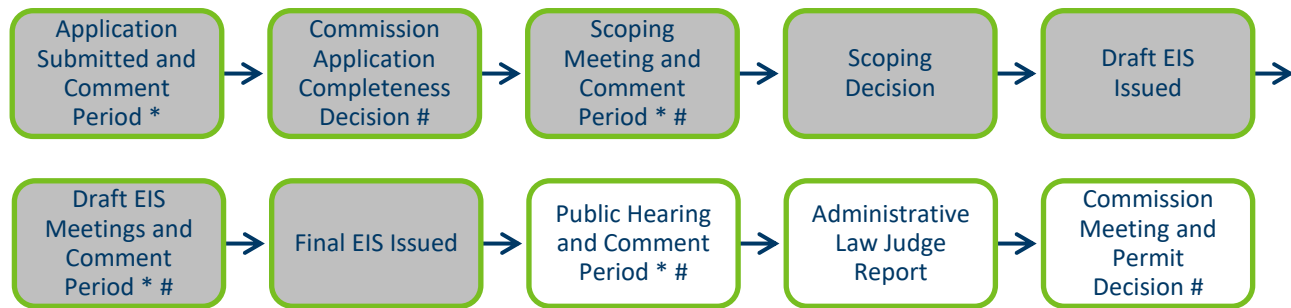
Pipeline routing permit application content requirements and procedural rules are provided in Minnesota Rule 7852. A pipeline routing permit designates a route and anticipated alignment for the pipeline and the conditions for preparing the ROW, constructing the pipeline and associated facilities, and cleaning up and restoring the ROW, in addition to any other appropriate conditions relevant to minimizing human and environmental impacts. The Commission’s website includes details regarding the pipeline routing permit process: <https://mn.gov/puc/activities/energy-facilities/pipeline/route-permit/>. Section 3.3 describes the criteria the Commission uses in issuing a routing permit. The Commission issued a sample routing permit for the project on January 18, 2023,² a copy of which is provided in **Appendix H**.

3.2 What is an environmental review?

Environmental review informs the Commission’s pipeline routing permit decision. It calls attention to potential human and environmental impacts and possible mitigation measures associated with the project and provides opportunities for public involvement.

Potential human and environmental impacts must be analyzed before the Commission can decide whether to issue a pipeline routing permit. This process is called environmental review.

On February 6, 2023, the Commission ordered that an EIS pursuant to Minnesota Rule 4410 be completed for the project.³ EERA staff is conducting the environmental review for the project on behalf of the Commission by preparing this EIS. As part of the review, public and evidentiary hearings are held and an ALJ report is prepared that includes findings of fact, conclusions of law, and recommendations. The Commission then considers the entirety of the record and holds a meeting to make a final decision regarding the routing permit application. **Figure 3-1** illustrates a simplified EIS process.

Figure 3-1 Summary of Environmental Review Process

Note: Shaded steps are complete; * = public comment opportunity; # = public meeting opportunity.

3.2.1 Scoping Process

Scoping is the first step in the environmental review process. It helped focus this EIS on the most relevant information needed by the Commission to make an informed pipeline routing permit decision.

EERA and Commission staff initiated the EIS scoping process on April 10, 2023, when the Commission filed a scoping EAW for the project pursuant to Minnesota Rule 4410.1400(B).⁴ Commission staff sent notice to the project contact list.⁵ The notice was available on the Minnesota Environmental Quality Board (EQB) and the Commission webpages on April 18, 2023.⁶ The notice was published in the *Wahpeton Daily News* on April 18, 2023, and the *Fergus Falls Daily Journal* on April 19, 2023.⁷

A 30-day public comment period extended from April 18 to May 18, 2023, giving an opportunity for the public to provide comments identifying issues, mitigation measures, alternatives, and alternative routes and route segments for consideration in the scope of the EIS. During this period, EERA and Commission staff, accompanied by the applicant, held a total of three in-person public information and EIS scoping meetings: one on May 2, 2023, at 6:00 p.m. in Breckenridge, Minnesota; two on May 3, 2023, at 1:00 p.m. and 6:00 p.m. in Fergus Falls; and one virtual meeting held on May 4, 2023, at 6:00 p.m.

The purpose of the meetings was to provide information about the proposed project and the state's pipeline routing permit process, provide the public an opportunity to participate in developing the scope of the EIS, and answer questions. EERA, Commission, and applicant staff provided multiple handouts, including a process summary and comment form.⁸ A court reporter was present to document the meeting presentations and public comments. A total of 37 commenters provided input at these meetings. In addition to the comments received at the public meetings, 119 commenters provided comments to EERA staff during the scoping period. Comments were received both for and against the project. Scoping comments are available to view or download on eDockets.⁹

3.2.2 Final Scoping Decision

The final scoping decision identified the topics studied in this EIS.

EERA staff provided a summary of the scoping process to the Commission and recommended a final scope for the EIS. The Commission concurred with the EERA staff's recommendations. On September 26, 2023, the Commission issued an Order approving the scope of the EIS.¹⁰

In the Order, the Commission specifically requested that EERA staff coordinate with the Minnesota Office of Pipeline Safety along with other state agencies and Tribal governments to ensure that their expertise is reflected in the EIS and to ensure that the environmental review process benefits from their expertise. Other state agencies and Tribal governments were provided the opportunity to review a preliminary draft of then-completed portions of the draft EIS (EERA staff sent Chapters 1-5, Chapters 7-9, a detailed mapset, and a comment table to these contacts; see **Appendix J**). Comments received from the Shakopee Mdewakanton Community, White Earth Nation, Mille Lacs Band of Ojibwe and several agencies (MnDOT, Minnesota Office of Pipeline Safety, MDH, and Department of Natural Resources [DNR]) on a preliminary draft of this EIS are included in **Appendix J**.

On September 27, 2023, EERA staff filed the EIS preparation notice required under Minnesota Rule 4410.2100, subpart 9.¹¹ This notice was also published in the *EQB Monitor* on September 26, 2023;¹² the *Wahpeton Daily News* on September 26, 2023; and the *Fergus Falls Daily Journal* on September 27, 2023.¹³ On October 6, 2023, EERA staff also sent a letter to newly affected landowners informing them that a route or route segment alternative identified in the Final Scoping Decision has the potential to impact their property.

The final scoping decision includes solely the Otter Tail to Wilkin project.

The Commission denied a petition filed by Clean Up the River Environment (CURE) and others requesting preparation of an EAW to study the entire Minnesota footprint of the Applicant's proposed MCE Project, including not only the Otter Tail to Wilkin pipeline whose permit application is pending in this docket, but also other portions that do not yet have pending permit applications. In its February 6, 2023, Order, the Commission concluded that an EIS was necessary for the project.¹⁴ Because preparation of an EAW for scoping is required as an initial step in developing an EIS (Minn. R. 4410.2100), the Commission denied the petition for an EAW with respect to this permit application. The Commission further noted that it would not act on the petition with respect to hypothetical future projects for which no permit applications have been filed.

3.2.3 Public Meetings and Hearings

Public meetings were held and written comments were received on the draft EIS. This input was used to prepare this final EIS. Now that the final EIS has been published, you can provide comments at public hearings or submit written comments during the associated comment period.

Minnesota Rule 4410.2600 describes the process and steps for the public comment process. After the draft EIS was issued in January 2024, EERA staff published a draft EIS notice that opened a 30-day comment period and provided information on the place and time of public meetings to accept comments on the draft EIS.¹⁵ EERA and Commission staff, accompanied by the applicant, held a total of four in-person and virtual public meetings: one on February 6, 2024, at 6:00 p.m. in Breckenridge, Minnesota; two on February 7, 2024, at 1:00 p.m. and 6:00 p.m. in Fergus Falls; and one virtual meeting held on February 8, 2024, at 6:00 p.m. Interested parties had the opportunity to speak at the public meetings, ask questions, and submit comments. EERA staff responded to questions and collected comments about the draft EIS at the public meetings. Transcripts of the meetings are provided in **Appendix O**.

The public, Tribal governments, organizations, and agencies also submitted approximately 176 written comments on the draft EIS. EERA staff's responses are included in **Appendix O**. EERA staff used the input from the public, Tribal governments, organizations, and agencies to prepare the final EIS.

Public comments regarding (1) the adequacy of the final EIS and (2) a routing permit for the project will be accepted through September 11, 2024, at 4:00 p.m. Public hearings concerning the project will be held in August 2024. Notice of the public hearings and associated comment period will be issued separately.

An ALJ will preside over the hearings. Interested persons will have the opportunity to speak at the hearings, ask questions, and submit comments.¹⁶ The ALJ will provide the Commission with a written report summarizing the public hearing and comment period, and any spoken or written comments received (ALJ Report). The ALJ Report will also provide the Commission with proposed findings of fact, conclusions of law, and recommendations regarding a routing permit for the project. The record developed during the environmental review process—including all public input received during the public hearing and comment period—will be considered by the Commission when it makes a routing permit decision.

3.2.4 *Commission Decision*

The Commission will consider the entirety of the project record, including environmental review completed through the EIS process, and will determine whether to issue a pipeline routing permit. A pipeline routing permit decision for this project is anticipated in the fourth quarter 2024.

3.3 What criteria does the Commission use to make decisions?

The Commission will make a pipeline routing permit decision after the public and evidentiary hearings. Applicable Minnesota statutes and rules provide the criteria the Commission must consider when deciding to issue a pipeline routing permit.

The Commission's pipeline routing permit decision must be based on the public hearing record and made in accordance with Minnesota Rule 7852.1900, which states that the Commission shall consider the impact of the pipeline on the following:

- A. human settlement, existence and density of populated areas, existing and planned future land use, and management plans;
- B. the natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water, and recreational lands;
- C. lands of historical, archaeological, and cultural significance;
- D. economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations;
- E. pipeline cost and accessibility;
- F. use of existing rights-of-way and right-of-way sharing or paralleling;
- G. natural resources and features;
- H. the extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in [Minnesota Rule] 7852.3400 for pipeline right-of-way preparation, construction, cleanup, and restoration practices;
- I. cumulative potential effects of related or anticipated future pipeline construction; and
- J. the relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws including ordinances adopted under [Minnesota Statute] 299J.05, relating to the location, design, construction, or operation of the proposed pipeline and associated facilities.

“In determining the route of a proposed pipeline, the Commission shall consider the characteristics, the potential impacts, and methods to minimize or mitigate the potential impacts of all proposed routes so that it may select a route that minimizes human and environmental impact.”¹⁷ The “‘environment’ means physical conditions existing in the area that may be affected by a proposed pipeline and associated facilities. It includes land, air, water, minerals, flora, fauna, ambient noise, energy resources, natural features, or artifacts of historic, archaeological, geologic, or aesthetic significance.”¹⁸ The Commission shall make a specific written finding with respect to each of the criteria.¹⁹

3.4 What does the Commission approve?

If the Commission decides to issue a routing permit for the project, it will include approval for the pipeline route, and construction and operation of the project.

If the Commission decides to issue a pipeline routing permit for the construction of a pipeline and associated facilities, the Commission will designate “a route for the pipeline type and maximum size specified in the application, conditions for right-of-way preparation, construction, cleanup, and restoration.”²⁰ A “‘route’ means the proposed location of a pipeline between two end points. A route may have a variable width...up to 1.25 miles.”²¹

The pipeline routing permit would also include approval of an anticipated alignment and would authorize the permittee to obtain an operational ROW (also referred to as the permanent ROW). ROW “means the interest in real property used or proposed to be used within a route to accommodate a pipeline and associated facilities.”²²

The pipeline routing permit can also include approval of temporary construction ROW or workspaces that might be needed to construct a project, which can extend outside of the operational ROW. These features are shown schematically in **Figure 3-2**.

Figure 3-2 Hypothetical Route Width, Construction Workspace, and Right-of-Way Illustration

Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that contribute indirectly to pipeline safety by regulating the activities of third parties located in the pipeline's vicinity. The Commission's obligation is to identify a pipeline route consistent with the criteria found in statute and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements.

3.5 Can the applicant use eminent domain?

No, the applicant cannot exercise the power of eminent domain for the project.

3.6 How is the project regulated by PHMSA? What is PHMSA's role?

The project is regulated by PHMSA under 49 CFR Parts 190, 195-199 for engineering, design, construction, safety, and operation.

PHMSA is a federal agency within USDOT. PHMSA has statutory authority over CO₂ pipeline safety²³ and establishes federal regulations governing pipeline safety (see **Appendix G** for more detail). PHMSA announced in May 2022 that it was initiating rulemaking to update its CO₂ pipeline safety standards. PHMSA had planned to publish a Notice of Proposed Rulemaking (NPRM) in June 2024 but has not set a date for a final rule (as of July 23, 2024, PHMSA had still not published the NPRM).²⁴ While not yet formally published in the *Federal Register*, the NPRM was submitted to the Office of the Secretary of

Transportation in December 2023, and the date for the Office of Management and Budget completing its review is listed as May 1, 2024.²⁵

In its September 26, 2023, Order approving the scope of the EIS for the project, the Commission stated it shared concerns with commenters over pipeline safety and agreed that pipeline safety is of paramount importance.²⁶ The Commission noted that PHMSA is currently conducting rulemaking proceedings on proposed amendments to its pipeline safety rules.²⁷ The Commission stated that if PHMSA identifies any updated mitigation strategies or safety guidelines during the routing proceeding, it would be prudent for EERA staff and the applicant to take that information into account even if the updates have not been finalized as amended federal rules by the time the EIS is completed. As of July 23, 2024, no new information is available from PHMSA, and PHMSA has not yet published the NPRM in the *Federal Register*. The rulemakings chart of the Protecting Our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2020 was last updated by PHMSA on July 9, 2024, indicating that the NPRM will be published in the *Federal Register* on August 10, 2024.

The Commission requested that EERA staff follow PHMSA rulemaking proceedings concerning CO₂ pipelines and include a discussion of mitigation strategies and measures to ensure public safety (to include, at a minimum, measures consistent with the most current proposed and final federal rules that are available at the time of EIS preparation and issuance). As noted above, the PHMSA NPRM for CO₂ pipelines is expected to be published in the *Federal Register* on August 10, 2024.²⁸

3.7 Are other permits or approvals required?

Yes, other permits and approvals would be required for the project.

The issuance of a pipeline routing permit is the only Commission approval required to construct the project. The pipeline routing permit supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local, or special purpose governments;²⁹ that is, the Commission's pipeline routing permit determines where a pipeline would be located. However, the Commission can and does consider impacts on zoning and land use when reviewing routing permit applications.

Various federal, Tribal, state, and local approvals might be required for activities related to construction and operation of the project. These subsequent permits (commonly referred to as "downstream" permits) must be obtained prior to construction.³⁰ **Table 3-1**, **Table 3-2**, and **Table 3-3** list permits, approvals, and consultations that might be required for the project pipeline facilities and describes applicable agency role(s). The applicant would be responsible for obtaining and complying with all permits and approvals required to construct and operate the project regardless of whether they appear in these tables.

Table 3-1 Potential Federal Permits, Approvals, and Consultations – Pipeline Facilities

Agency	Type	Description
United States Army Corps of Engineers – St. Paul District	Section 404 Clean Water Act – Dredge and Fill	The United States Army Corps of Engineers (USACE) “regulates the discharge of dredged or fill material into waters of the United States, including wetlands.” ³¹ Dredged or fill material, including material that moves from construction sites into these waters, could impact water quality. A permit is required from USACE if the potential for significant adverse impacts exists. USACE is also charged with coordinating with Native American Tribes regarding potential impacts on traditional cultural properties.
	Section 10 Rivers and Harbor Act	USACE regulates impacts on navigable waters and protects water quality through authorized crossings of navigable waters. Permit coverage is also required for trenchless crossings of Section 10 navigable waters.
	33 United States Code 408 (Section 408) Permission	Section 408 permission is required for the crossing of a USACE Civil Works project. Section 408 allows another party (such as a company or individual) to seek permission to alter a USACE Civil Works project.
United States Fish and Wildlife Service	Section 7 Threatened and Endangered Species Act consultation for federally listed threatened or endangered species	Consultation will occur with the United States Fish and Wildlife Service (USFWS) to determine whether any adverse impacts on federally listed species are anticipated or unavoidable because of a project, and to avoid, minimize, and mitigate impacts on federally listed species. Section 7 establishes conservation measures and authorizes, as needed, the take of federally protected species. A permit is required from USFWS for the incidental taking ³² of any threatened or endangered species or destruction or adverse modification to designated critical habitat.
United States Department of Transportation	Highway Crossing Permit	The United States Department of Transportation regulates crossings of federal highways through issuance of a Highway Crossing Permit.

Table 3-2 Potential State Permits, Approvals, and Consultations – Pipeline Facilities

Agency	Type	Description
Public Utilities Commission	Pipeline routing permit	A pipeline routing permit is required from the Public Utilities Commission for approval of the pipeline route, as well as construction and operation of the project, including approval of a defined ROW in which the proposed pipeline project would be located and also temporary construction areas (or workspaces) that might be needed to construct a project.
Department of Public Safety – Office of Pipeline Safety	Operational pipeline infrastructure safety standards	The Minnesota Office of Pipeline Safety (MNOPS) acts as a regulatory agency ensuring that Minnesota’s pipeline infrastructure is in compliance with applicable pipeline safety standards. Although no permits will be issued for this project by MNOPS, MNOPS maintains an agreement with PHMSA annually to inspect interstate pipelines as requested.
Department of Natural Resources	Public Waters Work Permit – Public Water Wetlands on Private Lands	Potential impacts on state lands and waters, as well as fish and wildlife resources, are regulated by the Department of Natural Resources. Licenses are required to cross state lands or waters. ³³ Projects affecting the course, current, or cross-section of lakes, wetlands, and streams that are public waters might require a Public Waters Work Permit. ³⁴ This permit protects water quality and quantity through authorized work in public water wetlands.
	Utility License to Cross Public Waters	A Utility License to Cross Public Waters protects water quality and quantity through authorized crossings of public water.
	Water Appropriation Permit for Trench Dewatering	This permit protects water quality and quantity through authorized trench dewatering activities.
	Water Appropriation Permit for HDD/Hydrostatic Testing	This permit protects water quality and quantity through authorized HDD/hydrostatic testing.
	Water Appropriation Permit for Dust Suppression	This permit protects water quality and quantity through authorized dust suppression activities.
	Natural Heritage Information System (NHIS) consultation; NHIS Review and Avoidance Plan	NHIS consultation will occur to protect state rare plants, animals, native plant communities, and other rare features.

Agency	Type	Description
Pollution Control Agency	Section 401 Water Quality Certification	The Pollution Control Agency (MPCA) regulates various water resources within the state, as described here. Section 401 Water Quality Certification protects water quality by applying state water quality standards to projects.
	Individual National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) Permit – Hydrostatic Testing	This permit protects water quality through regulation of water treatment and disposal systems.
	NPDES/SDS Construction Stormwater Permit (CSW Permit) – Pipeline (General Permit MNR100001)	The CSW Permit protects water quality from pollutants associated with construction activities through authorized discharge. Construction projects that disturb 1 acre or more of land require a general CSW Permit from MPCA. This permit is issued to “construction site owners and their operators to prevent stormwater pollution during and after construction.” ³⁵ The CSW Permit requires use of BMPs; development of a Stormwater Pollution Prevention Plan; and adequate stormwater treatment capacity once the project is complete. Projects with net increases of 1 acre or more to impervious surface must be designed so that stormwater discharged after construction does not violate state water quality standards.
Department of Agriculture	Minnesota Agricultural Protection Plan	The Department of Agriculture (MDA), Agricultural Marketing and Development Division assists farmers, ranchers, and agribusinesses in adopting practices and technologies to address current challenges and global issues. The Minnesota Agricultural Protection Plan protects wetlands, waterbodies, and agricultural areas through BMPs to mitigate and minimize construction impacts. It also assists in developing the project Agricultural Impact Mitigation Plan. MDA comments and advises on development of the required Agricultural Impact Mitigation Plan for a project.

Agency	Type	Description
State Historic Preservation Office and Office of the State Archaeologist	<p>Minnesota Statutes Chapter 138 (Minnesota Field Archaeology Act and Minnesota Historic Sites Act)</p> <p>Section 106 of the National Historic Preservation Act (if applicable)</p>	<p>The State Historic Preservation Office (SHPO) and Office of the State Archaeologist are charged with preserving and protecting cultural resources within the state. Consultation with SHPO is completed to review potential impacts on properties listed in the National or State Register of Historic Places, or State Historic Sites Network. Consultation with SHPO and the Office of the State Archaeologist is completed if a project has the potential to impact known or suspected archaeological sites. The consultation aids in determining strategies to avoid, minimize, or mitigate such impacts. Additionally, SHPO is charged with preserving and protecting national historic properties (properties listed in or eligible for listing in the National Register of Historic Places). If applicable, the federal agency providing the permit or approval consults with SHPO pursuant to Section 106 of the National Historic Preservation Act to identify historic properties and to avoid or minimize impacts on these resources. There may also be consultation with Tribes or the Tribal Historic Preservation Office carried out by the lead federal agency and/or the lead state agency.</p>
Department of Transportation	Utility Accommodation on Trunk Highway Right of Way and Miscellaneous Work on Trunk Highway Right of Way Permits	<p>A permit from the Minnesota Department of Transportation is required for construction, placement, or maintenance of utility lines adjacent to or across state roads/trunk highway ROW.³⁶ Coordination would be required to construct access roads or driveways from trunk highways.³⁷ These permits are required to ensure that use of the ROW does not interfere with free and safe flow of traffic, among other reasons.³⁸</p>
Department of Labor and Industry	Electrical permitting	The Minnesota Department of Labor and Industry requires permits for electrical work in the state to ensure that projects meet minimum safety requirements.
Board of Water and Soil Resources	Notification of Use of the Utilities Exemption	<p>The Board of Water and Soil Resources oversees implementation of Minnesota's Wetland Conservation Act. The Wetland Conservation Act is implemented by local government units. The Notification of Use of the Utilities Exemption allows utility projects to impact wetlands without replacement if impacts are less than 0.5 acre and overall impacts are minimized.</p>

Table 3-3 Potential Local Permits, Approvals, and Consultations – Pipeline Facilities

Agency	Type	Description
Wilkin County	Floodplain Permit	This permit ensures adequate consideration of portions of the project that would be constructed within designated floodplains.
Otter Tail County	Ditch Crossing Permit	This permit protects drainage systems by authorizing ditch crossings.
County and Township	Road Crossing Coordination	Collaboration and consultation will be required with counties and townships within which roads will be crossed by a project. This coordination authorizes crossings of county- and township-owned roads.
County and Township	Overweight/Oversize Loads	Coordination and approval might be required to move overweight and/or oversize loads on county or township roads.
Bois de Sioux and Buffalo Red River Watershed Districts	Watershed District/Drainage Permits	Construction activities might cause discharge into water belonging to the Bois de Sioux and the Buffalo Red River Watershed Districts. Prior to construction, a permit must be obtained from each watershed affected in order to protect water quality and quantity from pollutants. These permits protect water quality and quantity of specific rivers from pollutants associated with construction activities through authorized discharge.

Table 3-4 lists permits and approvals that might be required for the capture facility proposed at the ethanol plant. The applicant would be responsible for obtaining and complying with all permits and approvals required to construct and operate the project regardless of whether they appear in this table.

Table 3-4 Potential Permits and Approvals Required – Capture Facility

Agency	Type	Description
State		
Pollution Control Agency	Air Quality Permit Applicability Determination	This determines which air quality permits the project needs. It is required to determine whether the capture facility and the ethanol plant will be considered a single source with respect to air permitting, and to determine whether the capture facility is required to obtain an air quality permit.
	Air Quality Permit – Option D Registration Permit	This permit protects air quality by authorizing emissions and is required for projects with potential emissions above certain thresholds or subject to certain regulation.
	Construction Stormwater NPDES General Permit (MNR10000)	This permit protects water quality from pollutants associated with construction activities through authorized discharge. It is required for projects with at least 1 acre of ground disturbance.
	Industrial Stormwater NPDES General Permit MNR050000 (new or modification of existing ethanol facility coverage)	This permit protects water quality by monitoring and managing stormwater on properties where stormwater might contact harmful pollutants. It is required for discharge of stormwater from various sectors of industrial activities.
	Individual Industrial Wastewater NPDES Permit (modification of existing discharge ethanol facility permits, or stand-alone new permit)	This permit protects water quality by regulating a treatment and disposal system that discharges pollutants into surface water. It is required for discharge of industrial wastewater to waters of the state.
Department of Natural Resources	Water Appropriation Permit	This permit protects water quality and quantity through authorized water use activities. It is required for use of water in excess of regulatory thresholds.
Department of Labor and Industry	Electrical permitting	Electrical permitting ensures that the capture facility meets minimum safety requirements.
Local		
Otter Tail County	Building/Structure Permit	This permit ensures that the construction of the capture facility meets minimum safety and aesthetic requirements.

- ¹ Minn. Stat. 216B.2421, subd. 2.
- ² Commission. January 18, 2023. Sample Pipeline Routing Permit. eDockets No. 20231-192263-01.
- ³ Commission. February 6, 2023. *Order Accepting Application, Requiring Environmental Impact Statement, and Denying Petition; Notice of and Order for Hearing*. [eDockets No. 20232-192950-01](#).
- ⁴ Commission. April 10, 2023. Otter Tail to Wilkin Scoping Environmental Assessment Worksheet. eDockets Nos. 20234-194669-01, 20234-194669-02, 20234-194669-03, 20234-194669-04, 20234-194669-05, 20234-194669-06, 20234-194669-07, 20234-194669-08, 20234-194669-09, 20234-194669-10, 20234-194670-01, and 20234-194670-02.
- ⁵ On April 18, 2023, Commission staff filed Notice of Application Acceptance, Public Information and Scoping Meetings, and Availability of Scoping EAW and Draft Scoping Decision to eDockets.
- ⁶ Minnesota Environmental Quality Board. April 18, 2023. Otter Tail to Wilkin Carbon Dioxide Project: EIS Scoping EAW and Draft Scoping Decision. [Minnesota Environmental Quality Board \(state.mn.us\)](#); Minnesota Public Utilities Commission. April 18, 2023. Carbon Pipelines: Otter Tail to Wilkin Carbon Dioxide Pipeline. [Carbon Pipelines / Public Utilities \(mn.gov\)](#)
- ⁷ Public Utilities Commission. Affidavit of Publication – Scoping Meeting Affidavit. eDockets No. 20234-195360-01, and Public Utilities Commission. Affidavit of Publication – Scoping Meeting Affidavit. eDockets No. 20234-195360-02.
- ⁸ Public Utilities Commission. May 2, 2023. Public Information and Scoping Meeting Handouts. eDockets No. 20235-195493-01.
- ⁹ Department of Commerce. August 2, 2023. Scoping Summary. eDockets Nos. 20238-197948-01, 20238-197948-02, 20238-197948-03, 20238-197948-04, 20238-197948-05, and 20238-197948-06.
- ¹⁰ Commission. September 26, 2023. *Order Approving Scope of Environmental Review and Denying Stay*. [eDockets No. 20239-199149-01](#).
- ¹¹ Department of Commerce. December 22, 2023. Other – Notice of Environmental Impact Statement Preparation. eDockets No. 202312-201500-01.
- ¹² Department of Commerce. September 27, 2023. Other – EIS Prep Notice. eDockets No. 20239-199177-01.
- ¹³ Department of Commerce. December 22, 2023. Confirmation of newspaper publication of the Notice of Environmental Impact Statement Preparation. eDockets No. 202312-201500-01.
- ¹⁴ Commission. 2023. *Order Accepting Application, Requiring Environmental Impact Statement, and Denying Petition; Notice of and Order for Hearing*. February 6. eDockets No. 20232-192950-01).
- ¹⁵ Department of Commerce. 2024. Other –Notice of Availability of Draft Environmental Impact Statement and Public Information Meetings. January 23. eDockets No. 202310-199403-01.
- ¹⁶ Minn. R. 216G.02, subp. 3.
- ¹⁷ Minn. R. 7852.1900, subp. 2.
- ¹⁸ Minn. R. 7852.0100, subp. 13.
- ¹⁹ Minn. R. 7852.1900, subp. 1.
- ²⁰ Minn. R. 7852.3200, subp 1.
- ²¹ Minn. R. 7852.0100, subp. 31.
- ²² Minn. R. 7852.0100, subp. 30.
- ²³ 49 CFR Parts 190, 195–199, see [eCFR :: 49 CFR Part 190 -- Pipeline Safety Enforcement and Regulatory Procedures](#)
- ²⁴ PHMSA. 2023. *PHMSA Announces New Safety Measures to Protect Americans From Carbon Dioxide Pipeline Failures After Satartia, MS Leak*. May 26. Accessed November 2023. <https://www.phmsa.dot.gov/news/phmsa-announces-new-safety-measures-protect-americans-carbon-dioxide-pipeline-failures>.

- ²⁵ PHMSA. 2023. *Protecting Our Infrastructure of Pipelines and Enhancing Safety Act of 2020 Web Chart*. June 2024. Accessed July 23, 2024. <https://www.phmsa.dot.gov/legislative-mandates/pipes-act-web-chart>.
- ²⁶ Commission. September 26, 2023. *Order Approving Scope of Environmental Review and Denying Stay*. [eDockets No. 20239-199149-01](#).
- ²⁷ Docket No. PHMSA–2023–0013; See [Pipeline Safety: Carbon Dioxide Pipeline Safety Public Meeting | PHMSA \(dot.gov\)](#) (accessed Oct. 26, 2023), and [PHMSA Public Meetings and Documents: CO₂ Safety Public Meeting 2023 \(dot.gov\)](#) (accessed Nov. 6, 2023).
- ²⁸ PHMSA. 2023. *PHMSA Announces New Safety Measures to Protect Americans From Carbon Dioxide Pipeline Failures After Satartia, MS Leak*. May 26. Accessed November 2023. <https://www.phmsa.dot.gov/news/phmsa-announces-new-safety-measures-protect-americans-carbon-dioxide-pipeline-failures>.
- ²⁹ Minn. Stat. 216G.02, subd. 4.
- ³⁰ Appendix H, Sample Route Permit, Section 4.5.2 (stating the permittee “shall obtain all required permits for the project and comply with the conditions of those permits”).
- ³¹ United States Environmental Protection Agency (October 27, 2015) Section 404 Permit Program. <http://www.epa.gov/cwa-404/section-404-permit-program>.
- ³² 16 U.S.C. 1532(19) (defining “take” to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in such conduct).
- ³³ Minn. Stat. 84.415.
- ³⁴ Department of Natural Resources. n.d. Requirements for Projects Involving Public Waters Work Permits. http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/requirements.html.
- ³⁵ Pollution Control Agency. November 19, 2015. Stormwater Program for Construction Activity. <http://www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/construction-stormwater/index.html>.
- ³⁶ Minn. R. 8810.3300, subp. 1.
- ³⁷ Department of Transportation. n.d. Land Management. <https://www.dot.state.mn.us/utility/forms.html>.
- ³⁸ Department of Transportation. n.d. MnDOT Policies. <http://www.dot.state.mn.us/policy/operations/op002.html>.

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Chapter 4 Alternatives

The Commission issued a final scoping decision that details the alternatives to be studied in this EIS. The scoping decision was based on public comment and identified the following alternatives:

- No action
- Alternative routes
- Alternative technologies
- Modified designs or layouts (pipe diameter)
- Modified scale or magnitude (reduced throughput)
- Alternatives incorporating reasonable mitigation measures

The scoping decision states that the EIS will analyze whether an alternative pipe diameter or reduced throughput “is feasible to the extent that it would result in a significant environmental benefit over the project.” EERA staff, through its consultants, analyzed whether these alternatives are feasible and concluded that these alternatives would not result in a significant environmental benefit over the project. Therefore, the EIS does not study in detail a modified design or layout or a modified scale or magnitude.

The following sections describe each of these alternatives in more detail and explains why modified designs or layouts and modified scale or magnitude were not carried forward for detailed study in the EIS.

4.1 No Action Alternative

Under the no action alternative, the Commission would not issue a pipeline routing permit and the project would not be constructed. Impacts associated with construction and operation of the project would not occur. The following assumptions were used when analyzing the no action alternative:

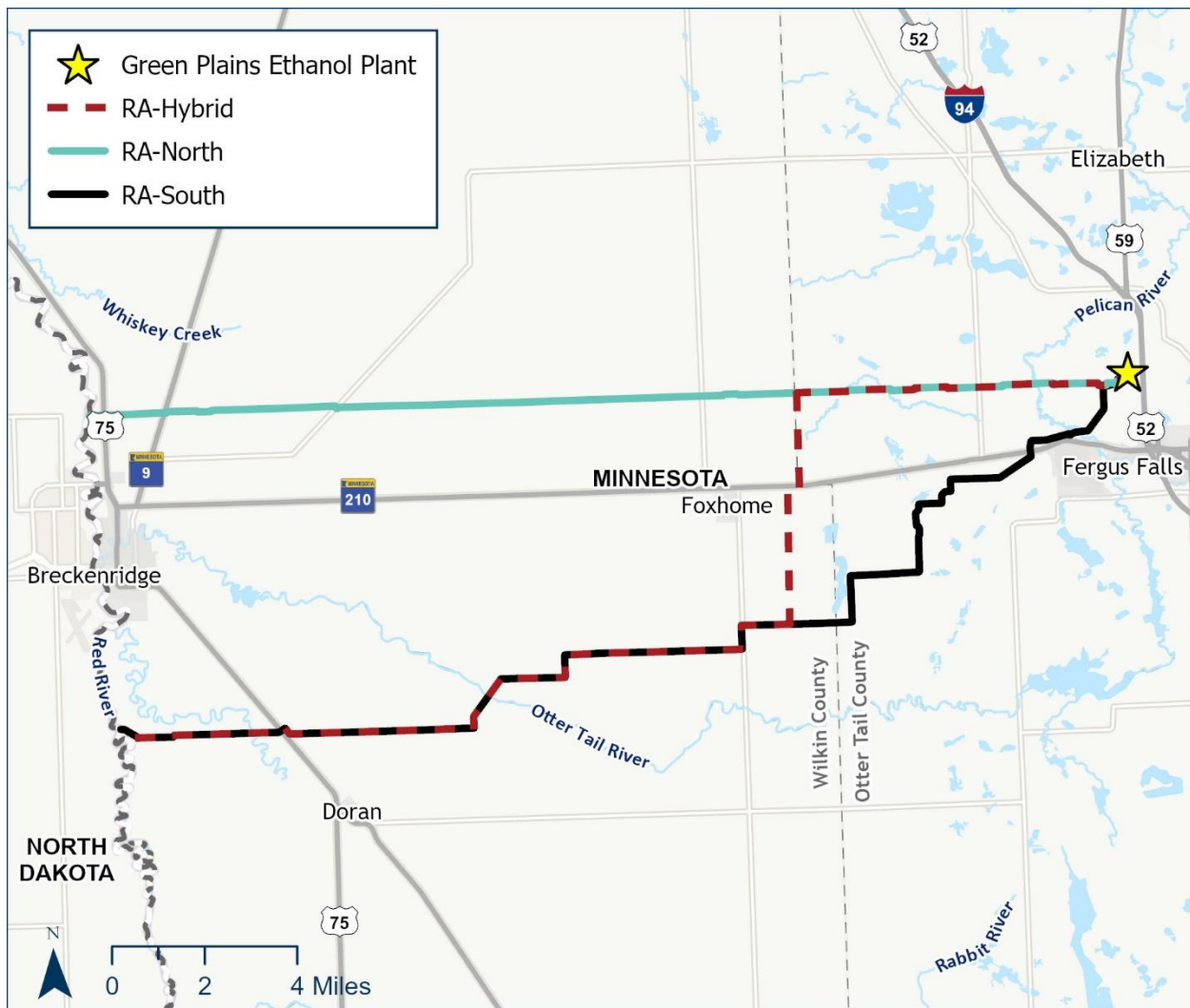
- The ethanol plant would continue to produce ethanol for the foreseeable future.
- The output of the ethanol plant could increase or decrease, or remain the same.
- Corn would continue to be the feedstock for the ethanol plant, as designed.
- The source of electricity provided by Lake Region Electric Cooperative is expected to shift toward including more renewable energy.

The effects of implementing the no action alternative as well as potential impacts are described in Chapter 7.

4.2 Alternative Routes

In addition to the applicant’s proposed route, this EIS studies two alternative routes. An alternative route represents an alternative path for the pipeline between the ethanol plant and the Minnesota-North Dakota border near Breckenridge. The Commission is free to select any of these routes should it choose to issue a pipeline routing permit. Therefore, three alternative routes are studied in this EIS. These three alternative routes are shown in **Figure 4-1** and described below. Detailed route maps can be found in **Appendix B**. Potential impacts associated with these route alternatives are described in Chapter 5.

Figure 4-1 Proposed Alternatives



4.2.1 Route Alternative – North

Route Alternative – North (RA-North) is 23.0 miles long. RA-North starts at the ethanol plant, crosses Viking Trail Road, and travels west along County Road 116 to County Highway 11. Then RA-North follows 240th Street into Wilkin County where it turns into 320th Street before continuing to the Minnesota-North Dakota border.

As described in Section 1.2, the project would connect to a larger CO₂ system called the MCE Project. RA-North would not connect to the applicant's proposed MCE Project route in North Dakota; however, the connection point remains undefined because the applicant has not obtained a permit for the pipeline in North Dakota.

4.2.2 Route Alternative – Hybrid

Route Alternative – Hybrid (RA-Hybrid) is 29.1 miles long. RA-Hybrid starts at the ethanol plant, crosses Viking Trail Road, and then travels west along County Road 116 and County Highway 11, continuing onto 240th Street. The route then turns south along 100th Avenue until turning west on State Highway 210,

then turning south again along 330th Avenue. Continuing south, the route turns west at County Road 162, then south at County Road 19 before turning west again midway between County Roads 162 and 160. The route then turns south and travels west along County Road 160 before turning southwest toward County Road 158. The route continues west along County Road 158 to the Minnesota-North Dakota border.

4.2.3 *Route Alternative – South, Applicant’s Proposed Route*

Route Alternative – South (RA-South) is 28.1 miles long. RA-South begins at the ethanol plant, crosses Viking Trail Road, and travels southwest, crossing County Road 210. The route continues southwest until turning west on County Road 162, then turns south on County Road 19 and west again midway between County Road 162 and 160. The route then continues southwest until turning west at County Road 158 and continuing along County Road 158 to the Minnesota-North Dakota border.

4.3 Alternative Technologies

The Commission identified two alternative technologies to be studied in the EIS: (1) a suite of agricultural practices and (2) a suite of energy use and efficiency changes. These technologies are not selectable alternatives but would aid the Commission’s decision-making. These actions would be implemented by the ethanol plant and farmer producers.

The ethanol plant could require farmers selling corn as feedstock for ethanol production to implement certain agricultural practices, which could reduce the carbon intensity of the ethanol produced at the ethanol plant. These practices could include no-till/reduced tillage, cover cropping, fertilizer reduction, and retaining corn stover/residues. Avoiding emissions is functionally the same as capturing and permanently sequestering carbon that would otherwise be released to the air. These agricultural practices would reduce the carbon intensity of the ethanol produced.

The ethanol plant could also implement a suite of energy use and efficiency changes—alone or in combination with the suite of agricultural practices described above—that could reduce the carbon intensity of the ethanol produced at the ethanol plant to a level consistent with the project’s purpose. Energy efficiency strategies could include insulating steam pipes, cleaning-in-place heat exchangers, tuning up boilers, using variable frequency drive for motors, using light emitting diode (LED) lighting, using alcohol mechanical vapor recompression, and using a low-pressure let-down steam turbine. Alternative energy sources for natural gas could include an anaerobic digester, synthetic methane, solar thermal, and electricity. Grid electricity alternatives could include on-site combined heat and power, on-site solar photovoltaics, on-site wind turbines, and a renewable power purchase agreement. An alternative energy source that could be used for both natural gas and grid electricity is geothermal. These energy use and efficiency changes would be undertaken by the ethanol plant itself and could be implemented by farmers selling corn to the ethanol plant.

These alternative technologies are analyzed in further detail in Chapter 6.

4.4 Modified Designs or Layouts

As directed by the scoping decision, EERA staff worked with the applicant to define an alternative pipeline diameter, consistent with PHMSA regulations, that could result in a significant environmental benefit over the proposed project. Staff considered a larger (6-inch) or smaller (3-inch) diameter pipeline.

The impacts of constructing a 6-inch-diameter or a 3-inch-diameter pipeline would be essentially the same as the impacts associated with constructing a 4-inch-diameter pipeline. Although a slightly shallower trench would be needed for the smaller pipeline and a slightly deeper trench would be needed for the larger pipeline, these differences would be negligible because there would be little difference in the depth of the trench and the volume of soil excavated. The duration of construction would be the same, and the construction workspace would be the same except for slight adjustments in the lengths of HDD boreholes. The operational ROW would be 50 feet wide for any of these pipeline diameters.

The operational parameters of a 6-inch-diameter pipeline would be substantially different than a 4-inch-diameter pipeline; however, the normal operating procedures would be the same. The design pressure (2,183 psi) would remain the same, but for a 6-inch-diameter pipeline, the operating pressure would be approximately 1,320 psi, compared to approximately 1,750 psi for a 4-inch-diameter pipeline (see the response to Supplemental Information Inquiry #3 in **Appendix I**). EERA staff, in consultation with its subcontractor Allied Solutions, Inc. (Allied), determined that at the design pressure, the impacted distance from the pipeline during a potential rupture would increase by approximately 33 percent if the diameter of the pipeline increases from 4 inches to 6 inches.

The operational parameters of a 3-inch-diameter pipeline also would be substantially different than a 4-inch-diameter pipeline. At the current design pressure, a 3-inch-diameter pipeline would not be capable of transporting the volume of CO₂ that would be captured at the ethanol plant. To transport the same volume of CO₂ from the ethanol plant, the design pressure would have to be greater than 3,200 psi for a 3-inch-diameter pipeline (see the response to Supplemental Information Inquiry #3 in **Appendix I**). EERA staff, in consultation with Allied, determined that at 3,200 psi the impacted distance from the pipeline during a potential rupture would decrease by approximately 24 percent if the diameter of the pipeline decreases from 4 inches to 3 inches.

In addition, in-line inspection technology, in other words, smart pigs, is not as well developed for pipelines less than 4 inches in diameter. Consequently, the pipeline industry typically has fewer options when choosing a smart pig for inspecting a pipeline less than 4 inches in diameter. Generally, at diameters less than 4 inches, there are greater challenges and risks associated with successfully passing inline inspection devices through the pipeline. The likelihood of a tool becoming stuck increases due to the geometry of the fittings and internal diameter changes associated with fittings, valves, and heavier walled pipe. Also, smart pig sensor coverage and battery life become more of an issue because of the need to put the same components in a smaller smart pig.

EERA staff concluded that an alternative pipeline diameter would not result in a significant environmental benefit over the proposed project, and diameters smaller than 4 inches would pose challenges for pipeline inspection. Therefore, this alternative is not analyzed further in the EIS.

4.5 Alternative Scale or Magnitude

As directed by the scoping decision, EERA staff worked with the applicant to determine if the throughput of CO₂ could be reduced to an extent that could result in a significant environmental benefit over the project, such as reducing the risks of a pipeline rupture.

Throughput, or volume of product being transported by a pipeline, is influenced by a number of factors including temperature, pressure, and the diameter and configuration of the pipeline. The throughput is limited by the maximum design capacity, which for the project as proposed by the applicant would be

0.25 MMTA. The applicant plans a normal throughput for the pipeline of 0.19 MMTA, which is the equivalent of 524 metric tons per day.

Reductions in throughput would not have any effect on pipeline construction activities, duration, or impacts. During project operation, there may be temporary reductions in throughput on the pipeline based on fluctuations in operations at the ethanol plant, such as temporary shutdowns for maintenance. However, the pipeline and associated equipment have been designed and sized to operate within optimized parameters. For example, a minimum throughput is needed to safely operate the pumps at the capture facility. If the throughput volume is reduced but still high enough for operation of the pumps, the operating pressure and product velocity would be reduced. If the throughput volume is reduced below the required volume for safe operation of the pumps, then the pipeline would be shut in, or isolated, and the MLV at the capture facility would be closed. During this shut-in period, there would still be CO₂ in the pipeline at a pressure typically above 1,200 psi.

Permanent reductions in throughput would result in changes in operational parameters that could impact the ability to safely operate the pipeline. Permanent reductions in throughput could also hamper the ability to perform in-line pipeline integrity inspections because the inspection tool could not move at its designed rate to optimally inspect the pipeline. Relative to the potential for a pipeline rupture, EERA staff, in consultation with Allied, determined that if the throughput is reduced by 75 percent, the impact distance from the pipeline during a potential rupture would decrease by only 3 percent. This is because the volume added via throughput is dwarfed by the volume already in a given valve segment. For instance, a 4-inch-diameter pipeline segment that is 13.9 miles long would be about 6,405 cubic feet in volume. Meanwhile, the throughput for that same pipeline segment would be about 706 cubic feet per hour based on operational data provided by the applicant. Therefore, in the time it would take for the valves to close in case of an emergency (10 minutes according to the applicant), the throughput volume would be equal to about 5 percent of the volume already in the 13.9-mile-long pipeline segment. Because the throughput volume is so small compared to the valve segment volume, changes in throughput velocity have a limited impact on the potential rupture release volume. Furthermore, the likelihood of a rupture happening would not decrease with a decreased throughput.

If a section of pipeline is pressured down to the point where the CO₂ vaporizes, that section would need to be purged before operations could resume. If the operator were to pressure up a pipeline with vaporized CO₂ in it, the result would be a two-phase product—part gas and part liquid—which would pose problems for the operator because the CO₂ sequestration process requires supercritical CO₂ for injection, not a two-phase substance.

Based on these considerations, EERA staff determined that a reduced throughput would likely not have significant environmental benefit compared to the project as proposed and could affect the ability to safely operate and maintain the pipeline. Therefore, this alternative is not analyzed further in the EIS.

4.6 Alternatives Incorporating Reasonable Mitigation Measures

The EIS must address alternatives incorporating reasonable mitigation measures identified through comments received during comment periods.¹ Mitigation measures suggested by commenters during comment periods are summarized as follows:

- DNR recommended using isolated dry trenching crossing methods on all stream crossings and installing the pipeline deep enough to prevent exposure over time. Exploratory borings should be conducted to characterize the shallow subsurface anywhere sheet piling would be used, and

results should be submitted to DNR groundwater staff for evaluation. At a minimum, Pennsylvania standards for trench breaker placement should be used; trench breakers should be used at the entrance and exit of every waterbody regardless of slope, except for HDD crossings. DNR requested plans for wildlife escape routes from the pipe trench and for removing wildlife from the open trench, as well as limiting the length of time the trench is open. The Wildlife Action Network tool should be used for mitigation strategies.

DNR requested a Vegetation Management Plan to address potential impacts related to pipeline construction, operation, and maintenance. The plan should discuss existing vegetation, reestablishment and restoration, seed mixes, noxious weeds and invasive species, herbicide use, sensitive plant communities, and other topics identified during coordination with the Vegetation Management Plan Working Group.

DNR requested an assessment of additional shut-off valves to reduce the magnitude of fish or aquatic organism mortality associated with a CO₂ release into a waterbody. Where trench crossings are used for streams, DNR recommended segregating the streambed surface material for restoring streambed surface material that is usually coarser than underlying material. DNR recommended the contingency plan for inadvertent releases of drilling fluid include equipment such as a functioning vac-truck and other equipment/materials on-site and be coordinated with the DNR utility license application.

- MPCA requested a discussion of alternative methods to be used instead of flowing (and nonflowing) open cuts such as the flume or dam and pump dry crossing methods. MPCA notes that Minnesota Statute 115.061, paragraph (a) requires recovery as rapidly and thoroughly as possible of discharges to a waterbody such as an inadvertent return of drilling fluid during an HDD. MPCA requested discussion of measures to prevent excessive crowning or subsidence over the pipeline, a requirement for a winter construction plan “at the front” of the project, clarification of whether independent environmental monitors would be required, and plans for excess soil and drilling fluid disposal.
- Measures that would be required by MnDOT at crossings of MnDOT ROW include meeting depth and casing requirements, restrictions on boring pit locations, avoiding intersections with other roads with MnDOT ROW, and setbacks for existing utilities and structures. The applicant should coordinate project construction activities, including plans for hauling oversized loads, with MnDOT staff and should stay current on MnDOT’s highway construction activities that could affect project construction.
- MDA stated that mitigation measures need to be required to minimize the potential impacts of any leak but did not identify specific mitigation measures.
- CURE suggested investigating the adequacy of the applicant’s proposed revegetation goal of 70 percent density compared to background and that revegetation goals be maintained for the life of the project.
- Relative to pipeline decommissioning, Bold Alliance suggested mitigation techniques from the Canadian Association of Petroleum Producers² that include, but are not limited to, hazardous materials mitigation, pipe removal, pipe filling, plug installation, ground stabilization, and temporary maintenance through cathodic protection and monitoring. Bold Alliance requested a discussion of mitigation options other than removal or abandonment in place, such as segmentation, filling with grout, and partial removal. Bold Alliance further suggested that landowners should have the power to select which mitigation options are appropriate for their lands.

- Commenter suggested installing MLVs at the Pelican River and burying the pipeline deeper than 4.5 feet so that it would be below the frost line and drain tiles.
- Commenter suggested including a permit condition to ensure that landowners are not by default liable for post-abandonment mitigation costs.
- Commenter recommended the applicant should be required to document and report the amount of drilling fluid lost to the environment in each inadvertent release and disclose all chemicals and amounts used in its drilling fluid.
- Several commenters recommended measures related to public health and safety, including:
 - the applicant should provide landowners along the pipeline with education, pipeline markers, and instructions in case of rupture;
 - the applicant should be required to obtain adequate insurance to cover all costs of a potential pipeline rupture;
 - the pipeline should be routed more than 50 feet from residences to mitigate risks from a potential pipeline rupture;
 - the pipeline should be buried deeper;
 - there should be shut-off valves at every stream;
 - redundant monitoring of the amount of moisture in the high pressure CO₂ is needed;
 - the pipeline should be inspected with smart pigs at least annually;
 - odorant should be added to the CO₂ in the pipeline;
 - the Commission should require a detailed safety plan from the applicant and detailed plans on the type of system to be used to detect leaks.

Suggested mitigation measures are addressed in more detail in Chapter 5 under the relevant resource sections and in Chapter 8.

¹ Minn. R. 4410.2300(G).

² Canadian Association of Petroleum Producers (CAPP). 1996. *Pipeline Abandonment, A Discussion Paper on Technical and Environmental Issues*. <https://www.cer-rec.gc.ca/en/applications-hearings/pipeline-abandonment/pipelineabandonment-discussion-paper-technical-environmental-issues.html>.

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Chapter 5 Potential Impacts and Mitigation for Alternative Routes

Chapter 5 defines how potential impacts and mitigative measures are described. It discusses the environmental setting, and highlights topics dismissed from detailed analysis. This chapter details potential human and environmental impacts and mitigative measures for the three route alternatives: RA-North, RA-Hybrid, and RA-South.

Potential impacts associated with pipeline removal would be similar to those described for construction because the removal is essentially pipeline installation in reverse order followed by restoration. Potential impacts for pipeline abandonment-in-place would be negligible, as described in Chapter 2. Operational impacts on all resources described in Chapter 5 would not occur once decommissioning of the project is complete.

5.1 Describing Potential Impacts

Potential impacts are measured on a qualitative scale based on an expected impact intensity level; the impact intensity level takes mitigation into account.

A potential impact is the anticipated change to an existing condition caused either directly or indirectly by the construction and operation of a proposed project. Potential impacts can be positive or negative and short or long term. Impacts vary in duration and size, by resource, and across locations. In certain circumstances, potential impacts can accumulate incrementally, meaning that impacts from the project would be in addition to on-the-ground impacts already occurring.

Direct impacts are caused by the proposed action and occur at the same time and place. An indirect impact is caused by the proposed action but is further removed in distance or occurs later in time. This EIS considers direct and indirect impacts that are reasonably foreseeable, which means a reasonable person would anticipate or predict the impact. Cumulative potential effects are the result of the impacts of the proposed action in addition to other projects in the environmentally relevant area. Cumulative impacts are analyzed in Chapter 10.

5.1.1 *Potential Impacts and Mitigation*

To provide appropriate context, the following terms and concepts are used to describe and analyze potential impacts:

- **Duration.** Impacts vary in length. Short-term impacts are generally associated with construction. Long-term impacts extend beyond the end of construction and are generally associated with operation of the project. Permanent impacts extend beyond project decommissioning and reclamation.
- **Size.** Impacts vary in size. To the extent possible, potential impacts are described quantitatively; for example, the number of impacted acres or the percentage of affected individuals in a population.
- **Uniqueness.** Resources are different. Common resources occur frequently, while uncommon resources are not ordinarily encountered.
- **Location.** Impacts are location dependent. For example, common resources in one location might be uncommon in another.

The context of an impact—in combination with its anticipated on-the-ground effect—is used to determine an impact intensity level, which can range from highly beneficial to highly harmful. Impact intensity levels are described using a qualitative scale, which is explained below. These terms are not intended as value judgments, but rather a means to ensure common understanding among readers and to compare potential impacts among alternatives. Impact intensity levels are as follows:

- **Negligible** impacts do not alter an existing resource condition or function and are generally not noticeable to an average observer. These short-term impacts affect common resources.
- **Minimal** impacts do not considerably alter an existing resource condition or function. Minimal impacts might, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short or long term.
- **Moderate** impacts alter an existing resource condition or function and are generally noticeable to the average observer. Impacts might be spread out over a large area making them difficult to observe but can be estimated by modeling. Moderate impacts might be long term or permanent to common resources, but generally short to long term to uncommon resources.
- **Significant** impacts alter an existing resource condition or function to the extent that the resource is impaired or cannot function. Significant impacts are likely noticeable or predictable to the average observer. Impacts might be spread out over a large area making them difficult to observe but can be estimated by modeling. Significant impacts can be of any duration and affect common or uncommon resources.

Also discussed are opportunities to mitigate potential impacts through **mitigation**. Mitigation means:

- avoiding impacts altogether by not undertaking a certain project or parts of a project;
- minimizing impacts by limiting the degree of magnitude of a project;
- rectifying impacts by repairing, rehabilitating, or restoring the affected environment;
- reducing or eliminating impacts over time by preservation and maintenance operations during the life of the project;
- compensating for impacts by replacing or providing substitute resources or environments; or
- reducing or avoiding impacts by implementing pollution prevention measures.

Some impacts can be avoided or minimized; some might be unavoidable but can be minimized; others might be unavoidable and unable to be minimized but can be rectified (corrected). The level at which an impact can be mitigated might change the impact intensity level.

When referring to construction practices or mitigation measures, this EIS uses the convention of describing these as actions by the applicant, even if the action would be carried out by the applicant's contractor.

5.1.2 *Regions of Influence*

Potential impacts on human and environmental resources are analyzed within specific geographic areas called regions of influence (ROI). The ROI is the geographic area where the project might exert some influence and is used as the basis for assessing potential impacts. ROIs vary by resource. As necessary, the EIS discusses potential impacts and mitigation measures beyond the identified ROI to provide appropriate context. Direct impacts within the ROI might cause indirect impacts outside the ROI.

This EIS uses the following ROIs:

- **Construction Workspace** – Includes the capture facility and workspaces required for the proposed pipeline. RA-South: as proposed by applicant; RA-North and RA-Hybrid: estimated, including valve locations and potential additional temporary workspace
- **Route Width** – RA-South: as proposed by applicant; RA-North and RA-Hybrid: 500 feet centered on the centerline with exceptions where more width would be needed for construction
- **Local Vicinity** – All route alternatives: area within 1,600 feet of the route width
- **Project Area** – All route alternatives: area within 1 mile of the route width
- **Otter Tail and Wilkin Counties**

The ROIs include the proposed CO₂ capture facility. **Table 5-1** summarizes the ROIs used in this EIS by resource element.

Table 5-1 Regions of Influence

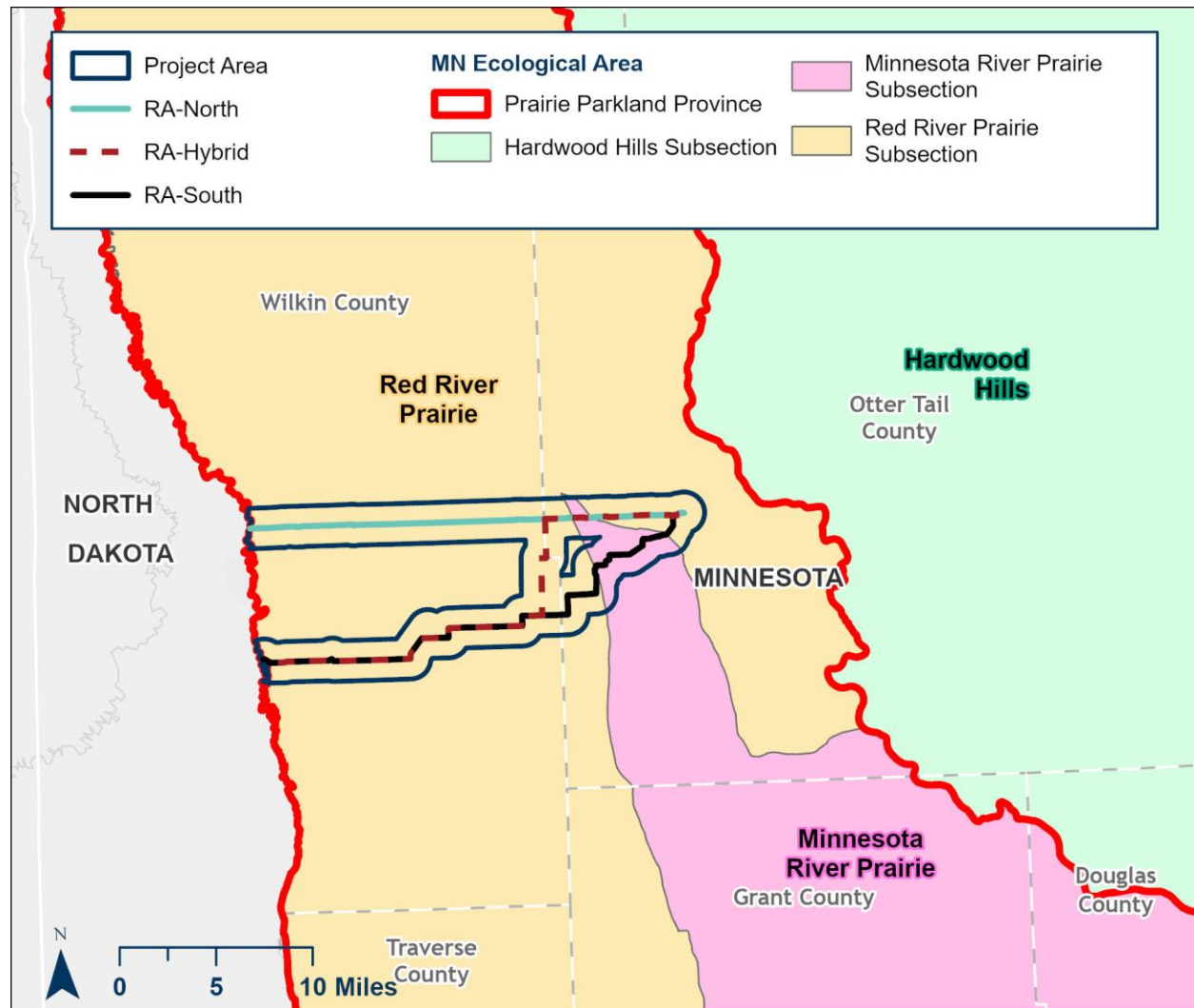
Resource Type	Resource Element	Region of Influence
Human Settlement	Land Use and Zoning	Route Width
	Environmental Justice	Census Tracts crossed by the Route Width
	Aesthetics, Noise, Property Values, Recreation, Public Services, Populated Areas	Local Vicinity
	Cultural Resources, Tribal Treaty Rights	Project Area
	Public Health and Safety, Public Infrastructure, Socioeconomics	Otter Tail and Wilkin Counties
Land-based Economies	Agriculture, Commercial, Forestry, Industrial, Mining	Route Width
	Tourism	Local Vicinity
Archaeological and Historic Resources		Project Area
Natural Environment	Geology, Soils, Vegetation	Construction Workspace
	Public and Designated Lands, Floodplains, Wildlife and their Habitats	Route Width
	Rare and Unique Resources, Surface Waters, Groundwater	Project Area
	Air Quality, Climate Change	Otter Tail and Wilkin Counties

5.2 Environmental Setting

The environmental setting includes the geological and vegetative character of the landscape surrounding the project in addition to the built human environment. Route alternatives RA-North,

RA-Hybrid, and RA-South all traverse Otter Tail and Wilkin Counties in western Minnesota. The counties intersect the Prairie Parkland Province and the Minnesota River Prairie and Red River Prairie subsections as defined by the DNR Ecological Classification System.¹ The provinces and subsections are shown in **Figure 5-1** and described below.

Figure 5-1 Minnesota Ecological Areas in the Vicinity of the Project



5.2.1 *Prairie Parkland Province*

The Prairie Parkland Province extends north to south across western Minnesota and stretches northwest into Manitoba, west into North Dakota and South Dakota, and south and southeast into Iowa and beyond, covering much of the midwestern United States. The province coincides with the portion of the state dominated by tallgrass prairie prior to European settlement and cultivation. Glacial ice crossed the province several times during the Wisconsin glaciation, heavily influencing the province's landscape by depositing a mantle drift 100 to 600 feet deep in most places. The province is also largely defined by the deep-water sediments deposited by Glacial Lake Agassiz at the northern end of the province, and by the Minnesota River valley that cut through the southern part of the province by Glacial River Warren. Both provincial geological features extend beyond Otter Tail and Wilkin Counties.²

5.2.2 Minnesota River Prairie Subsection

All route alternatives cross a small portion of the Minnesota River Prairie subsection at the subsection's northernmost tip. The subsection is bounded by large plains of glacial till flanking the Minnesota River and is largely characterized by 60 miles of gently rolling ground moraine. Shale, sandstone, and clay bedrock is topped by well to moderately drained loamy soils throughout most of the subsection.³ Pre-European contact vegetation was largely tallgrass prairie with islands of wet prairie and forests along the Minnesota River. Forested wetland areas, where present, are typically dominated by species other than oaks. Agriculture is the dominant land use today, and small stands of remnant native tallgrass prairie can be found spotting the subsection.⁴

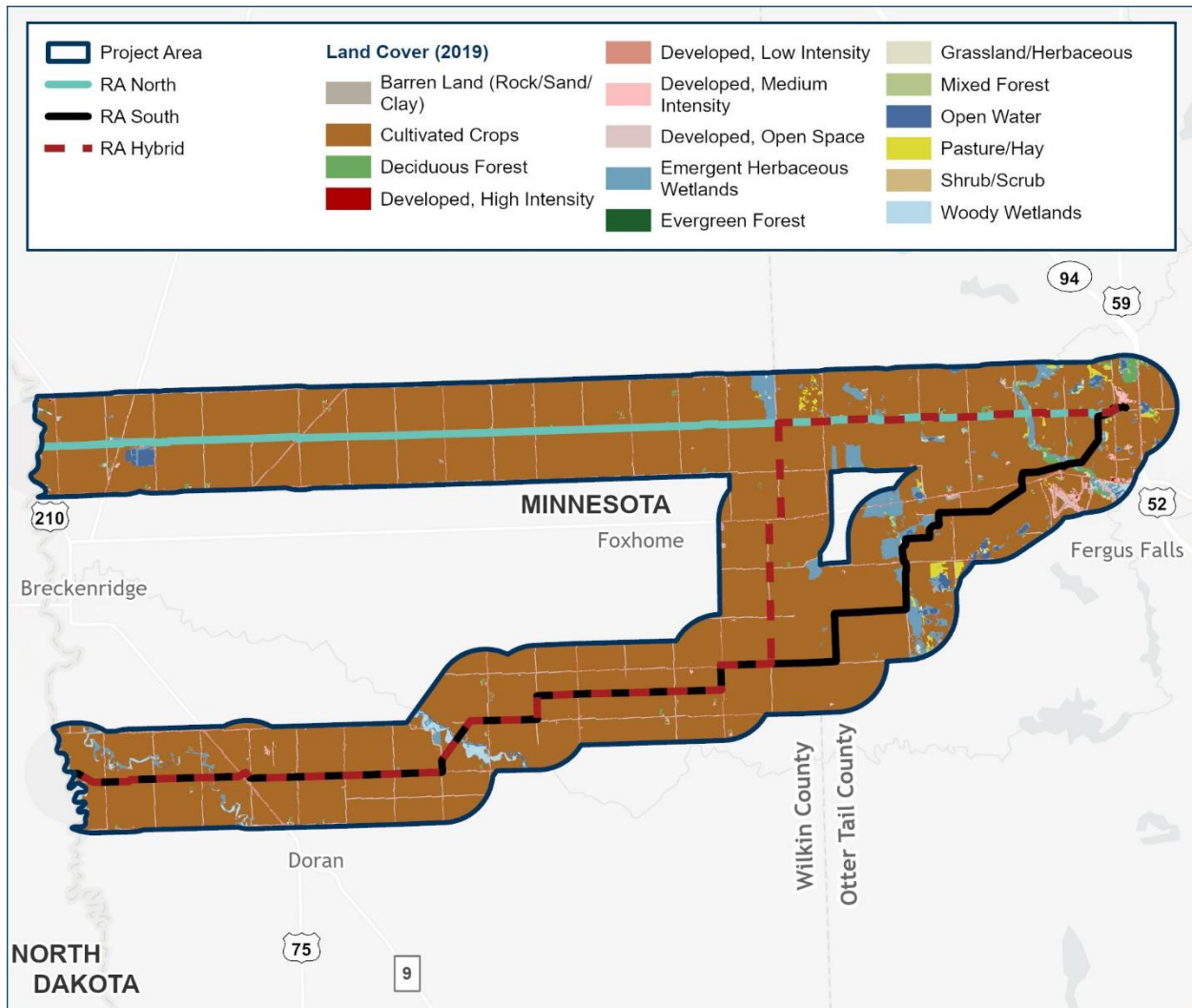
5.2.3 Red River Prairie Subsection

All route alternatives cross the Red River Prairie subsection toward the subsection's southern end. Most of the subsection to the north of the route alternatives is defined by the deep-lake deposits of Glacial Lake Agassiz. It includes poorly to moderately well drained silty, sandy, and clayey lacustrine deposits overlaying sedimentary bedrock. The major landform of the subsection and of the project area is the remaining large lake plain. Topography across the area is level to gently rolling. The subsection and its defining lake plain have been extensively ditched for agriculture with few small fragments of native prairie remaining.⁵ Pre-European contact vegetation was largely composed of tallgrass prairie and wet prairie with narrow stretches of forest along streams and rivers.⁶ Agriculture is the dominant land use today, and small stands of remnant native tallgrass prairie can be found spotting the area.⁷ According to 2019 National Land Cover Database (NLCD) data,⁸ land use is relatively consistent among the route alternatives and is mostly composed of cultivated land with some small, scattered sections of woody herbaceous wetland, pasture/hay field, deciduous forest, and few areas of developed spaces. The closest cities within Minnesota are Fergus Falls in Otter Tail County to the southeast of the capture facility, and Breckenridge in Wilkin County. Breckenridge is on the east side of the Red River and is south of the western end of RA-North and north of the western ends of RA-Hybrid and RA-South. The city of Wahpeton, North Dakota, is adjacent to Breckenridge on the west side of the Bois de Sioux River.

5.2.4 Project Area

Each route alternative would parallel existing road ROW, mostly through agricultural fields, and would occasionally cross agricultural fields, rivers, and the wetlands and wooded areas along river edges. All three routes cross the Pelican River at the eastern end of the project. The RA-Hybrid and RA-South routes cross the Otter Tail River toward the west-central end of the project. As shown in **Figure 5-2**, the NLCD classifies most land cover in the areas crossed by all three route alternatives as cultivated crops.

Figure 5-2 Land Cover Types in Project Area



5.3 Impacts Anticipated to be Negligible

Impacts for three resource categories—commercial economies, forestry, and mining—are expected to be negligible. The ROI for each of these resources is the local vicinity (area within 1,600 feet of the route width) for each route alternative.

Commercial economies include property used for businesses such as grocery stores, offices, and manufacturing shops. No commercial properties are located within the three route alternatives.

Forestry is defined as land used for forestry operations such as commercial timber harvest. The landowner list does not include commercial timber companies. No forestry operations are located within the ROIs for the three route alternatives. RA-North, RA-Hybrid, and RA-South do not cross significant forested areas. Currently, the maximum potential impact on forested cover communities for any of the route alternatives is 0.1 acre—primarily hardwoods, with only partial oak coverage. The maximum possible impact on oak communities, regardless of route alternative selected, is less than 0.1 acre. Thus, commercial timber harvest is not expected in the route width. The applicant indicates

that landowners may keep any timber cut for clearing during construction, and easement agreements can compensate for impacts on personal use harvest of wood products. These agreements are outside the scope of this EIS.

Mining is defined as operations to obtain surface or subsurface minerals and aggregates. The Aggregate Source Information System maintained by MnDOT shows no aggregate sources along any of the proposed routes.⁹

5.4 Human Settlement

5.4.1 Aesthetics

The ROI for aesthetics is the local vicinity (area within 1,600 feet of the route width). Aesthetic impacts are subjective. Thus, potential impacts are unique to the individual and can vary widely. Potential impacts along each route alternative are expected to be minimal to moderate during construction. RA-North would have several more residences with at least a partial view of the construction workspace compared to RA-Hybrid. RA-South would have several fewer residences with at least a partial view of the construction workspace compared to RA-Hybrid. For those residences with at least a partial view of the construction workspace, visual impacts would be noticeable during construction, but would be short term in nature. The pipeline would be underground and not visible during project operation. MLVs would create long-term aesthetic impacts within a small viewshed. The capture facility would be located at the ethanol plant and its impact would be incremental to the viewshed. Aesthetic impacts from project operation would be negligible to minimal, with no noticeable difference among the route alternatives.

5.4.1.1 Existing Conditions

Aesthetics refer to the visual quality of an area as perceived by a viewer and forms the impression a viewer has of an area. Aesthetics are subjective, meaning their relative value depends on the perception and philosophical or psychological responses unique to individuals. Impacts on aesthetics are equally subjective and depend on an individual's sensitivity and exposure. How an individual values aesthetics, as well as perceived impacts on a viewshed, can vary greatly.

Viewer sensitivity is an individual's interest or concern for the quality of a viewshed and varies depending on the activity viewers are engaged in, their values and expectations related to the viewshed, and their level of concern for potential changes to the viewshed. Viewer exposure refers to variables associated with observing a viewshed and can include the number of viewers, frequency and duration of views, and view location. Viewer exposure would typically be highest for views experienced by high numbers of people, frequently, and for long periods. These variables, as well as other factors, such as viewing angle or time of day, all affect the aesthetic impact. Aesthetic impacts are subjective, unique to the individual, and can vary widely.

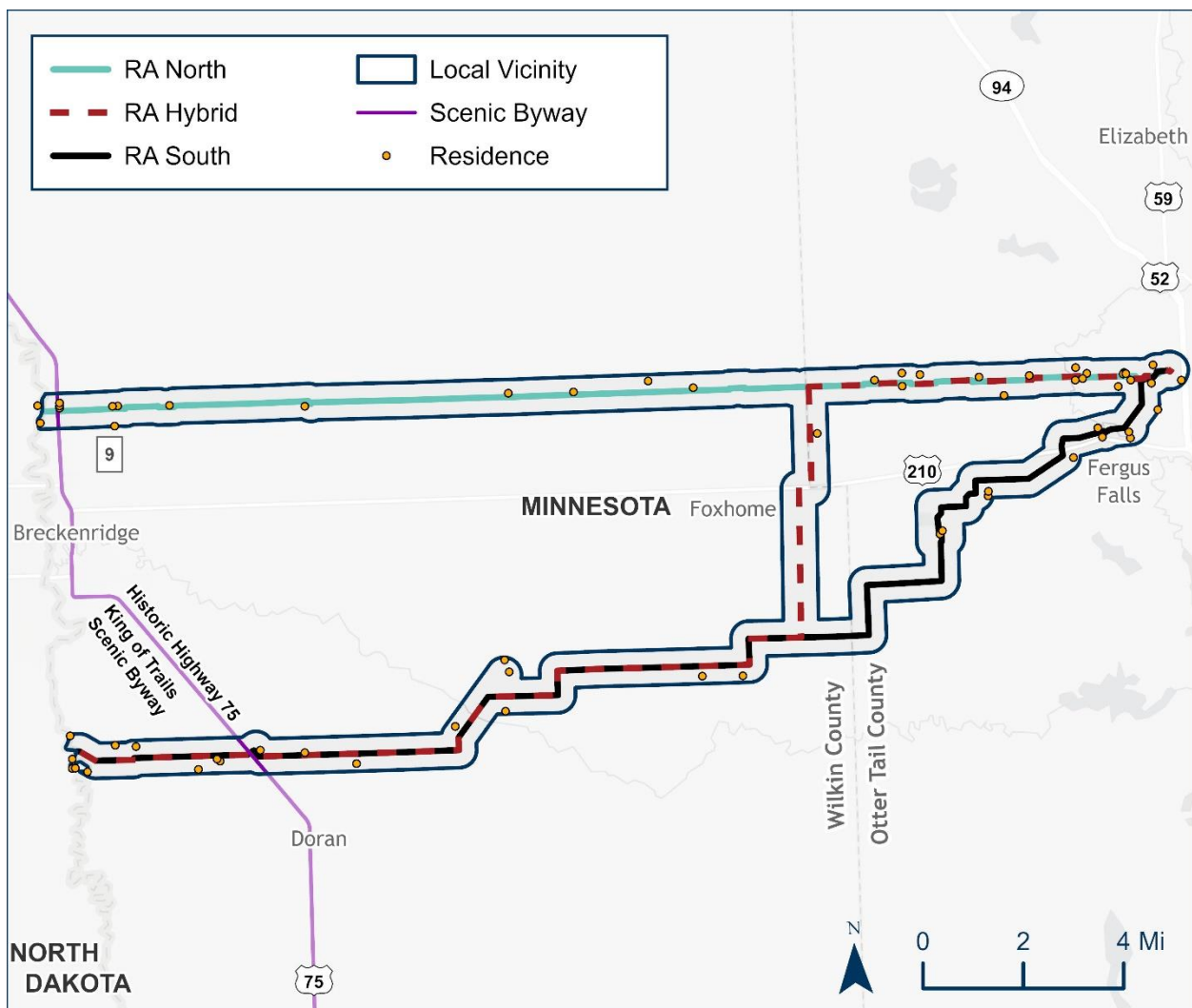
A viewshed includes the natural landscape and built features visible from a specific location. Natural landscapes include wetlands, surface waters, distinctive landforms, and vegetation patterns. Homes, businesses, roads, bridges, cell towers, and power lines are examples of built features. Generally, an intact and harmonious viewshed is considered by many to be more aesthetically pleasing.

Viewsheds within the local vicinity of each route alternative and the capture facility are defined largely by transportation and agriculture, with the majority of the viewshed within the local vicinity for all three route alternatives being composed of cultivated fields. Large sections of each route alternative would parallel existing road ROW. RA-North would parallel existing roadways along its entire route, except for

the westernmost 0.3 mile where it crosses an agricultural field between US Highway 75 and the Red River at the Minnesota-North Dakota border. Both RA-Hybrid and RA-South would diverge from road ROW to cross agricultural fields at several locations before rejoining a different road ROW. All three route alternatives would cross the Pelican River near the eastern end of the project. RA-Hybrid and RA-South would cross the Otter Tail River toward the west-central end of the project. All three routes would cross one scenic byway, the historic US Highway 75 King of Trails Scenic Byway, in Wilkin County. All three routes would also cross historical trails to Abercrombie and Breckenridge.¹⁰ There are no scenic overlooks, parks, trails, or documented cultural landscapes¹¹ within the local vicinity of the route alternatives.

No schools, churches, or similar gathering places are within the local vicinity of the route alternatives. There are 33 residences within the local vicinity of RA-North, 39 residences within the local vicinity of RA-Hybrid, and 34 residences within the local vicinity of RA-South. The locations of these residences, as well as the King of Trails Scenic Byway, are shown in **Figure 5-3**.

Figure 5-3 Residences and Scenic Byway within the Local Vicinity for each Route Alternative



5.4.1.2 Potential Impacts

Construction related aesthetic impacts would be short term and primarily include vegetation removal, trenching, dirt piles, equipment laydown areas, increased traffic, and presence of construction vehicles, machinery, and equipment. These short-term visual impacts would be greatest for residents living within the local vicinity. Residents would likely be accustomed to seeing similar heavy equipment used for farming (tractors, combines, etc.) during agricultural operations. The route alternative with the most residences in the local vicinity is RA-Hybrid with 39 residences, followed by RA-South with 34 residences, and RA--North with 33. **Table 5-6, Table 5-7, and Table 5-8** in Section 5.4.5 list the residences within the local vicinity and their distance from the pipeline centerline for each route.

Potential impacts along each route alternative are expected to be minimal to moderate during construction for those residences with at least partial visibility of the construction workspace. Construction related impacts would decrease greatly as segments are completed and restored. Impacts would generally be short term and localized.

Based on review of satellite imagery, about 16 residences within the local vicinity of RA-North have vegetation, typically a shelter belt or wind break, that would block their view of the construction workspace, whereas 24 residences within each of the local vicinities for RA-Hybrid and RA-South would have their views of the construction workspace blocked by dense vegetation. The remaining residences along each alternative route would have at least partial visibility of short-term construction activities occurring near their residence. The approximate number of residences within the local vicinity with at least partial views would be 17 for RA-North, 15 for RA-Hybrid, and 10 for RA-South. Based on this desktop analysis, RA-South would have the fewest residences exposed to short-term construction-related aesthetic impacts. However, impacts are expected to be short term and minimal for all route alternatives.

All residents with homes located within the local vicinity for each route would likely see construction activities while driving to and from their residences. Limited removal of trees and shrubby vegetation would be required for pipeline installation and maintenance.

Construction activities would be visible for a short distance to travelers along the King of Trails Scenic Byway. All three route alternatives would use HDD technology to cross this highway. Travelers on the scenic byway would briefly see the drilling equipment and other construction activities at the pipeline crossing location. RA-Hybrid and RA-South would parallel the King of Trails Scenic Byway for about 0.15 mile, resulting in greater visual impacts during construction compared to RA-North. As shown in the maps in **Appendix B**, there are few trees and little shrubby vegetation within view of the scenic byway where it would be crossed by RA-Hybrid or RA-South. On RA-North, trees along the Red River may be visible from the scenic byway, but these trees would not be removed by the project because the Red River would be crossed using HDD methods.

After construction, the applicant would generally maintain the 50-foot-wide operational ROW over the pipeline by mowing and removing woody vegetation taller than 15 feet in non-cultivated areas. Exceptions include the area between HDD entry and exit points where the vegetation would not be maintained and at riparian buffers adjacent to waterbodies where only a 10-foot-wide corridor would be maintained. Travelers along the scenic byway could notice portions of the maintained operational ROW where it does not blend in with the surrounding vegetation. Because the surrounding area is largely farmland, the maintenance of an herbaceous state during operation would result in minimal impact.

Aesthetic impacts from project operation would be minimal. Because the capture facility would be located at the ethanol plant, it would not introduce a new visual element to the viewshed and its impact would be incremental. There is one residence within the local vicinity of the capture facility. Views of the capture facility from this residence, which is about 1,500 feet away, would be obstructed by shelter belts. Although the capture facility would be visible to travelers along 240th Street and 170th Avenue, it would generally blend with the existing industrial setting of the ethanol plant.

During project operation, the pipeline would be buried underground and not visible. Aboveground facilities along the length of the pipeline would include MLVs and both temporary and permanent access roads. The pipeline pig/inspection tool launcher would be located within the capture facility. The MLVs would be installed with minor aboveground components that would be about 9.5 feet tall. These features would create long-term aesthetic impacts within a small viewshed.

The nearest aboveground structure to the King of Trails Scenic Byway associated with RA-North would be an MLV over 1 mile east of the crossing. The nearest MLVs to the King of Trails Scenic Byway associated with RA-Hybrid and RA-South are over 2 miles away. Therefore, no aboveground facilities would be visible from the King of Trails Scenic Byway for any of the route alternatives.

Aesthetic views would be impacted by vegetation removal required for pipeline installation at various points along each route alternative. Vegetation in workspaces outside the operational pipeline easement would be allowed to grow back. Within the 50-foot-wide operational ROW, the applicant would maintain vegetation by mowing and trimming woody vegetation greater than 15 feet tall in areas outside of agricultural production.

Post-construction vegetation maintenance would be limited adjacent to waterbodies to promote the growth of the riparian buffer. At these locations, the applicant would limit vegetation maintenance along a 10-foot-wide corridor centered over the pipeline to facilitate visual inspection of the pipeline and allow for corrosion and leak surveys. Vegetation between HDD entry and exit points, which would not be cleared during construction, would not be cleared or mowed routinely during project operation. Therefore, visual impacts from vegetation clearing at the Pelican, Otter Tail, and Bois de Sioux Rivers would be minimized.

5.4.1.3 Mitigation

Commission Sample Routing Permit

The sample routing permit, provided in **Appendix H**, includes the following mitigation measures for aesthetics:

- “Care shall be used to preserve the natural landscape, minimize tree removal, and prevent any unnecessary destruction of the natural surroundings in the vicinity of all pipeline construction and restoration activities.” (**Appendix H**, Section 7.11, Landscape Preservation).
- “The Permittee shall clear the permanent right-of-way and temporary right-of-way preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation in areas such as trail and stream crossings where vegetative screening may minimize aesthetic impacts, to the extent that such actions do not impact the safe operation, maintenance, and inspection of the pipeline and are in compliance with all applicable laws and regulations.” (**Appendix H**, Section 7.14, Vegetation Management).

Additionally, the routing permit in **Appendix H**, Section 8, Other Permits and Regulations, states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all

required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations.”

Applicant-Proposed Mitigation

The applicant proposes to use the HDD method to cross the Pelican River, Otter Tail River, Bois de Sioux River, and King of Trails Scenic Byway. Because vegetation would not be cleared between the HDD entry and exits, aesthetic impacts at these locations would be minimized.

No mitigation specific to aesthetics is proposed for the capture facility.

Mitigation Proposed During Comment Periods

No mitigation specific to aesthetics was proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended.

5.4.2 Cultural Resources

The ROI for cultural resources is the project area (area within 1 mile of the route width), though this discussion also provides a greater context for Otter Tail and Wilkin Counties. Cultural resources contribute to the principles that form the foundation for community unity. These principles can pull from heritage, local resources, and common experiences/events and can include work and leisure pursuits, land use, Tribal identified cultural resources, and native Minnesota plants and wildlife of Tribal significance. Cultural resources impacts are subjective. Thus, potential impacts are unique to the individual or community and can vary widely. Agricultural operations, which can have contemporary cultural value, would be impacted temporarily along each of the route alternatives, but the project would not remove cultivated land from production. The project could temporarily impact hunting activities and the habitats of plants and wildlife of Tribal cultural interest during construction and until restoration of disturbed areas is complete. Overall, potential impacts on cultural resources during construction and operation of the project are anticipated to be minimal and would be similar for all route alternatives, though landowners with property within the construction workspace would experience this impact to a greater extent.

5.4.2.1 Existing Conditions

Cultural resources contribute to the principles that form the foundation for community unity. These principles can pull from heritage, local resources, and common experiences/events. The project area has been home to various peoples and cultures over time. During the period of European contact (1650 to 1837 AD) into the Post-Contact Period (1837 AD to Present), the Dakota people (historically known by Euro-American settlers as the Sioux) and the Ojibwe (historically known by Euro-American settlers as the Chippewa) occupied the land within the local vicinity of the project area. In the 1825 Treaty of Prairie du Chien,¹² the Ojibwe relinquished their claims to the area. The land was ceded by the Dakota in two 1851 treaties at Traverse des Sioux and Mendota (see Section 5.4.12).^{13, 14}

According to the United States Department of Housing and Urban Development Tribal Directory Assessment Tool, contemporary Tribes with historic cultural interest or ancestral ties in the project area include the:

- Apache Tribe of Oklahoma;
- Cheyenne and Arapaho Tribes of Oklahoma;

- Flandreau Santee Sioux Tribe of South Dakota;
- Fort Belknap Indian Community of the Fort Belknap Reservation of Montana;
- Iowa Tribe of Kansas and Nebraska;
- Lac Vieux Desert Band of the Lake Superior Chippewa Indians of Michigan;
- Leech Lake Band of the Minnesota Chippewa Tribe;
- Lower Sioux Indian Community of Minnesota;
- Prairie Island Indian Community of Minnesota;
- Minnesota Chippewa Tribe;
- Menominee Indian Tribe of Wisconsin;
- Santee Sioux Nation of Nebraska;
- Sisseton-Wahpeton Oyate of the Lake Traverse Reservation of South Dakota.¹⁵

No contemporary or historic Tribally owned reservation or trust land bounds are located within Otter Tail and Wilkin Counties.¹⁶ Bodies of water of Tribal significance include Otter Tail River, Otter Tail Lake, Bois de Sioux River, and Pelican River. These rivers and lakes are described by the Mille Lacs Band of Ojibwe using Ojibwe toponymy as follows. Otter Tail River is known in Ojibwe as Nigigwaanowe-ziibi (Otter Tail River) due to the long sandbar at the river's outlet into Otter Tail Lake, which results in Fergus Falls being called Nigigwaanowe gakaabikaans (Little falls of the Otter Tail), Bois de Sioux as Gaa-edawayi'ii-maamiwang-ziibi (River from which it [Lake Traverse] flows out from both ends) due to the lake's location within Glacial Lake Agassiz and now is a basin divide, and Pelican River as Zhede-zaaga'iganiwi-ziibi (River that of Pelican lake) due to Lakes Lizzie and Lida, known as Zhede-zaaga'igan aazhawaakwa (Pelican lake beyond the woods) and Zhede-zaaga'igan (Pelican lake) respectively, being a habitat for American white pelican (*Pelecanus erythrorhynchos*).¹⁷

Native Minnesota plants of significance to Tribes can include northern white cedar, sugar maple, wild rice, sage, and sweetgrass. According to the United States Department of Agriculture (USDA) PLANTS database,¹⁸ northern sweetgrass (*Hierochloa hirta*) and white sage (*Artemisia ludoviciana*) are native to both Otter Tail and Wilkin Counties, while northern white cedar (*Thuja occidentalis*) and sugar maple (*Acer saccharum*) are native only to Otter Tail County. There are a number of recorded wild rice lakes within Otter Tail County, though none are located within the project area.¹⁹ There are no wild rice lakes in Wilkin County.²⁰ The project area is heavily cultivated with minimal intact areas of native prairie—habitat where sweetgrass and white sage might grow. See Sections 5.7.7 and 5.7.10 for further information on vegetation.

Native Minnesota wildlife of Tribal significance can include bison, deer, elk, moose, black bear, wolf, lynx, grouse, furbearing mammals, waterfowl, and various species of fish, depending on the region. During the Contact Period, European hunting and habitat conversion resulted in the loss of many species in this area. Today, no wild bison herds exist in Minnesota and no managed bison herds exist within the project area.²¹ White-tailed deer (*Odocoileus virginianus*) are present within the project areas.²² Elk (*Cervus canadensis*),²³ moose (*Alces alces*),²⁴ black bear (*Ursus americanus*),²⁵ gray wolf (*Canis lupus*),²⁶ and Canada lynx (*Lynx canadensis*)²⁷ no longer occur naturally within the project area. Sharp-tailed grouse (*Tympanuchus phasianellus*) and ruffed grouse (*Bonasa umbellus*) might occasionally be found within the project area.²⁸ Various species of seasonal waterfowl and fish might be found along the Pelican and Otter Tail Rivers, or in one of the several National Waterfowl Production Areas at the eastern end of the project area. Furbearing mammals can include mink (*Neovison vison*),²⁹ fisher (*Pekania pennanti*),³⁰ beaver (*Castor canadensis*),³¹ river otter (*Lontra canadensis*),³² and muskrat

(*Ondatra zibethicus*).³³ All species, with the exception of the fisher, might be found along the riverbanks of the Pelican and Otter Tail Rivers, and possibly within the National Wildlife Production Areas to the eastern end of the project area. See Section 5.7.10 for further information on wildlife.

During the Contact Period, the first Europeans in Otter Tail and Wilkin Counties were French and British fur traders. By 1870, the European population was composed mostly of Norwegian, Swedish, German, and English settlers.³⁴ Later, as railroads were built through the counties, towns were built along the rail lines. Lumber and agriculture became the major industries of each county. Fergus Falls became the major lumber city of the area.

As wheat evolved into the dominant crop of the late 1800s, Otter Tail County became known for its milling. One of the most famous mills, Phelps Mill, has been preserved as part of a county park and is now a popular historic and recreation site.³⁵ Phelps Mill Park is located outside of the project area. Historic logging throughout both Otter Tail and Wilkin Counties largely cleared most wooded areas in both counties.

Today, agricultural land use comprises nearly all of Wilkin County and about half of Otter Tail County³⁶ (see Section 5.4.4 for more information on land usage within the route width). The contemporary cultural value of local agriculture is exhibited and celebrated at the Wilkin County Fair³⁷ and the East and West Otter Tail County fairs each year.³⁸

Otter Tail County contains numerous outdoor community resources available to residents and visitors, such as a large chain of recreational boating and fishing lakes, three county parks (historic Fort Juelson Park, historic Phelps Mill Park, and the in-development Echo Bay Park), two county hiking trails (Glacial Edge Trail and Heart of the Lakes Trail),³⁹ the Fergus Falls Fish & Game Club's Orwell property, and two state parks (Maplewood State Park⁴⁰ and Glendalough State Park⁴¹). All of these community resources are located outside the project area, except for the Fergus Falls Fish & Game Club's Orwell property, which is within the route width for RA-South.

The City of Fergus Falls is the largest city within either county. The city supports an active art community with the local organizations and attractions of A Center for the Arts, Kaddatz Galleries, Kaddatz Artist Lofts, Springboard for the Arts, and the Lake Region Arts Council.⁴² Major events in Fergus Falls include the annual Summerfest and the West Otter Tail County Fair.

Breckenridge is the largest city in Wilkin County and is directly across the Bois de Sioux River from Wahpeton, North Dakota. The city's Headwaters Park and Boat Landing and Welles Memorial Park mark the joining of the Bois de Sioux and Otter Tail Rivers to form the Red River. The Bois de Sioux Public Golf Course is known as the only public golf course in the United States to house nine holes in two different states. The Wilkin County Fair is held annually in Breckenridge.⁴³

The highest employing industries in the region encompassing Otter Tail and Wilkin Counties are health care, manufacturing, retail, public administration, education, and accommodation and food services.⁴⁴ However, contemporary cultural resources are centered around the agricultural industry and the appreciation of the natural features of the region.

5.4.2.2 Potential Impacts

The value residents put on the character of the landscape within which they live is subjective, meaning its relative value depends upon the perception and philosophical or psychological responses unique to individuals. Because of this, construction of the project might—for some residents—change their

perception of the area's character, thus potentially eroding their sense of place or connection to the landscape.

This tension between infrastructure projects and rural character creates real tradeoffs. Some stakeholders view the project as harmful or unhelpful (for example, "not proven to reduce emissions – small effect on global," "farmland takes more than 3 years to come back and is disruptive," "long-term impact on land, animals, water, and humans basically unknown").⁴⁵ Other stakeholders see it as beneficial (for example, environment and climate benefits [by reducing CO₂ emissions], decarbonizing/removing CO₂ and associated health benefits, local community and socioeconomic benefits, agriculture industry benefits). This document cannot resolve these issues but can acknowledge they exist.

This might be the case for the landowners directly within the construction ROW who are concerned about damage to their agricultural lands. The remaining resources defining the contemporary culture of the residents of Otter Tail and Wilkin Counties are located largely outside of the project area and would not be directly impacted by the project.

Surveys for cultural resources have been completed for about 89 percent of a 300-foot-wide corridor along the pipeline centerline for RA-South, 60 percent of RA-Hybrid, and 1 percent of RA-North. Potential impacts on cultural resources, including Tribal identified cultural resources and native Minnesota plants and wildlife of Tribal significance, within the project area for RA-North, RA-Hybrid, and RA-South would be similar for all three route alternatives. The project would temporarily impact the habitats of plants and wildlife during construction until restoration of disturbed areas is complete. Some of these habitats, and the plants and wildlife they contain, may have Tribal significance. Land that would be affected within the construction ROW is mostly agricultural (see **Table 5-4** in Section 5.4.4), and impacts would be limited to temporary, direct impacts on agricultural lands within the construction ROW. The project is not anticipated to impact or alter the work and leisure pursuits or land use of residents within the project area of any route alternative in such a way as to impact the current underlying culture of the area. The project would impact agricultural operations temporarily, but because the project would not remove cultivated land from long-term production, no long-term impacts on agricultural activities are expected.

The project would impact hunting activities temporarily during construction, due to the removal of vegetation in construction workspaces and higher levels of noise from construction vehicles and equipment (see Section 5.4.5 for more details on noise). The project would not result in temporary closures of hunting areas. RA-South would pass through the Fergus Falls Fish & Game Club's Orwell property. The applicant would continue to communicate with the club to minimize visual and noise impacts during construction. The pipeline would be underground during operation and would not cause visual or noise impacts on hunting areas. Overall, impacts on hunting activities are anticipated to be short term and minimal. Impacts on hunting are also influenced greatly by construction timing; that is, if construction overlaps an active hunting season.

5.4.2.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include mitigation measures specific to cultural resources. The sample routing permit in **Appendix H**, Section 8, Other Permits and Regulations, states that "the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations."

Applicant-Proposed Mitigation

The applicant has proposed mitigation for specific types of cultural resources, including agricultural, vegetation, and wildlife resources. See applicant-proposed mitigation for agricultural resources in Section 5.5.1, for vegetation in Section 5.7.7, and for wildlife in Section 5.7.10.

Mitigation Proposed During Comment Periods

No mitigation specific to cultural resources was proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended. Recommended mitigation for agricultural lands is discussed in Section 5.5.1 and in Sections 5.7.7 and 5.7.10 for vegetation and wildlife and their habitats, respectively. Because minimal impacts on these types of cultural resources are anticipated, no further mitigation is recommended.

5.4.3 Environmental Justice

The ROI for environmental justice (EJ) includes the census tracts intersected by the route widths of the route alternatives. An EJ assessment identifies disadvantaged communities that have been historically marginalized and overburdened by pollution and evaluates if a project would disproportionately affect these communities. Census Tract 9609, which is in the ROI for all alternatives, was identified by the MPCA screening tool as an EJ area of concern. Potential impacts along each of the route alternatives are expected to be minimal for EJ communities during construction. Local roadways would experience a short-term minimal increase in traffic during construction activities. Construction would use HDD and boring techniques at road crossings to limit impacts on local traffic. Residents within Census Tract 9609 and the other census tracts crossed by the project might experience intermittent, short-term noise from construction equipment for up to 30 days. Operation of the capture facility and pipeline facilities would not generate noticeable noise. The project would not result in significant impacts on air quality during construction or operation. Potential impacts on EJ populations in the event of a release of CO₂ are expected to be similar to potential impacts on the general public and are described in Chapter 8. Overall, EJ impacts from construction and operation of the project would not result in disproportionate adverse impacts for EJ areas of concern within the ROI and are similar across the three route alternatives.

5.4.3.1 Minnesota Pollution Control Agency Areas of Concern

MPCA maintains the MPCA EJ Proximity Analysis Tool, which is an online mapping tool that “allows users to identify census tracts where additional consideration or effort is warranted to ensure meaningful community engagement and to evaluate the potential for disproportionate adverse impacts.”⁴⁶

This tool identifies EJ areas of concern using the following four criteria:

- At least 35 percent of people reported income less than 200 percent of the federal poverty level
- 40 percent or more minority population
- Federally recognized Tribal areas
- At least 40 percent of people have limited English proficiency

Using these criteria, Census Tract 9609 within Otter Tail County was identified as an MPCA EJ area of concern within the ROI because 43 percent of the population has a reported income that is less than 200 percent of the federal poverty level. The Council on Environmental Quality’s Climate and Economic Justice Screening Tool also identified Census Tract 9609 as a disadvantaged community due to a legacy

pollution and being above the 65th percentile for low income.⁴⁷ The legacy pollution for Census Tract 9609 is related to its proximity to Risk Management Plan facilities, which are located within 3.1 miles.⁴⁸ These facilities use extremely hazardous substances and are therefore required under the United States Environmental Protection Agency (EPA) Clean Air Act to develop a Risk Management Plan to identify the potential effects of a chemical accident, steps to prevent an accident, and emergency response procedures in case of an accident.⁴⁹

5.4.3.2 Existing Conditions

EPA defines EJ as the “fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income in the development, implementation, and enforcement of environmental laws, regulations, and policies,” and the EPA’s EJ guidelines are intended to ensure that all people benefit from equal levels of environmental protection and have the same opportunities to participate in decisions that might affect their environment or health.⁵⁰

An important step in an EJ assessment is identifying whether an EJ community is present within the project’s ROI. The term “environmental justice community” includes disadvantaged communities that have been historically marginalized and overburdened by pollution. Environmental justice areas of concern include, but may not be limited to, minority populations, low-income populations, or indigenous peoples.

EJScreen, an interactive screening and mapping tool developed by the EPA, provides a nationally consistent dataset and approach for combining EJ environmental and demographic indicators. An EJScreen search showed that all negative environmental indicators within the ROI are below the state average except for ozone and the lead paint indicator (percentage of pre-1960s housing). The project would not emit ozone (see Section 5.7.1) or use lead paint. There are no superfund sites or hazardous waste treatment, storage, and disposal facilities located directly within the ROI. The full EJScreen Report is provided in **Appendix K**.

For the purposes of this analysis, EJ populations within the ROI were identified using the MPCA EJ Proximity Analysis Tool and United States census data for low-income and minority populations, as discussed below.

Low Income and Minority Populations

Using United States census data, a demographic assessment of the affected communities in the ROI was conducted to identify low-income and minority populations that might be present (see **Table 5-2**). Statistics for census tracts were compared to their respective county statistics to determine the level of low income and minority populations. The following guidelines were used in the comparison:

- Low-income and minority populations were determined to be present in an area when the percentage of minority group or low-income population exceeded 50 percent of the county population or was “meaningfully greater” than the general population of the county.
- A difference of 10 percentage points or more was used to determine whether the percentage of a minority or low-income group in a census tract in the ROI was “meaningfully greater” than that group’s percentage in the respective county.

Minority populations were calculated as the populations excluding those persons who self-reported as being white (and no other race) and not Hispanic or Latino. The remainder includes persons who self-reported as Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, some other race, having two or more races, or being of Hispanic or Latino origin.

As shown in **Table 5-2**, a meaningfully greater low-income or minority population does not exist for census tracts within the ROI for any of the route alternatives. When compared to the populations of Otter Tail and Wilkin Counties, the percentage of people living in poverty or not self-identifying as white alone were either: (1) not greater than 50 percent, or (2) not 10 percentage points or more than the percentage of the same population in Otter Tail and Wilkin Counties.

Table 5-2 Environmental Justice Data for Census Tracts Crossed by All Route Alternatives^{51, 52, 53}

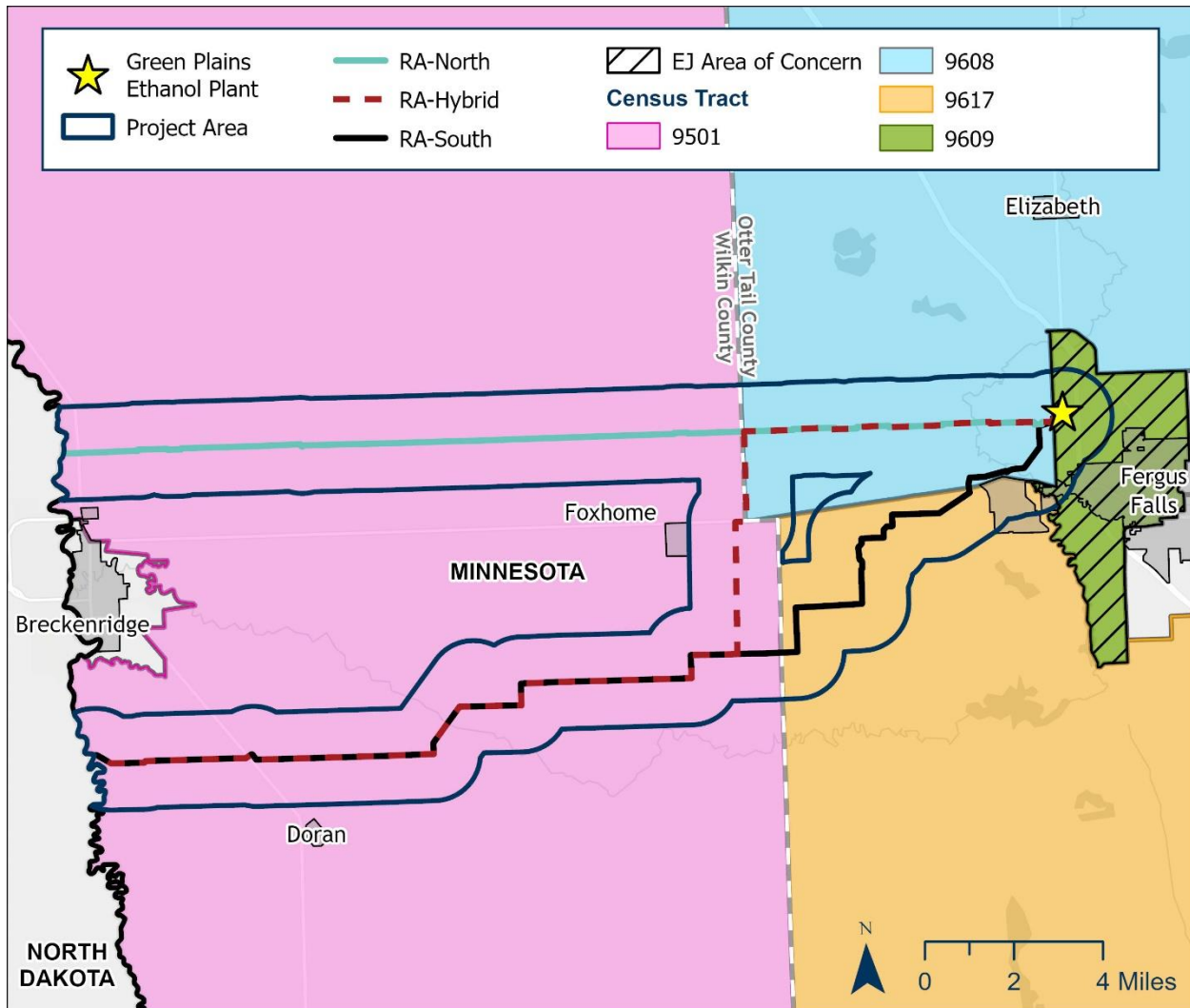
Area	Population	Percent Below Poverty Level	Percent Total Minority ^a
Minnesota	5,706,494	9.3	23.7
Otter Tail County	60,081	8.8	9.5
Wilkin County	6,506	13.5	9.0
Region of Comparison	66,587	9.3	9.5
Otter Tail			
Census Tract 9608	3,149	5.2	6.2
Census Tract 9609	5,853	12.1	11.0
Census Tract 9617	3,234	4.0	5.9
Wilkin			
Census Tract 9501	3,080	7.6	6.2

Note: Minority or low-income populations exceeding the established thresholds are indicated in bold type.

^a "Minority" refers to people who reported their ethnicity and race as something other than non-Hispanic White.

The nearest residence to project facilities in Census Tract 9609 is about 1,500 feet southeast of the capture facility and each of the three route alternatives. **Figure 5-4** shows the census tracts crossed by the three route alternatives.

Figure 5-4 Census Tracts Crossed by the Project



Community Engagement in Identified EJ Areas of Concern

As described in Chapter 3, several public meetings have been held and notices have been published in Fergus Falls, which includes Census Tract 9609, as follows:

- The applicant hosted open houses in Fergus Falls on October 13, 2021; January 25, 2022; April 8, 2022; and June 23, 2022. Prior to the open houses, the applicant sent invitations to landowners and public officials along its proposed route.
- EERA and Commission staff initiated the EIS scoping process on April 10, 2023. Commission staff sent notice to the project contact list. The notice was available on the Minnesota EQB and the Commission webpages on April 18, 2023. The notice was published in the Fergus Falls *Daily Journal* and on the EERA website on April 19, 2023.
- A 30-day public comment period extended from April 18 to May 18, 2023, giving the public an opportunity to provide comments identifying issues, mitigation measures, alternatives, and route alternatives/route segments for consideration in the scope of the EIS. During this period, EERA and Commission staff, accompanied by the applicant, held a total of three in-person public

information and EIS scoping meetings in 2023: two were held in Fergus Falls on May 3 at 1:00 p.m. and 6:00 p.m., and one virtual meeting was held on May 4 at 6:00 p.m.

- On September 27, 2023, EERA staff filed the EIS preparation notice required under Minnesota Rule 4410.2100, subpart 9. This notice was also published in the *EQB Monitor* on September 26, 2023.
- On October 6, 2023, EERA staff sent a letter to newly affected landowners informing them that a route or route segment alternative identified in the Final Scoping Decision has the potential to impact their property.
- On February 7, 2024, EERA and Commission staff, accompanied by the applicant, held in-person meetings at 1:00 p.m. and 6:00 p.m. in Fergus Falls to receive comments on the draft EIS.
- Now that the final EIS has been published, a public comment period is open and a public hearing will be held in August 2024. Interested parties will have the opportunity to speak at the hearings, ask questions, and submit comments.

5.4.3.3 Potential Impacts

While no census tracts within the ROI for the route alternatives were identified to have a meaningfully greater low-income or minority population when compared to their respective counties, Census Tract 9609 was identified by the MPCA screening tool as an EJ area of concern.

Factors that could affect this EJ area of concern include increased traffic during construction, noise, and air impacts from construction and operation. Because Census Tract 9609 is within the ROI for each of the proposed route alternatives, the impacts described below would apply to all three route alternatives.

Local roadways would experience a short-term, minimal increase in traffic during construction activities. Because the roadway network is adequate to support 200 construction vehicles, and because the applicant proposes to cross all paved roads using HDD or boring techniques, impacts on traffic are anticipated to be minimal during construction and negligible during operation. Traffic impacts are described further in Section 5.4.9.

As discussed in Section 5.4.5.1, construction of the pipeline and the CO₂ capture facility, and the use of construction equipment that generates noise, would occur primarily in rural agricultural areas and primarily during daytime hours. Although most construction activities would occur during the daytime hours, HDD typically requires 24-hour construction. Hydrostatic testing could also extend into nighttime hours. Residences within Census Tract 9609 and 1,600 feet of the construction workspace may experience intermittent, short-term noise from construction equipment for up to 30 days.

The capture facility would be near the ethanol plant and within Census Tract 9609. Operation of the capture facility, pipeline, MLVs, launcher, or cathodic protection system would not generate noticeable noise. Therefore, project operation would not result in disproportionate adverse impacts from noise to EJ areas of concern within the ROI.

As discussed in Section 5.7.1, the Minnesota Statewide Screening of Health Risks from Air Pollution (MnRISKS) tool calculates an air pollution score for all areas in the state. The census tracts crossed by the three route alternatives all have air pollution scores below one, indicating that air pollution levels are below health benchmarks and that health effects are unlikely to result after a lifetime of exposure. Construction emissions, further described in Section 5.7.1, are not expected to cause or significantly

contribute to a violation of an applicable ambient air quality standard in any of the census tracts crossed by the three route alternatives.

The project would be required to obtain an air permit from MPCA. As detailed in Section 5.7.1, estimated annual air emissions for the capture facility would be well below the air permit thresholds for all constituents. The project would not result in significant impacts on air quality during construction or operation in Census Tract 9609, or any other census tract crossed by the project. Therefore, construction and operation of the project would not result in disproportionate adverse impacts on air quality for EJ areas of concern within the ROI.

Potential impacts on EJ populations in the event of a release of CO₂ are expected to be similar to potential impacts on the general public and are described in Chapter 8.

5.4.3.4 Mitigation

The project is not anticipated to have EJ impacts, and no additional mitigation outside of the resource-specific mitigation outlined above is proposed at this time.

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include mitigation measures specific to EJ. The sample routing permit in **Appendix H**, Section 8, Other Permits and Regulations, states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations.”

Applicant-Proposed Mitigation

The applicant-proposed mitigation measures for roadways and traffic are listed in Section 5.4.9.2. Measures to reduce air emissions are listed in Section 5.7.1.2, and measures to reduce noise are included in Section 5.4.5.2.

Mitigation Proposed During Comment Periods

No mitigation measures for EJ were proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended.

5.4.4 Land Use and Zoning

The ROI for analyzing impacts on land use and zoning is the route width. Land use is the primary tool used by counties and local jurisdictions to manage growth and development within their limits. Zoning is a regulatory tool used by local governments (cities, counties, and some townships) to promote or restrict certain land uses within specific geographic areas. A routing permit supersedes local zoning, building, and land use rules. However, the Commission’s routing permit decision must be guided, in part, by consideration of impacts on local zoning and land use. Land use in the ROI, and in the area of the project generally, is predominantly agriculture. Project construction would have a short-term, minimal to moderate impact on land use within the construction workspace where agricultural land would be taken out of production for one growing season. Pipeline operation would have a long-term, minimal impact on land use. An operational ROW would be created, but agriculture (the most prevalent land use) could continue. Landowners could not plant trees or build structures within the operational pipeline ROW. The project would be compatible with local and regional land

use plans. Overall, impacts on land use and zoning are anticipated to be minimal and the same for each of the three route alternatives.

5.4.4.1 Existing Conditions

Existing Land Uses and Ownership

Except for road, railroad, and public water crossings, the project is located entirely on privately owned land. This land is used primarily for agriculture, as shown in **Figure 5-2**. Farmsteads, consisting of buildings and service areas adjacent to farms, are scattered throughout the project area. Additionally, there are commercial and industrial land uses in the area, primarily associated with the city of Fergus Falls and the ethanol plant. **Table 5-3** shows the acres of existing land uses and cover types located within the route width of each route alternative. Land cover types were identified using geospatial data. Land use types were grouped into six categories based on the land cover types, including agriculture land, developed land, forested land, open land, open water, and wetlands.

Table 5-3 Land Cover⁵⁴

Land Use	NLCD Cover Types	Acres Within Route Width		
		RA-North	RA-Hybrid	RA-South ^a
Agriculture Land	Cultivated Crops	1,054.7	1,440.4	1,539.2
	Pasture/Hay	2.5	0.6	1.4
	Subtotal	1,057.2	1,441.0	1,540.6
Developed Land	Developed High Intensity	3.1	3.0	2.8
	Developed, Low Intensity	122.9	119.5	70.2
	Developed, Medium Intensity	16.6	15.8	12.7
	Developed, Open Space	170.2	163.0	106.6
	Subtotal	312.8	301.3	192.3
Forested Land	Deciduous Forest	2.6	1.2	3.9
	Subtotal	2.6	1.2	3.9
Open Land	Barren Land (Rock/Sand/Clay)	0.2	0.2	0.1
	Grassland/Herbaceous	0.3	0.0	0.1
	Subtotal	0.5	0.2	0.2
Open Water	Open Water	1.6	1.3	0.0
	Subtotal	1.6	1.3	0.0
Wetlands	Emergent Herbaceous Wetlands	15.6	15.1	81.1
	Woody Wetlands	0.9	1.2	7.4
	Subtotal	16.5	16.3	88.5
Total		1,391.2	1,762.3	1,828.4

^a The requested route width for RA-South is up to 1,808 feet from MP 6.4 to MP 7.1, allowing for additional route study and the potential need to make modifications to the pipeline alignment. A similar increase is not incorporated into the route widths for RA-North and RA-Hybrid.

Local and Regional Plans

Otter Tail County is composed mainly of water, wooded areas, and agricultural production with historically more agricultural production in the western part of the county where the route alternatives cross. The Otter Tail County Long-Range Strategic Plan,⁵⁵ adopted in 2020, establishes a 20-year vision for the county and provides existing conditions and supporting information for each of the strategic plan's elements.

Of the six plan elements that were identified for inclusion in the strategic plan, one of them includes existing and future use of land. The strategic plan suggests that the county implement a future land use map, county-developed model ordinance, and county-wide zoning as tools to expand regulatory growth management or land use authority. A major goal of the strategic plan is to “continue to support and grow the County’s strong and diverse agricultural economy” by supporting farm-to-table programming, such as community farmers markets, to promote the health of the local agricultural economy.

Other goals include the following:

- maintain an environment that supports agriculture at all scales throughout the county
- explore economic development efforts that attract agribusinesses that support agricultural products produced in the county
- ensure that all new development is compatible with the natural and manmade environment
- preserve the scenic quality of the rural landscape by defining the edge of communities and maintaining the rural character of roadways on the edges of communities

Otter Tail County also developed a Local Water Management Plan⁵⁶ that identifies existing and potential problems and opportunities for protection, management, and development of water resources and related land resources within the county. The plan also addresses “development patterns and economic growth” related to surface water and groundwater resources.

Wilkin County does not have a county plan but has adopted the Wilkin County Zoning Ordinance to serve many purposes, as outlined below in the discussion about zoning. The county is primarily agricultural with 92 percent of its land use dedicated to cropland.⁵⁷ Wilkin County developed a Local Water Management Plan that identifies existing and potential problems or opportunities for protection, management, and development of water resources and land resources in the county. The Local Water Management Plan’s goals are to develop and implement a plan of action to promote sound hydrologic management of water and related land resources in the county and to work toward effective environmental protection and management of water and land resources in the county.⁵⁸

The ROI for RA-North would cross the Buffalo Red River Watershed District. The Buffalo Red River Watershed District Comprehensive Watershed Management Plan includes measures to conserve soil and water resources through the implementation of practices, programs, and regulatory controls that effectively control or prevent erosion, sedimentation, and siltation to reduce damages caused by floods, protect the tax base, protect water quality, preserve and conserve natural resources, ensure continued soil productivity, and protect public land and waters.⁵⁹

The ROIs for RA-Hybrid and RA-South would cross the boundaries of the Buffalo Red River Watershed District and the Bois de Sioux Watershed District. The Bois de Sioux Watershed District follows the Joint Comprehensive Watershed Management Plan for the Bois de Sioux and Mustinka Watersheds. This plan

outlines environmental programs, conservation districts, and management of erosion, soil, and water conservation programs.

Zoning

Wilkin County adopted the Wilkin County Zoning Ordinance to serve many purposes. This zoning ordinance serves to create compatibility between different land uses, determine appropriate use of land, protect and preserve the economic viability of land, and protect public health, safety, and the general welfare of the people.

The eastern portion of the project would fall within Wilkin County's Agricultural Zoning District. As stated in the Wilkin County Zoning Ordinance, the Agricultural District is intended to:

Provide a district that would: be protective of agricultural lands of Wilkin County from non-farm influences; foster sound development of farmsteads including the location of farm and non-farm dwellings; retain major areas of natural ground cover for conservation purposes; prevent scattered non-farm growth; secure economy in governmental expenditures for public services, utilities, and schools; deter abuse of water resources and conserve other natural resources of the County.⁶⁰

In addition, the zoning ordinance was enacted generally for the purpose of “protecting and preserving economically viable agricultural land,” among other activities.

The Otter Tail County Shoreland District⁶¹ includes all land within certain distances from public waters: 1,000 feet from the ordinary high water level or a lake, pond, or flowage and 300 feet from a river of the landward extent of the floodplain on such river, whichever is greater. The Otter Tail County Shoreland District controls “lakeshore, river, and stream development independent of the other provisions.” Among other requirements, development in the district requires performance standards that must be met for public and private facilities. This includes placement and design of roads, driveways, and parking areas; vegetation management; grading and filling; and stormwater management.

The ROI for RA-North intersects the Pelican River. This route alternative is located on land within 300 feet of the Pelican River; therefore, this land is considered shoreland and would be within the Otter Tail County Shoreland District.

The ROIs for RA-Hybrid and RA-South cross the Pelican River and one unnamed public creek. These route alternatives are located on land within 1,000 feet of the unnamed public creek and within 300 feet of the Pelican River; therefore, this land is considered shoreland and would be within the Otter Tail County Shoreland District.

5.4.4.2 Potential Impacts

The project would result in temporary changes to current land uses. Most land uses would be allowed to revert to prior uses following construction—for example, agriculture. Because the project would not impair the counties' ability to manage the orderly development and use of land and water resources, impacts on local zoning due to the project are anticipated to be minimal.

Conversion of Existing Land Uses and Cover

Land cover types are identified by the NLCD. Cover types have been grouped into six categories of land use types to discuss the impacts of each route alternative, as shown in **Table 5-4**, along with the construction (short-term) and operational (long-term) impacts for each route alternative.

Table 5-4 Land Cover and Land Use Impacts by Route Alternative ⁶²

Land Use	Cover Types	Acres Within Construction Workspace					
		RA-North		RA-Hybrid		RA-South	
		Construction	Operation	Construction	Operation	Construction	Operation
Agriculture Land	Cultivated Crops	194.6	82.7	297.5	137.9	305.5	144.2
	Pasture/ Hay	-	-	-	-	0.3	0.2
	Subtotal	194.6	82.7	297.5	137.9	305.8	144.4
Developed Land	Developed High Intensity	0.4	0.2	0.4	0.2	1.3	0.2
	Developed, Low Intensity	34.4	20.0	25.9	16.5	14.4	10.0
	Developed, Medium Intensity	4.2	2.8	3.7	2.6	4.5	2.0
	Developed, Open Space	54.6	33.1	32.6	18.0	18.5	10.5
	Subtotal	93.6	56.1	62.6	37.3	38.7	22.7
Forested Land	Deciduous Forest	0.3	0.01	0.1	-	0.1	0.1
	Subtotal	0.3	0.01	0.1	0.0	0.1	0.1
Open Land	Barren Land (Rock/Sand/C lay)	0.1	-	0.1	-	-	-
	Grassland/ Herbaceous	-	-	-	-	-	-
	Subtotal	0.1	0.0	0.1	0.0	0.0	0.0
Open Water	Open Water	0.2	0.2	-	-	-	-
	Subtotal	0.2	0.2	0.0	0.0	0.0	0.0
Wetlands	Emergent Herbaceous Wetlands	1.3	0.8	2.1	1.6	4.7	3.3
	Woody Wetlands	-	-	-	-	-	-
	Subtotal	1.3	0.8	2.1	1.6	4.7	3.3
Total		290.1	139.8	362.4	176.8	349.3	170.5

Agricultural Land

Agricultural land uses include cultivated crop and pasture/hay land cover types. As shown in **Table 5-4**, each route alternative would result in short-term and long-term impacts on agricultural land. Construction activities would temporarily affect active cropland within the construction workspace and may result in a delay, loss, or other impact on planting, the growing season, and/or a harvest effort,

depending on the timing of construction. Agricultural land in the construction workspace would generally be taken out of production for one growing season and restored to previous use following construction, resulting in long-term, minimal to moderate impacts. Long-term impacts would result under all the route alternatives from the construction of the capture facility, MLVs, and permanent access roads, and from the conversion of land to operational pipeline easement. Generally, the existence of a pipeline easement is compatible with row crop agricultural practices, and long-term impacts would be minimal after restoration is complete. Section 5.5.1 discusses impacts on agricultural land in greater detail.

Developed Land

Developed land uses include developed high intensity, low intensity, medium intensity, and open space land cover types. As shown in **Table 5-4**, portions of the project would be constructed on developed land uses. While the project would require operational ROW to construct and operate the capture facility, MLVs, and permanent access roads, it would not result in conversion of land use because the existing land use is already developed.

Forested Land

Forested land uses include the deciduous forest land cover type. As shown in **Table 5-4**, the ROI for each route alternative for this resource includes few areas that are classified as forested land. Minimal impacts on forested land are anticipated for each route alternative as there are no active forestry operations occurring in the route width of any route alternative and commercial timber harvest is not expected to occur. Section 5.5.3 discusses impacts on forested land in greater detail.

Open Land

Open land uses include the barren land cover type. As shown in **Table 5-4**, activities associated with the construction of all route alternatives would result in negligible or minimal, temporary impacts on open land use. Following the completion of construction, open land areas would be restored to pre-construction conditions.

Open Water

Construction activities associated with the pipeline have the potential to affect surface water flow and quality. These activities include clearing and grading, dewatering and trenching, access road construction, waterbody crossings, surface water withdrawals and discharges (for example, for hydrostatic test water), fueling and use of hazardous materials, and restoration or reclamation of construction areas. Most impacts on surface waters would be short term, but impacts associated with disturbance of riparian vegetation could be long term as vegetation re-establishes. Impacts on water resources are discussed in greater detail in Section 5.7.8.

Wetlands

Wetlands in the ROI include emergent herbaceous wetland land cover types. Each route alternative would result in short-term and long-term impacts on wetlands. Based on NLCD data, RA-South would affect more areas classified as wetlands than the other two route alternatives. Impacts on wetlands are discussed further in Section 5.7.9.

Compatibility with Local and Regional Plans

The Otter Tail County Long Range Strategic Plan sets broad policies and strategies to direct future growth and development in the areas of land use and other plan elements. Otter Tail County may only regulate lands within its jurisdiction, and land use planning activities are emphasized for lands where the

county has authority. Non-jurisdictional areas include incorporated municipalities, state and federal lands, and townships that choose to exercise their own zoning authority. Land use authority has not been exercised for the entire county, resulting in limited authority to work with property owners regarding growth management if the property lies outside of a shoreland area.

The project would be consistent with the goals and objectives for land designated by the Otter Tail County Long Range Strategic Plan for agricultural use because agricultural land cover types would still be available for crop production following project restoration.

The goals of watershed districts are broad and involve all aspects of water within their districts. Goals of watershed districts include improving water quality, managing drainage systems, providing flood protection, enhancing recreational opportunities, and providing for wildlife habitat. The compatibility of project construction with these goals is largely related to the potential impacts of construction on water resources in the watershed.

The Wilkin County Local Water Management Plan expresses concerns about the contamination of groundwater, including gravel mining, improperly sealed abandoned wells, industrial development, major highways, petroleum pipelines, railroads, sewage lagoons, and land use on sensitive groundwater areas. None of these concerns fit the description of the project. The Otter Tail County Local Water Management Plan also expresses concerns about groundwater contamination, including abandoned wells, failing septic systems, agriculture contamination, potential for well contamination, education, effects of land use, hazardous waste dumping, and the natural/artificial contamination from arsenic. Accidental releases of fuels, lubricants, and coolants from project construction equipment could impact soils, as described in Section 5.7.6. Impacts on the local water supply are discussed in Section 5.7.8.

During construction, removal of vegetation in construction work areas and working in and around wetlands and waterbodies may result in temporary impacts on water resources in watersheds, as discussed further in Section 5.7.8. Vegetation in watershed areas acts to slow water runoff, stabilize banks, prevent erosion, and enhance scenic views from the water. Temporary removal of vegetation in and around waterbodies could eliminate or reduce some of these benefits (and associated watershed district goals), which may temporarily reduce the scenic integrity of shoreland areas. With the incorporation of mitigation measures, impacts on water resources from project construction would not interfere with watershed districts' goals of conserving watershed functions and limiting impacts on water quality from development.

Generally, the existence of a pipeline easement can be compatible with future private landowner desires to continue activities on their property. Landowners would be restricted from some activities within the pipeline easement, such as planting trees or building structures. Present agricultural practices could continue during project operation.

To minimize impacts on forest land, the applicant has reduced the width of the construction workspace or has committed to trenchless crossing methods. Where trenchless waterbody crossing methods are used, trees would not be cleared along the operational ROW during construction or operations. Limited hand clearing would occur at these waterbodies, where necessary, to access a water source to withdraw water for the HDD operations, place the HDD guidewires, and/or test the pipe segment. After construction, tree regeneration would be permitted to occur naturally within the portion of the construction workspace that is located outside of the operational ROW. The applicant would maintain the 50-foot-wide operational ROW by mowing and removing woody vegetation taller than 15 feet in non-cultivated areas. Exceptions include the area between HDD entry and exit points where the

vegetation would not be maintained and at riparian buffers adjacent to waterbodies where post-construction vegetation maintenance within the operational ROW would be limited to a 10-foot-wide corridor centered over the pipeline.

Zoning

The county land use plans and zoning ordinances discussed above place an emphasis on maintaining and developing strong agricultural economies in the counties affected by the project. Wilkin County has enacted zoning, and Otter Tail County implements shoreland ordinances that accommodate essential service networks and other commercial and industrial uses, such as wind and solar development; biofuel production; oil, gas, sewer and drainage pipelines; electrical transmission and substations; and telecommunication towers.^{63, 64}

The route alternatives would cross land zoned as shoreland in both Otter Tail and Wilkin Counties. The applicant would comply with the standards and ordinances set forth in The Shoreland Management Ordinance of Otter Tail County. Impacts on land zoned as shoreland would be minimal, as vegetation buffers and streambanks would be left intact. Generally, construction in the shoreland areas and across streambanks would be compatible with the goals of shoreland overlay districts.

Overall, the impacts in shoreland areas would be minimal because the amount of land along waterbodies that would be affected is small and the post-construction vegetation maintenance procedures described above would be implemented. The impacts would be temporary and limited to the length of the construction and restoration period because vegetation would be allowed to regrow in the operational ROW.

The project would have minimal short-term and long-term impacts on zoning.

5.4.4.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include mitigation measures specific to zoning but includes the following provision that would mitigate impacts on land use and zoning in **Appendix H**, Section 7.24, Restoration: “the Permittee shall restore the right-of-way, temporary workspaces, access roads, abandoned right-of-way, and other public or private lands affected by construction of the pipeline to the natural conditions that existed immediately before construction of the pipeline and as required by other federal and state agency permits. Restoration must be compatible with the safe operation, maintenance, and inspection of the pipeline. Within 60 days after completion of all restoration activities, the Permittee shall advise the Commission in writing of the completion of such activities.”

Additionally, the sample routing permit in **Appendix H**, Section 8, Other Permits and Regulations, states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations.”

Applicant-Proposed Mitigation

The applicant proposed mitigation measures to minimize the impacts on and restoration of agricultural lands, as described in detail in **Appendix E**. The applicant has initiated discussions with the Buffalo Red River Watershed District and the Bois de Sioux Watershed District regarding permitting needs and would obtain all necessary permits prior to construction. These permits would ensure that project activities are compatible with the plans of the watershed districts.

Mitigation Proposed During Comment Periods

No mitigation measures for land use were proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended.

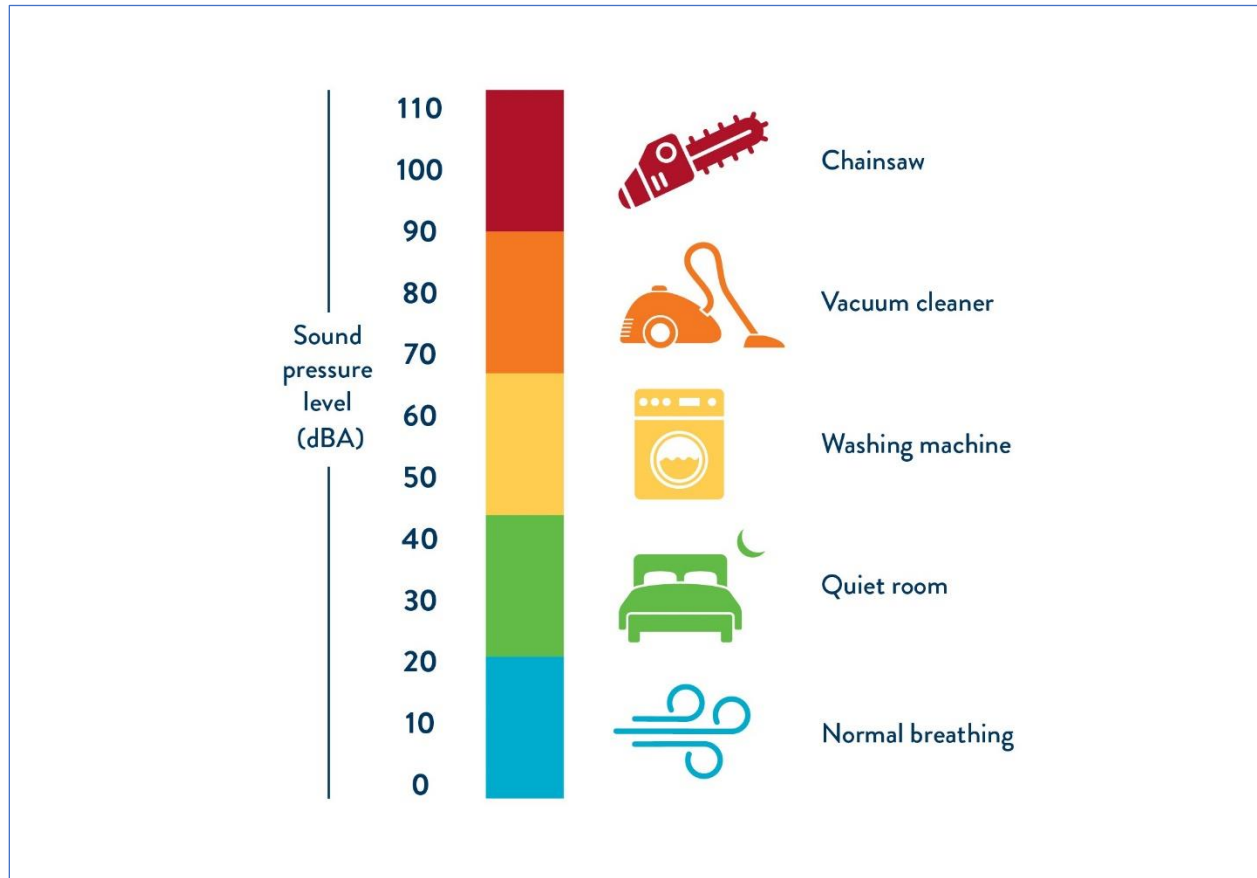
5.4.5 Noise

The ROI for noise is the local vicinity (area within 1,600 feet of the route width). Heavy equipment needed to construct the pipeline would have an intermittent, short-term impact on noise levels in the vicinity of the project. Except for HDDs and some hydrostatic testing activities, construction would be limited to daytime hours. Noise from HDDs would be noticeable but temporary, typically lasting 5 to 6 days or more, depending on the length and depth of the drill path. Construction equipment noise would be expected to decrease to levels below state daytime standards within 500 to 1,600 feet. The project is expected to conform to state noise standards. Compared to the other route alternatives, RA-South would have fewer noise sensitive receptors (NSR) close to the construction workspace but more NSRs within 0.5 mile of an HDD entry. Noise from the operation of the capture facility is not expected to result in a perceptible increase in the sound levels experienced at NSRs near the capture facility and would not be distinguishable from the noise already produced at the ethanol plant. Operation of the pipeline facilities would not have a noticeable impact on ambient sound levels. Because the project is expected to conform to state noise standards and the applicant would use barrier walls as needed for mitigating noise from HDDs, overall, noise impacts would be temporary, minimal, and short term for each of the three route alternatives.

5.4.5.1 Existing Conditions

Noise is measured in decibels (dB) on a logarithmic scale. For reference, MPCA states that the human ear can tell the difference when sound changes by 3 decibels on the A-weighted scale (dBA) although the difference may be subtle. A change of 5 dBA is clearly noticeable,⁶⁵ and a 10 dBA change is perceived as a doubling in loudness. How noise travels and is perceived depends upon several factors, such as wind speed, wind direction, humidity, and natural and built features between the noise source and the listener. **Figure 5-5** shows the noise levels associated with common activities and equipment.

Figure 5-5 Common Noise Levels



The Minnesota noise standards provide different permissible noise levels according to land activities established for three different noise classification areas: residential, commercial, and industrial (see **Table 5-5**). The L10 standard cannot be exceeded for more than 6 minutes during a 1-hour period (10 percent of the time), and the L50 standard cannot be exceeded for more than 30 minutes during a 1-hour period (50 percent of the time).

Table 5-5 Minnesota Noise Standards⁶⁶

Noise Classification	Daytime (7 a.m. -10 p.m.) (dBA)		Nighttime (10 p.m. – 7 a.m.) (dBA)	
	L10	L50	L10	L50
Area 1 (Residential)	65	60	55	50
Area 2 (Commercial)	70	65	70	65
Area 3 (Industrial)	80	75	80	75

Noise associated with heavy equipment can range between 80 and 90 dBA at full power 50 feet from the source.⁶⁷ Heavy equipment generally runs at full power up to 50 percent of the time.⁶⁸ Point source sounds decrease by 6 dBA at each doubling of distance,⁶⁹ therefore, a hypothetical 90 dBA sound at 50 feet is perceived as a 72 dBA sound at 400 feet and a 60 dBA sound at 1,600 feet.

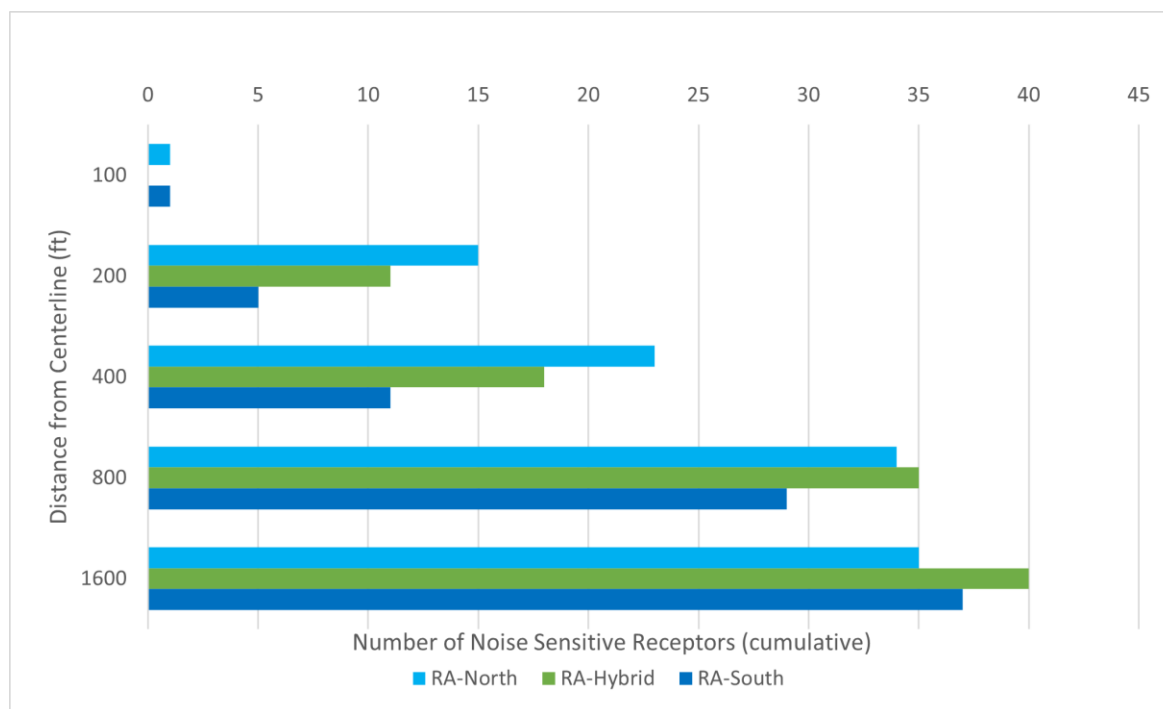
In addition to the state noise standards, both counties crossed by the project have nuisance noise ordinances in place. These municipal noise ordinances prevent noise from becoming a nuisance beyond the property line. No separate or more restrictive quantitative standards exist for these areas; therefore, compliance with local noise ordinances is assured through compliance with the state standard.

Existing noise sources within the local vicinity include the ethanol plant, traffic, railroads, and farm equipment. EPA estimates that day-night average levels for rural residential spaces are about 40 to 45 dBA, with higher baseline levels in more developed areas or when heavy agricultural machinery is in operation.⁷⁰ The ethanol plant operates equipment that produces high levels of noise, including compressors, pumps, the distillation system, and dryer.

The applicant identified NSRs within the ROI. NSRs identified were Noise Area Classification 1 receptors, as established in Minnesota Rule 7030.0050, Subp. 2. EERA staff confirmed these receptors. The noise area classification receptors are listed below; most of these receptor types were not present within the ROI:

- Household units (residences including farmhouses)
- Hotels, motels, or other overnight lodging
- Mobile home parks or courts
- Other residential units
- Motion picture production
- Medical and other health services
- Correctional institutions
- Educational services
- Religious activities
- Cultural activities and nature exhibitions
- Entertainment assembly
- Camping and picnicking areas (designated)
- Resorts and group camps
- Other cultural, entertainment, and recreational activities

The applicant also identified structures, such as garages and barns and industrial and business features, which are shown in the detailed route maps in **Appendix B**, but garages, barns, and industrial features were not considered NSRs for the purpose of this analysis. The closest residence to the CO₂ capture facility workspace is about 1,500 feet to the south. EERA staff received information in comments on the draft EIS that reclassified two structures along RA-South as residences. The detailed route maps in **Appendix B** have been revised to reflect the new information. Based on data provided by the applicant, RA-North has 33 residences and two businesses within the ROI, RA-Hybrid has 39 residences and one business within the ROI, and RA-South has 34 residences and three businesses within the ROI. **Figure 5-6** depicts the number of NSRs within the ROI at different distances from the pipeline centerline for each route alternative. These NSRs are listed in **Table 5-6**, **Table 5-7**, and **Table 5-8**.

Figure 5-6 Noise Sensitive Receptors by Distance from Centerline

RA-North has a greater number of NSRs within 400 feet of the centerline than either RA-Hybrid or RA-South. RA-Hybrid has no NSRs within 100 feet of the centerline, whereas RA-North and RA-South each have one, but the total number of NSRs within the ROI is greater for RA-Hybrid than for either RA-North or RA-South. There are 21 residences within 400 feet of the centerline for RA-North, 17 for RA-Hybrid, and 10 for RA-South. The number of residences within 800 feet of the centerline is 32 for RA-North, 34 for RA-Hybrid and 27 for RA-South. Within the ROI of RA-South there is one more residence than RA-North, but there are fewer residences than RA-Hybrid.

Table 5-6 Noise Sensitive Receptors Within 1,600 Feet of RA-North Route Width

Approximate Milepost ^a	Description	Distance from RA-North Centerline (feet) ^b	Direction from RA-North Centerline ^b
0.01	Residence	1,491	SE
0.15	Business	245	N
0.24	Residence	930	NW
0.42	Residence	721	S
0.97	Residence	417	S
1.06	Residence	267	N
1.10	Residence	420	N
1.12	Residence	262	N
1.21	Residence	1,044	S
1.89	Residence*	295	NE

Approximate Milepost ^a	Description	Distance from RA-North Centerline (feet) ^b	Direction from RA-North Centerline ^b
1.96	Residence*	279	S
2.09	Residence*	920	N
2.11	Residence*	382	S
2.97	Residence	381	NW
3.57	Residence	1,542	S
4.05	Residence	468	N
5.30	Residence	976	N
5.69	Residence	1,008	N
5.69	Residence	353	S
6.24	Residence	367	N
9.92	Residence	306	N
10.82	Residence	1,164	N
12.31	Residence	299	N
13.61	Residence	402	N
17.72	Residence	553	S
20.44	Residence	182	N
21.39	Business	700	S
21.53	Residence	285	N
21.60	Residence	1,824	S
21.63	Residence	258	N
22.68	Residence*	831	N
22.68	Residence*	516	N
22.69	Residence*	305	N
23.02	Residence*	823	NW
23.02	Residence*	1,244	S

^a Mileposts for RA-North are distances along the centerline from the Green Plains Ethanol Plant.

^b Distances are measured from the centerline and, therefore, may be greater than 1,600 feet because the ROI is measured as 1,600 feet from the route width, which varies.

* Asterisk indicates the NSR is within 0.5 mile of an HDD entry.

Table 5-7 Noise Sensitive Receptors Within 1,600 Feet of RA-Hybrid Route Width

Approximate Milepost ^a	Description	Distance from RA-Hybrid Centerline (feet) ^b	Direction from RA-Hybrid Centerline ^b
0.01	Residence	1,491	SE
0.15	Business	245	N
0.24	Residence	930	NW
0.42	Residence	721	S
0.97	Residence	417	S
1.06	Residence	267	N
1.10	Residence	420	N
1.12	Residence	262	N
1.21	Residence	1,044	S
1.89	Residence	295	NE
1.96	Residence	279	S
2.09	Residence	920	N
2.11	Residence	382	S
2.97	Residence	381	NW
3.57	Residence	1,542	S
4.05	Residence	468	N
5.30	Residence	976	N
5.69	Residence	1,008	N
5.69	Residence	353	S
6.24	Residence	367	N
8.56	Residence	765	E
14.53	Residence	1,147	S
15.33	Residence	1,054	S
19.67	Residence	2,574	N
19.75	Residence	3,837	N
19.76	Residence	1,542	S
20.96	Residence*	973	NW
23.40	Residence	1,047	S
24.43	Residence	262	N
25.43	Residence*	493	NE
26.21	Residence	586	S
26.27	Residence	351	S
26.64	Residence	1,403	S
27.87	Residence	1,202	N

Approximate Milepost ^a	Description	Distance from RA-Hybrid Centerline (feet) ^b	Direction from RA-Hybrid Centerline ^b
28.30	Residence	1,581	N
28.73	Residence*	1,458	SW
28.98	Residence*	1,758	S
29.15	Residence*	1,825	S
29.15	Residence*	866	SW
29.15	Residence*	1,742	N

^a Mileposts for RA-Hybrid are distances along the centerline from the Green Plains Ethanol Plant.

^b Distances are measured from the centerline and, therefore, may be greater than 1,600 feet because the ROI is measured as 1,600 feet from the route width, which varies.

* Asterisk indicates the NSR is within 0.5 mile of an HDD entry.

Table 5-8 Noise Sensitive Receptors Within 1,600 Feet of RA-South Route Width

Approximate Milepost ^a	Description	Distance From RA-South Centerline (feet) ^b	Direction from RA-South Centerline ^b
0.01	Residence	1,491	SE
0.15	Business	245	N
0.28	Residence	800	NW
0.49	Residence	571	S
0.68	Residence	1,082	W
0.68	Residence	1,726	NW
1.15	Residence	1,779	E
1.33	Business	1,821	SE
1.74	Residence*	644	SE
1.74	Residence*	1,259	SE
2.14	Residence*	555	SW
2.28	Residence*	491	N
3.35	Residence*	1,120	E
4.85	Business	1,477	N
4.98	Residence	1,193	S
5.49	Residence	1,312	E
6.94	Residence	229	NE
6.97	Residence	179	SW
13.48	Residence	1,147	S
14.28	Residence	1,054	S
18.62	Residence	2,574	N
18.70	Residence	3,837	N

Approximate Milepost ^a	Description	Distance From RA-South Centerline (feet) ^b	Direction from RA-South Centerline ^b
18.71	Residence	1,542	S
19.91	Residence*	973	NW
22.35	Residence	1,047	S
23.38	Residence	262	N
24.38	Residence*	493	NE
25.16	Residence	586	S
25.22	Residence	351	S
25.59	Residence	1,403	S
26.82	Residence	1,202	N
27.25	Residence	1,581	N
27.68	Residence*	1,458	SW
27.93	Residence*	1,758	SW
28.10	Residence*	1,825	S
28.10	Residence*	866	SW
28.10	Residence*	1,742	N

^a Mileposts for RA-South are distances along the centerline from the Green Plains Ethanol Plant.

^b Distances are measured from the centerline and, therefore, may be greater than 1,600 feet because the ROI is measured as 1,600 feet from the route width, which varies.

* Asterisk indicates the NSR is within 0.5 mile of an HDD entry.

5.4.5.2 Potential Impacts

The project is expected to conform to state noise standards.

Construction

Construction of the pipeline and the CO₂ capture facility, and the use of construction equipment that generates noise, would occur primarily in rural agricultural areas. The human ear can usually tell the difference when sound changes by 3 dBA, and a 5 dBA change is clearly noticeable.⁷¹ Heavy equipment needed to construct the pipeline would have an intermittent, short-term impact on noise levels in the vicinity of the project. Typical pipeline construction equipment (for example, bulldozers, loaders, backhoes, and side boom tractors) generates between 70 and 90 dB at 50 feet from the equipment when operating at full load.⁷² Members of the public would not be expected to experience this level of noise due to their distance from operating equipment.

During construction, residences within the ROI may experience intermittent, short-term noise from construction equipment for up to 30 days. Construction equipment noise would be expected to decrease to levels below state daytime residential standards (less than 60 dBA) within 500 to 1,600 feet, depending on the initial source level. Although most construction activities would occur during daytime hours, HDDs typically require 24-hour construction. Hydrostatic testing could also extend into nighttime hours.

As shown in **Figure 5-6**, RA-North would have the most NSRs within 400 feet of the pipeline centerline, followed by RA-Hybrid. RA-Hybrid would have the most NSRs within 800 feet, followed by RA-North. RA-South would have fewer NSRs within these distances than the other route alternatives.

The applicant would use HDD methods for some waterbody, road, and railroad crossings. Typically, drilling equipment operates at these crossings for 5 to 6 days; however, more time may be needed depending on the length and depth of the drill. The HDD crossings for the project are in rural locations where existing ambient noise levels are generally low. NSRs within 0.5 mile of an HDD entry (where the drilling rig would be located) are denoted with an asterisk in **Table 5-6**, **Table 5-7**, and **Table 5-8**.

RA-North would have 9 NSRs within 0.5 mile of an HDD entry, RA-Hybrid would have 7, and RA-South would have 11.

Table 5-9 lists the closest NSR to each HDD entry and the corresponding distance for the three route alternatives. Except for the HDD at the Red River for RA-North and the HDD at the Pelican River for RA-South, the closest NSRs would be more than 1,000 feet from the HDD entry.

Table 5-9 Closest NSR to each HDD Entry

HDD	Distance to Closest NSR RA-North (feet)	Distance to Closest NSR RA-Hybrid (feet)	Distance to Closest NSR RA-South (feet)
Pelican River	1,013	1,013	950
Otter Tail Valley Railroad/ State Highway 210	Not crossed	Not crossed by HDD	1,303
Otter Tail River	Not crossed	1,052	1,052
BNSF Railway/State Highway 9	BNSF Railway not crossed. State Highway 9 not crossed by HDD	1,278	1,278
Bois de Sioux River or Red River	975	1,086	1,086

Noise attenuation (decrease with distance) would vary by HDD location due to topography and weather conditions. Based on field measurements collected on active HDD operations, the applicant estimates the noise level for a 4-inch pipeline HDD would be less than 60 dB at 1,320 feet, less than 55 dB at 2,640 feet, and not audible at 5,280 feet (1 mile). The Minnesota noise standards are in units of dBA rather than dB. As a general comparison, dB is typically somewhat higher than dBA for a given sound level. Because some NSRs would be less than 1,320 feet from the drilling equipment, the noise standards listed in **Table 5-5** could be exceeded at these locations. If noise mitigation is required for compliance with applicable Minnesota noise standards, temporary sound dampening barrier walls would be placed around the equipment. The applicant has stated that it would coordinate with nearby landowners prior to starting HDDs and determine the need for noise mitigation and noise monitoring based on feedback received from landowners during construction.

The blowdown process (when the internal pressure is reduced prior to discharge) associated with hydrostatic testing of the pipeline would result in increased noise levels for about 1 hour or less.

The applicant does not anticipate the need for blasting during construction of the project; therefore, no noise impacts from blasting activities would occur.

Operation

The CO₂ capture facility would be at the ethanol plant. The primary noise-generating activities at the CO₂ capture facility would be operation of compressors and pumps. The predicted noise level of the compressors is 95 dBA at 3 feet, and they would be housed inside an insulated building. The applicant states that noise from the CO₂ capture equipment would comply with all local and state requirements.

The ethanol plant operates compressors and pumps that produce noise similar to the noise anticipated from the proposed capture facility equipment. The ethanol plant also operates additional equipment that produces higher levels of noise, including a distillation system and dryer. The CO₂ capture facility would produce less noise than the distillation system at the ethanol plant. Noise from the operation of the CO₂ capture facility is not expected to result in a perceptible increase in the sound levels experienced at NSRs near the capture facility and would not be distinguishable from the noise already produced at the ethanol plant.

Operation of the pipeline, MLVs, launcher, and the cathodic protection system would not generate noticeable noise. Periodic maintenance activities for the operational ROW, MLV, and pipeline could generate temporary and intermittent noise in isolated areas. Overall, these activities are not expected to have a noticeable impact on ambient sound levels.

5.4.5.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**, Section 7.7, Noise) includes the following mitigation for noise: “the Permittee shall comply with noise standards established under Minnesota Rules 7030.0100 to 7030.0080, at all times at all appropriate locations during operation of the facility. Construction and maintenance activities shall be limited to daytime working hours to the extent practicable to ensure nighttime noise level standards will not be exceeded.”

Additionally, the sample routing permit in **Appendix H**, Section 8, Other Permits and Regulations, states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations.”

Applicant-Proposed Mitigation

The applicant would minimize construction-related noise impacts by limiting pipeline construction activities to daylight hours (except for HDD crossings, which can require 24-hour work to complete the drilling process, and hydrostatic testing), maintaining equipment in good working order, and using manufacturer-supplied silencers, including mufflers when available. Temporary sound dampening barrier walls would be placed around the HDD equipment, if necessary.

Because of negligible noise impacts during operation of the project, the applicant has not proposed any operational noise related mitigation aside from housing the compressors and pumps at the CO₂ capture facility inside buildings.

Mitigation Proposed During Comment Periods

No mitigation specific to noise impacts was proposed by commenters.

Mitigation Recommended by EERA Staff

EERA staff recommends the applicant provide documentation of coordination with residents located within 1,320 feet of HDD entries. The submittal should document locations of sound dampening barrier walls and include a plan for monitoring noise levels at these locations during HDD operations. The information should be provided 30 days prior to submittal of the Plan and Profile. In its review of a preliminary version of the draft EIS, MDH concurred with this mitigation measure.

5.4.6 Populated Areas

The ROI for populated areas is the local vicinity (area within 1,600 feet of the route width). Populated areas are defined for this analysis as incorporated areas and census-designated places (CDP). There would be no impacts on defined populated areas because no populated areas are within the ROI of any of the three route alternatives. The EIS describes potential impacts on the human environment, regardless of whether they would or would not occur within defined populated areas.

5.4.6.1 Existing Conditions

Minnesota Rule 7852.1900, Subpart 3, requires that the Commission evaluate the “existence and density of populated areas.”⁷³ For this analysis, populated areas, as defined by the United States Census Bureau, consist of incorporated areas and CDPs.

- Incorporated places are legally incorporated under state law, have a legally defined boundary, and have an active, functioning governmental structure.⁷⁴ Examples of incorporated places include cities, towns, and villages.
- CDPs are statistical equivalents of incorporated places and represent unincorporated communities that do not have a legally defined boundary or an active, functioning governmental structure.⁷⁵ Examples of CDPs include unincorporated communities, planned communities, military installments, university towns, and resort towns. A single location cannot be part of both an incorporated place and a CDP.⁷⁶

None of the three route alternatives cross a CDP or an incorporated place.

The average population density of Otter Tail County is 30.5 people per square mile, and the average population density of Wilkin County is 8.7 people per square mile. Neither county exceeds the Minnesota average population density of 71.7 people per square mile, reflecting the rural landscape surrounding the project. Otter Tail County saw a population increase of 0.7 percent in the last 2 years, and Wilkin County saw a population decrease of 2.5 percent in the last 2 years.⁷⁷

Populations range from 6,350 (Wilkin County) to 60,519 (Otter Tail County). The project generally avoids population centers, although the nature of its partnership with an ethanol producer necessitates proximity to the ethanol plant. The ethanol plant is near, but not within, the incorporated city of Fergus Falls. Fergus Falls is the only municipality within 0.5 mile of any of the three route alternatives. The city of Breckenridge is located about 1 mile south of RA-North and about 2 miles north of RA-Hybrid and RA-South. Wahpeton, North Dakota, is located about 1 mile south of RA-North and about 2 miles north of RA-Hybrid and RA-South and is outside the ROI for populated areas.

5.4.6.2 Potential Impacts

There would be no impacts on populated areas because no populated areas are within the ROI of any of the three route alternatives. The EIS describes potential impacts on the human environment, regardless of whether they would or would not occur within defined populated areas.

5.4.6.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include mitigation measures specific to populated areas. The sample routing permit in **Appendix H**, Section 8, Other Permits and Regulations, states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations.”

Applicant-Proposed Mitigation

The applicant did not propose any mitigation measures specific to populated areas.

Mitigation Proposed During Comment Periods

No mitigation measures specific to populated areas were received by commenters.

Mitigation Recommended by EERA Staff

None recommended.

5.4.7 Property Values

The ROI for property values is the local vicinity (area within 1,600 feet of the route width). A property’s value is influenced by a complex interaction of characteristics such as size, location, and improvements. The value of a tract of land is related to many tract-specific variables, including the utilities and services available or accessible, the current land use, and the values of adjacent properties. Valuations generally do not consider subjective aspects. Construction-specific impacts on property values would be temporary (less than 6 months), and the applicant would be responsible for any construction-related damages and for returning affected property to its original condition. Impacts on property values during construction would be temporary but could be significant for landowners attempting to sell their properties during construction.

During project operation, landowners could continue activities within the pipeline easement on their property with some restrictions, such as planting trees or building structures. Although no studies related to the impacts of CO₂ pipelines on property values have been identified, studies for natural gas pipelines have not shown that the proximity of a pipeline affects the sale price or value of residential properties. The applicant states it would indemnify landowners for loss resulting from the applicant’s use of easements, which would include increases in property insurance, if incurred. Overall, impacts on property values are anticipated to be minimal, lessen with distance from the pipeline, and be similar for all three route alternatives. However, impacts on specific properties could vary.

5.4.7.1 Existing Conditions

A total of 33 single-family residences are located within the ROI for RA-North, 39 single-family residences are located within the ROI for RA-Hybrid, and 34 single-family residences are located within the ROI for RA-South. Distances from aboveground facilities to the closest residences range from 399 to 2,645 feet, which may extend beyond the ROI.

Table 5-10 lists the median value of owner-occupied housing units for the affected counties.

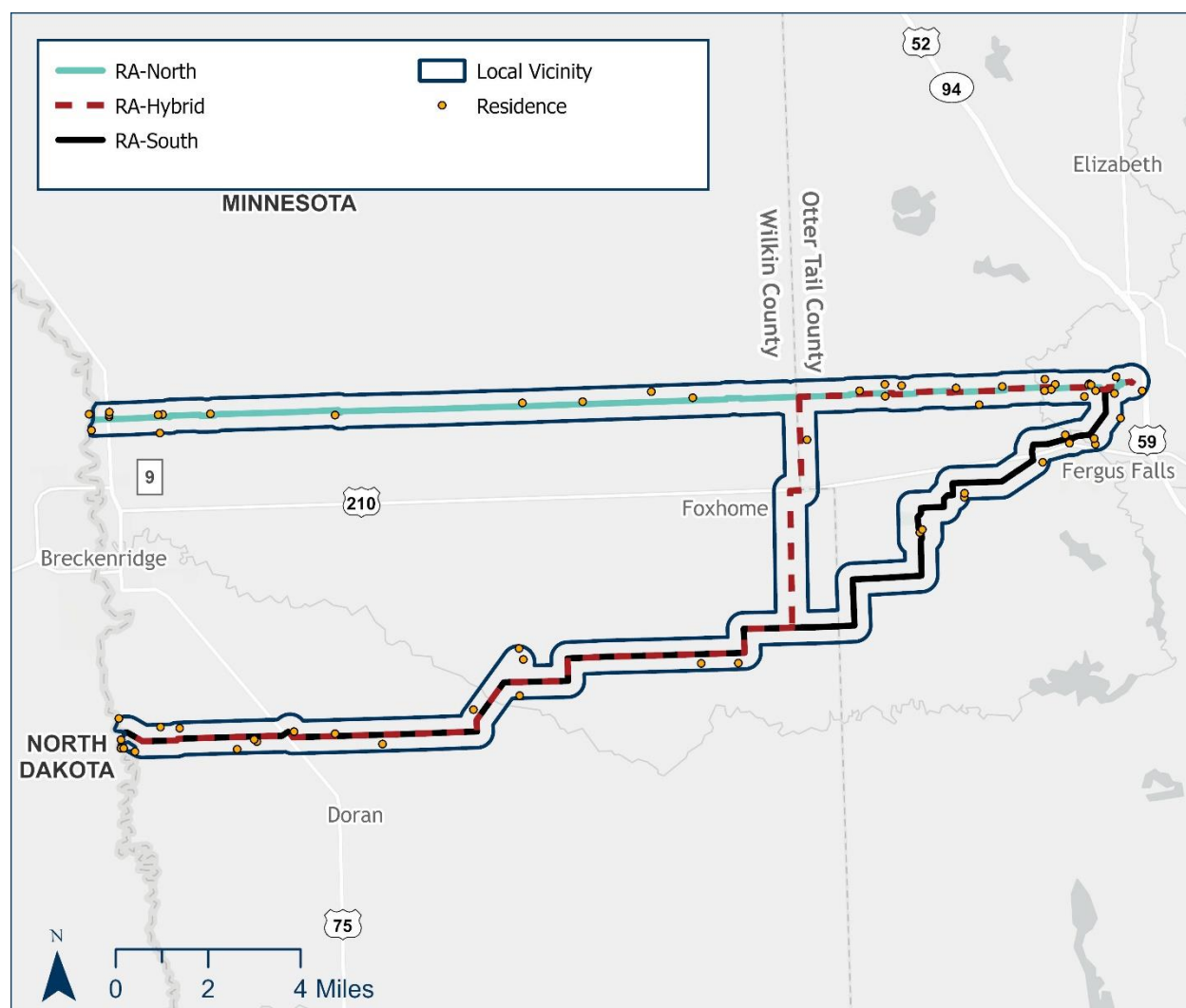
Table 5-10 Housing in Counties Crossed by All Route Alternatives^{78, 79, 80}

State/ County	Occupied Housing Units	Median Household Income	Median Monthly Housing Costs	Median Value of Owner-Occupied Housing Units
Minnesota	2,229,100	\$77,706	\$1,195	\$250,200
Otter Tail County	24,838	\$63,587	\$862	\$209,100
Wilkin County	2,680	\$57,907	\$754	\$154,400

Land values are determined by appraisals that consider the objective characteristics of a property. Most of these factors are parcel specific—condition, size, improvements, acreage and neighborhood characteristics; the proximity to schools, parks, and other amenities; and the presence of existing infrastructure (for example, highways, railways, or power lines). In addition to property-specific factors, local and national market trends, as well as interest rates, can affect a property's value. The value of a tract of land is related to many tract-specific variables, including the utilities and services available or accessible, the current land use, and the values of the adjacent properties. The valuations generally do not consider subjective aspects, such as the potential effect of a pipeline.

5.4.7.2 Potential Impacts

Figure 5-7 shows the number of single-family residences within the local vicinity of all route alternatives. The presence of a home does not necessarily translate into greater potential for impacts on a property's value; property value impacts can occur whether a home is present or not.

Figure 5-7 Residences Within the Local Vicinity of each Route Alternative

For homeowners who would be affected by construction, the applicant would be responsible for any construction-related damages and for returning affected property to its original condition, which would help maintain property value. Impacts on property values during construction would be temporary but could be significant for landowners attempting to sell their properties during construction. Specific changes to a property's value are difficult to predict. The construction period would be relatively short (less than 6 months), so the number of landowners in this situation would likely be small.

Generally, the existence of a pipeline easement can be compatible with private landowner desires to continue activities on their property. Landowners would be restricted from some activities within the pipeline easement, such as planting trees or building structures.

Although no studies related to the impacts of CO₂ pipelines on property values have been identified, there are several studies that assess the effects of natural gas pipelines and compressor stations on property values. While research demonstrates that property value impacts vary, most studies indicate that the presence of an underground natural gas transmission pipeline does not affect the sales price or

value of residential properties.^{81, 82} **Table 5-11** summarizes reviewed literature that focuses on the relationship of property values to the presence of a pipeline facility.

Table 5-11 Summary of Review of Property Values Literature

Citation	Description	Conclusions
INGAA Foundation 2016 ⁸³	The Interstate Natural Gas Association of America (INGAA) Foundation retained Integra Realty Resources to study how natural gas transmission pipelines affect the value of real estate.	Integra Realty Resources concluded that proximity to a natural gas pipeline had no measurable impact on the sales price or insurability of a property and that the presence of a pipeline does not affect any specific type of property more or less than any other property type.
Wilde et al. 2014 ⁸⁴	Hedonic regression models were used to study the effects of proximity to a natural gas pipeline on residential property values in a master-planned community in Clark County, Nevada.	No effects associated with proximity to the natural gas pipeline were found, either at or after the time of the initial takings, after a later change in the allowable pressure on the pipeline, or after the 2010 incident in San Bruno, California.
Wilde et al. 2012 ⁸⁵	A literature review by Gnarus Advisors on the effects of pipelines on property values. Published in Journal of Real Estate Literature.	Gnarus Advisors found, "There is no credible evidence based on actual sales data that proximity to pipelines reduces property values."
Disken et al. 2011 ⁸⁶	A study on the effect of natural gas pipelines on residential value. The study analyzed sales data from about 1,000 residential properties in Arizona to determine whether proximity to a natural gas pipeline affected real estate sales prices.	The study was unable to identify a systematic relationship between proximity to a pipeline and sales price or property value.
Palmer 2008 ⁸⁷	A study to determine the effect of natural gas pipelines on property values by locating sales of properties influenced by a natural gas pipeline and comparing that sale with sales of comparable, non-influenced properties.	There is no measurable long-term impact on property values resulting from natural gas pipelines for the particular pipeline project studied.

These studies do not indicate a conclusive, quantitative relationship between property values and proximity to natural gas pipelines. Therefore, it would not be feasible to quantify the potential for impacts of the project on property values, both in general or specifically to any parcels or areas. It is reasonable to expect that property values may be impacted differently based on the setting and characteristics of each property. However, there is no conclusive evidence indicating that the project would have a significant negative impact on property values. Overall, impacts on property values are anticipated to be minimal and lessen with distance from the pipeline. However, impacts on specific properties could vary widely.

The applicant filed a decommissioning plan with its routing permit application. The plan includes provisions for the applicant to provide financial assurance to the Commission in the amount of total net decommissioning costs. The decommissioning costs would be updated every 5 years, starting 10 years after the Project was commissioned. This would ensure that the pipeline would be properly decommissioned at the end of its useful life, and facilities would be removed or properly abandoned in place. A copy of the decommissioning plan was included in the applicant's routing permit application.

Based on the factors discussed above, no significant impacts on property values are anticipated from construction and operation of the project. EERA staff note that every landowner has a unique relationship and sense of value associated with their property. Thus, a landowner's assessment of potential impacts on their property's value is often a deeply personal comparison of the property "before" and "after" a proposed project is constructed. However, these judgments do not necessarily influence the market value of a property. Rather, appraisers assess a property's value by looking at the property "after" a project is constructed. Moreover, potential market participants likely see the property independent of the changes brought about by a project; therefore, they do not take the "before" and "after" into account in the same way the current landowner might. EERA staff acknowledge this section does not and cannot consider or address the fear and anxiety felt by landowners when facing the potential for negative impacts on their property's value.⁸⁸

Several commenters raised concerns about the cost and availability of property insurance for lands crossed by a CO₂ pipeline. If a landowner is unable to obtain insurance coverage for a property or if insurance becomes prohibitively expensive, the value of a property could be adversely affected.

As noted in **Table 5-11**, the 2016 INGAA study concluded that proximity to a natural gas pipeline had no measurable impact on the insurability of a property. The INGAA study stated that "all agents and company representatives interviewed by [Integra Realty Resources] agreed that the proximity to the pipeline would not be a consideration during the underwriting of insurance or in the marketing of insurance. Further, unless a claim has been made related to the pipeline, a property's proximity to a natural gas pipeline has no impact on the availability of property insurance or the cost of the premiums."⁸⁹

If the cost of insurance for landowners should rise due to the presence of the project, the applicant states that it has agreed to indemnify landowners for loss resulting from the applicant's use of the easements (see response to Supplemental Information Inquiry #13 in **Appendix I**). Therefore, impacts on insurance availability and the cost of insurance are anticipated to be minimal.

5.4.7.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**, Section 7.2, Access to Property for Construction) contains the following mitigation related to property values: "the Permittee shall negotiate agreements with landowners that would give the landowners access to their property; minimize the impact on planned future development of the property; and to assume any additional costs for such development that may be the result of installing roads, driveways, and utilities that must cross the right-of-way. The Permittee shall not unreasonably deny a landowner's request to cross the easement to access the landowner's property."

Additionally, the sample routing permit in **Appendix H**, Section 8, Other Permits and Regulations, states that "the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain

all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations.”

Applicant-Proposed Mitigation

The applicant would be responsible for any construction-related damages and for returning affected property to its original condition, which would help maintain property value.

Mitigation Proposed During Comment Periods

A commenter proposed that the EIS include post-abandonment mitigation for the project, including a permit condition to ensure that landowners are not liable by default for post-abandonment mitigation costs.

Mitigation Recommended by EERA Staff

None recommended.

5.4.8 Public Health and Safety

The ROI for public health and safety is Otter Tail and Wilkin Counties. Construction of the project would have negligible impacts on public health and safety. The presence of construction personnel and equipment could temporarily increase demand for local public services. As with any major construction project, worker health and safety concerns exist. Normal operation of the project would not impact public health and safety. Operational impacts on health and safety would be a concern primarily in the event of an accidental release of CO₂, when public health and safety impacts are expected to be minimal to significant (depending on the extent and where a release occurs). As discussed in Chapter 8, local first responders would receive training and equipment related to a potential release, funded by the applicant. Aerial dispersion modeling and computational fluid dynamics modeling were conducted to estimate the extent of a CO₂ plume in the event of a rupture. Potential impacts on public health and safety are expected to be negligible to minimal, short term, and similar for all three route alternatives. Accident conditions are discussed in Chapter 8.

Section 5.4.8 analyzes and discusses potential human health and safety impacts of construction and normal operation of the project. Chapter 8 includes a summary of potential impacts associated with a pipeline release. A detailed analysis of pipeline release scenarios is provided in **Appendix G**. Emergency planning and response, as well as a range of mitigative techniques, are discussed in Chapter 8.

5.4.8.1 Existing Conditions

PHMSA regulates safety of pipelines that transport hazardous liquids, including CO₂, according to regulations in 49 CFR Part 195. It develops safety regulations and other approaches to risk management to ensure safety in the design, construction, testing, operation, maintenance, and emergency response associated with pipeline facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and require the pipeline operator to use various technologies to achieve safety. This work is shared with state agency partners and others at the federal, state, and local levels.

Section 5.4.9 describes the public services that currently provide emergency response for Otter Tail and Wilkin Counties and would provide emergency services, as needed, for the project. **Table 5-12** lists emergency services in the counties crossed by the project, which include law enforcement agencies, ambulance services, hospitals, and professional and volunteer fire departments.

5.4.8.2 Potential Impacts

Construction Health and Safety

As with any major construction project, the presence of construction personnel and equipment could temporarily increase demand for local public services, including the potential need for local emergency services to respond to emergencies associated with construction of the project and the temporary increase in population. Traffic would increase in the vicinity of the project. It is anticipated that impacts on local facilities would be minimal and that local healthcare facilities would be able to manage minor increases to healthcare needs during construction, as the number of construction workers expected at peak construction phase would be about 200 workers. The health and safety procedures and policies of the applicant and its contractor(s) would seek to prevent workplace injuries, which would limit the need to use local healthcare facilities during the temporary presence of construction workers.

The increase of temporary workers could result in an increase in incidences of violence against community members, such as human trafficking or violence against Indigenous women, as noted by commenters on the draft EIS.⁹⁰

Local law enforcement agencies, ambulance services, hospitals, and professional and volunteer fire departments are anticipated to be adequate for the minimal impacts on public health and safety associated with construction of the project.

Operations Health and Safety

Most potential impacts on health and safety that would be caused by operation of the project would occur primarily during unexpected and abnormal operating conditions associated with an unplanned release of CO₂. These impacts are discussed in Chapter 8. Section 5.7.6.2 addresses the pipeline burial depth and potential for frost heave. Normal operations and maintenance of the project would not impact public health and safety.

Beneficial Impacts for Health and Safety

The completed project would capture and transport 524 metric tons of CO₂ per day, or 0.19 MMTPA. CO₂ is a leading contributor to climate change, which has been identified by the World Health Organization as a health threat. The Centers for Disease Control has identified the following health-related impacts of climate change in the Midwest, including in Minnesota: temperature-related death and illness, air quality impacts, extreme events, vector-borne diseases, water-related illness, and high risks for certain populations of concern.⁹¹ The project would reduce greenhouse gases in the atmosphere and contribute to reducing the effects of climate change.

5.4.8.3 Mitigation

Many commenters have raised questions about safety and hazards associated with CO₂ pipelines. EERA staff reiterates that the Commission cannot set safety standards. More information on PHMSA safety standards is provided in **Appendix G**.

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) includes the following measures specific to public health and safety:

- “Minnesota Statute 216G.07, subdivision 1, requires the pipeline trench to be excavated to a depth that sufficiently allows for at least 54 inches (4.5 feet) of backfill from ground surface to the top of pipeline in all areas where the pipeline crosses the right-of-way of any public drainage

facility or any county, town, or municipal street or highway and where the pipeline crosses agricultural land. Where the pipeline crosses the right-of-way of any drainage ditch the pipeline shall be installed with a minimum level cover of not less than 54 inches (4.5 feet) below the authorized depth of the ditch, unless waived in the manner provided in Minnesota Statute 216G.07, subdivisions 2 and 3” (**Appendix H**, Section 5, State and Federal Minimum Depth of Cover Requirements).

- “In agricultural land, the Permittee may seek a depth requirement waiver from the affected landowners to install the pipeline at the same depth as required by U.S. Department of Transportation regulation 49 CFR 192.327. In all cases, the pipeline trench shall be excavated to a depth that sufficiently allows for at least 36 inches (3 feet) of backfill from ground surface to the top of pipeline” (**Appendix H**, Section 5, State and Federal Minimum Depth of Cover Requirements).
- “The Permittee shall provide all affected landowners with complete information about the project keeping them informed throughout the initial survey, right-of-way acquisition, right-of-way preparation, construction, restoration, and future operation and maintenance. As provided by applicable laws and regulations the Permittee shall provide educational materials about the project and any restrictions or dangers associated with the project to landowners within the route whose land is crossed by the pipeline and, upon request, to any interested persons” (**Appendix H**, Section 6.1, Permit Distribution).
- “The Permittee shall file with the Commission the name, address, email, phone number, and emergency phone number of the field representative 14 days prior to commencing construction. The Permittee shall provide the field representative’s contact information to affected landowners, residents, local government units and other interested persons 14 days prior to commencing construction. The Permittee may change the field representative at any time upon notice to the Commission, affected landowners, residents, local government units and other interested persons” (**Appendix H**, Section 7.3, Field Representative).
- “The Permittee will install temporary gates or similar barriers, as needed, to prohibit public access to the right-of-way during construction” (**Appendix H**, Section 7.21. Security).

Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant would take measures to prevent unexpected and abnormal conditions that could result in an accidental CO₂ release. The applicant would also train and coordinate with emergency managers and educate the public on the dangers of a CO₂ release and what residents should do if one were to occur. These measures are described in Chapter 8.

The applicant would require that all its employees and contractors complete a Human Trafficking Prevention Training prior to construction work.

Mitigation Proposed During Comment Periods

No mitigation specific to public health and safety during construction or normal operation of the project was proposed by commenters. See Chapter 8 for additional mitigation related to an accidental CO₂ release.

Mitigation Recommended by EERA Staff

See Chapter 8 for mitigation considered reasonable by EERA staff regarding the event of an accidental CO₂ release.

EERA staff believes that a special permit condition requiring the applicant to provide its Human Trafficking Prevention Training for Commission review 30 days prior to submittal of the Plan and Profile is reasonable.

5.4.9 Public Services and Infrastructure

The ROI for public services is the counties and the ROI for infrastructure is the local vicinity (area within 1,600 feet of the route width). Public services and infrastructure include emergency services, hospitals, school districts, and public utilities that serve residents and business. The presence of additional construction personnel could affect law enforcement agencies, fire protection services, and health care facilities in the communities adjacent to the project for all route alternatives. Local emergency services would be able to manage these minor increases during the 6 months of construction. There are no anticipated impacts on schools, public transit, or railroads. Impacts on roads would be minimal and primarily from increased construction traffic. A temporary increase of water use, sewage, and solid waste is anticipated due to the influx of construction workers and materials. The existing utilities would be sufficient to handle the temporary increase. Water for operating the capture facility would be supplied by an existing well at the ethanol plant. During operation, electrical service would be supplied to the capture facility through existing service lines, and the project is not anticipated to require additional power generation capacity. The applicant indicated it would be responsible for all costs associated with the infrastructure upgrades and operation of the capture facility. Public services and infrastructure impacts are anticipated to be short term, negligible to minimal, and similar across the three route alternatives.

5.4.9.1 Existing Conditions*Emergency Services*

There are 9 local law enforcement agencies, 4 ambulance services, 4 hospitals, and 24 professional and volunteer fire departments in the counties crossed by the project. These services currently provide emergency response for Otter Tail and Wilkin Counties and would provide services for the project, as needed. **Table 5-12** summarizes emergency services in the counties crossed by the project.

Table 5-12 Emergency Services in Counties Crossed by the Project

Service	Name	City	County
Ambulance	Ambulance-Pelican Rapids	Pelican Rapids	Otter Tail
Ambulance	Parkers Prairie Ambulance	Parkers Prairie	Otter Tail
Ambulance	Ringdahl Ambulance Service	Fergus Falls	Otter Tail
Ambulance	Ambulance Service, Inc	Breckenridge	Wilkin
Hospital	Lake Region Healthcare Corp	Fergus Falls	Otter Tail
Hospital	Perham Health	Perham	Otter Tail
Hospital	Perham Memorial Hospital	Perham	Otter Tail
Hospital	CHI St. Francis Health	Breckenridge	Wilkin
Fire Department	Battle Lake Fire Department	Battle Lake	Otter Tail

Service	Name	City	County
Fire Department	Bluffton Fire Department	Bluffton	Otter Tail
Fire Department	Candor-Dora-Hobart-Vergas Fire and Rescue Department	Vergas	Otter Tail
Fire Department	Dalton Fire Department	Perham	Otter Tail
Fire Department	Dalton Fire Hall	Dalton	Otter Tail
Fire Department	Deer Creek Fire and Rescue	Deer Creek	Otter Tail
Fire Department	Dent Fire Department	Dent	Otter Tail
Fire Department	Elizabeth Fire Department	Elizabeth	Otter Tail
Fire Department	Elizabeth Volunteer Fire Department	Elizabeth	Otter Tail
Fire Department	Fergus Falls Fire Department	Fergus Falls	Otter Tail
Fire Department	Henning Volunteer Fire Department	Henning	Otter Tail
Fire Department	New York Mills Fire Department	New York Mills	Otter Tail
Fire Department	Ottertail Fire and Rescue	Ottertail	Otter Tail
Fire Department	Parkers Prairie Fire Department	Parkers Prairie	Otter Tail
Fire Department	Parkers Prairie Volunteer Fire Department	Parkers Prairie	Otter Tail
Fire Department	Pelican Rapids Volunteer Fire Department	Pelican Rapids	Otter Tail
Fire Department	Perham Fire Department	Perham	Otter Tail
Fire Department	Underwood Fire Department	Underwood	Otter Tail
Fire Department	Vining Fire Department	Vining	Otter Tail
Fire Department	Breckenridge Fire Department	Breckenridge	Wilkin
Fire Department	Campbell Volunteer Fire Department	Campbell	Wilkin
Fire Department	Foxhome Fire Department	Foxhome	Wilkin
Fire Department	Rothsay Fire Department	Rothsay	Wilkin
Fire Department	Wolverton Fire Department	Wolverton	Wilkin
Law Enforcement	Battle Lake Police Department	Battle Lake	Otter Tail
Law Enforcement	Fergus Falls Police Department	Fergus Falls	Otter Tail
Law Enforcement	Henning Police Department	Henning	Otter Tail
Law Enforcement	New York Mills Police Department	New York Mills	Otter Tail
Law Enforcement	Otter Tail Sheriff's Office	Fergus Falls	Otter Tail
Law Enforcement	Parkers Prairie Police Department	Parkers Prairie	Otter Tail
Law Enforcement	Pelican Rapids Police Department	Pelican Rapids	Otter Tail
Law Enforcement	Perham Police Department	Perham	Otter Tail
Law Enforcement	Breckenridge Police Department	Breckenridge	Wilkin

Schools and Public Transit

The 13 public school districts within the counties crossed by the project are summarized in **Table 5-13**.

Table 5-13 Public School Districts in the Counties Crossed by the Project

Name	City	County	Number of Schools	Number of Students
Battle Lake Public School District	Battle Lake	Otter Tail	2	402
Fergus Falls Area Special Education Cooperative	Fergus Falls	Otter Tail	3	73
Fergus Falls Public School District	Fergus Falls	Otter Tail	10	2993
Henning Public School District	Henning	Otter Tail	2	377
New York Mills Public School District	New York Mills	Otter Tail	2	785
Parkers Prairie Public School District	Parkers Prairie	Otter Tail	2	544
Pelican Rapids Public Schools	Pelican Rapids	Otter Tail	4	867
Perham-Dent Public School District	Perham	Otter Tail	4	1572
Region 4-Lakes Country Service Coop	Fergus Falls	Otter Tail	3	47
Underwood Public School District	Underwood	Otter Tail	3	581
Breckenridge Public School District	Breckenridge	Wilkin	4	638
Campbell-Tintah Public Schools	Campbell	Wilkin	2	142
Rothsay Public School District	Rothsay	Wilkin	2	309

There are no public transit routes within the local vicinity of the three route alternatives. The Otter Express provides local bus service within Fergus Falls and Perham in Otter Tail County and Breckenridge in Wilkin County.

Telecommunication, Electric, and Natural Gas Utilities

Electric and natural gas service is provided to the project area and surrounding municipalities by Otter Tail Power Company, Lake Region Electric Cooperative, and Great Plains Natural Gas Company. Electricity for the ethanol plant and proposed capture facility would be provided by Lake Region Electric Cooperative. Recent improvements have led to improved efficiency at the ethanol plant resulting in a 23 percent reduction in natural gas usage and a 27 percent reduction in electrical consumption from 2019 to 2023.⁹² Over the past 24 months, the ethanol plant has used an average of 134,620 million British thermal units (MMBtu) of natural gas per month and 3,171,885 kWh of electricity per month.

It is assumed that local utilities, such as telephone and cable television, are buried in the project area. These utilities, along with fiber optic cables, are often buried along roads and might intersect the route width of any routing alternative.

The route alternatives would cross electric transmission lines and natural gas and refined product pipelines. Other electric transmission lines are located near the project but would not be crossed by any of the alternatives. Identified utilities that would be crossed by the project are listed in **Table 5-14**.

Table 5-14 Utility Lines Crossed by the Route Alternatives

Route Alternative	County	Utility Line Type	Milepost
RA-North	Otter Tail	Refined Product Pipeline	0.7
RA-North	Otter Tail	Refined Product Pipeline	1.5
RA-North	Otter Tail	230 kV Electric Transmission Line	4.9
RA-Hybrid	Otter Tail	Refined Product Pipeline	0.7
RA-Hybrid	Otter Tail	Refined Product Pipeline	1.5
RA-Hybrid	Otter Tail	230 kV Electric Transmission Line	4.9
RA-Hybrid	Wilkin	Natural Gas Pipeline	9.3
RA-Hybrid	Wilkin	230 kV Electric Transmission Line	9.6
RA-South	Otter Tail	Refined Product Pipeline	0.7
RA-South	Otter Tail	230 kV Electric Transmission Line	1.1
RA-South	Otter Tail	Refined Product Pipeline	1.4
RA-South	Otter Tail	Natural Gas Pipeline	1.6
RA-South	Otter Tail	230 kV Electric Transmission Line	6.3

kV = kilovolt

Transportation

RA-North would not cross any railroads. RA-Hybrid and RA-South would each cross two active railroads. The locations where the pipeline would cross active railroads are listed in **Table 5-15**.

Table 5-15 Active Railroads Crossed by the Route Alternatives

Route Alternative	County	Railroad	Milepost
RA-North	None		
RA-Hybrid	Otter Tail Valley Railroad (OTVR)	Wilkin	9.9
RA-Hybrid	BNSF Railway	Wilkin	25.6
RA-South	Otter Tail Valley Railroad (OTVR)	Otter Tail	3.2
RA-South	BNSF Railway	Wilkin	24.5

The ethanol plant is on the outskirts of Fergus Falls and close to Interstate 94 (I-94), County Road 116, and State Highway 210. None of the route alternatives would cross I-94. All three route alternatives would cross County Road 116. RA-Hybrid and RA-South would cross State Highway 210 using the HDD method. **Table 5-16** lists roads crossed by the three route alternatives.

Table 5-16 Roads Crossed by the Route Alternatives

Route Alternative	Road Name	Milepost
RA-North	Otter Tail T 1019	0.3
RA-North	Otter Tail CR 116	0.4
RA-North	Otter Tail T 1018	1.4

Route Alternative	Road Name	Milepost
RA-North	Otter Tail T 1001	2.5
RA-North	Otter Tail CSAH 21	3.5
RA-North	Otter Tail T 988	4.6
RA-North	Otter Tail CSAH 11	5.5
RA-North	Otter Tail T 1017	5.6
RA-North	Otter Tail T 1016	6.7
RA-North	Wilkin T 241	8.6
RA-North	Wilkin T 70	9.2
RA-North	Wilkin CSAH 19	9.7
RA-North	Wilkin T 237	10.7
RA-North	Wilkin CSAH 15	12.7
RA-North	Wilkin T 226	13.6
RA-North	Wilkin CR 169	14.6
RA-North	Wilkin T 218	15.6
RA-North	Wilkin T 212	16.6
RA-North	Wilkin CSAH 16	17.6
RA-North	Wilkin T 206	17.6
RA-North	Wilkin T 196	19.6
RA-North	Wilkin T 187	20.6
RA-North	Wilkin T 69	20.7
RA-North	MN 9	21.4
RA-North	Wilkin T 184	21.7
RA-North	King of Trails Scenic Byway (US Highway 75)	22.7
RA-Hybrid	Otter Tail T 1019	0.3
RA-Hybrid	Otter Tail CR 116	0.4
RA-Hybrid	Otter Tail T 1018	1.4
RA-Hybrid	Otter Tail T 1001	2.5
RA-Hybrid	Otter Tail CSAH 21	3.5
RA-Hybrid	Otter Tail T 988	4.6
RA-Hybrid	Otter Tail CSAH 11	5.5
RA-Hybrid	Otter Tail T 1017	5.6
RA-Hybrid	Otter Tail T 1016	6.7
RA-Hybrid	Otter Tail T 1034	8.6
RA-Hybrid	MN 210	9.6
RA-Hybrid	Wilkin T 79	10.8
RA-Hybrid	Wilkin T 86	11.8
RA-Hybrid	Wilkin CSAH 19	13.9

Route Alternative	Road Name	Milepost
RA-Hybrid	Wilkin CR 162	13.9
RA-Hybrid	Wilkin T 96	15.4
RA-Hybrid	Wilkin T 162	16.4
RA-Hybrid	Wilkin CR 169	17.4
RA-Hybrid	Wilkin T 261	18.7
RA-Hybrid	Wilkin CSAH 17	19.7
RA-Hybrid	Wilkin T 92	20.1
RA-Hybrid	Wilkin T 91	21.4
RA-Hybrid	Wilkin T 311	22.4
RA-Hybrid	Wilkin T 100	23.4
RA-Hybrid	Wilkin CR 159	24.4
RA-Hybrid	Wilkin T 94	25.4
RA-Hybrid	King of Trails Scenic Byway (US Highway 75)	25.6
RA-Hybrid	MN 9	25.6
RA-Hybrid	Wilkin CR 158	26.4
RA-Hybrid	Wilkin T 127	27.4
RA-Hybrid	Wilkin CSAH 9	28.5
RA-Hybrid	Wilkin T 93	29
RA-South	Otter Tail T 1019	0.3
RA-South	Otter Tail CR 116	0.4
RA-South	Otter Tail T 1018	2.2
RA-South	MN 210	3.2
RA-South	Otter Tail T 1050	4.8
RA-South	Otter Tail T 1063	6.9
RA-South	Wilkin CSAH 19	12.8
RA-South	Wilkin CR 162	12.8
RA-South	Wilkin T 96	14.3
RA-South	Wilkin T 162	15.3
RA-South	Wilkin CR 169	16.3
RA-South	Wilkin T 261	17.7
RA-South	Wilkin CSAH 17	18.7
RA-South	Wilkin T 92	19.1
RA-South	Wilkin CR 158	20.3
RA-South	Wilkin T 91	20.3
RA-South	Wilkin T 311	21.3
RA-South	Wilkin T 100	22.3
RA-South	Wilkin CR 159	23.3

Route Alternative	Road Name	Milepost
RA-South	Wilkin T 94	24.3
RA-South	King of Trails Scenic Byway (US Highway 75)	24.5
RA-South	MN 9	24.5
RA-South	Wilkin T 127	26.4
RA-South	Wilkin CSAH 9	27.4
RA-South	Wilkin T 93	27.7

Fergus Falls Municipal Airport-Einar Mickelson Field is located south of the project and within the ROI of RA-South. This airport is owned by the city of Fergus Falls, operated by Sky Crew Services LLC, and open to the public on weekdays from 8:00 a.m. to 5:00 p.m. and on Saturdays from 9:00 a.m. to 2:00 p.m., seasonally.⁹³ No regularly scheduled commercial flights are based out of the airport.⁹⁴

Sewer, Water, and Waste Management

A summary of waste management, sewer, and water public services in the municipalities around the project area is provided in **Table 5-17**. Farmsteads are assumed to use private wells and septic systems.

Table 5-17 Sewer, Water, and Waste Management in the Project Area

Service	Name	County	Municipality or Region
Waste Management	Otter Tail Solid Waste Department	Otter Tail	Fergus Falls
	Waste Management	Wilkin	Breckenridge
	T&G Sanitation	Wilkin	Breckenridge
Sewer and Water	Fergus Falls Public Works Department	Otter Tail	Fergus Falls
	Breckenridge Public Utilities	Wilkin	Breckenridge

5.4.9.2 Potential Impacts

Emergency Services

Construction and normal operation of the project is not expected to cause a significant increase in emergency health and safety events that would impact local emergency services. The presence of additional construction personnel would have the potential to affect law enforcement agencies, fire protection services, and health care facilities in the communities adjacent to the project, including the potential need to respond to emergencies associated with construction of the project and the temporary increase in population. However, it is anticipated that these impacts would be negligible to minimal. Local emergency services would be able to manage these minor increases during construction and normal operations.

Impacts on emergency services in the event of a pipeline rupture are discussed in Chapter 8.

Schools and Public Transit

Because of the relatively small size of the temporary workforce (100 construction workers are anticipated to arrive from outside of Otter Tail and Wilkin Counties [see Section 5.4.11]) and the relative short construction period (less than 6 months), there are no anticipated impacts on schools or public transit.

Telecommunication, Electric, and Natural Gas Utilities

The Lake Region Electric Cooperative substation, which would be the capture facility's power source, is located adjacent to the ethanol plant and the capture facility. The project's operational needs, about 38,501,733 kWh per year, are not anticipated to require the addition of power generation capacity. Lake Region Electric Cooperative intends to install fans on an existing transformer or install an additional transformer within the existing substation footprint to meet the project's electricity needs and does not anticipate any additional work would be needed to support the project. The applicant indicated it would be responsible for all costs associated with the infrastructure upgrades and operation of the capture facility. Underground cables would bring 12.47 kilovolts of electricity from the substation to the capture facility area and connect to the capture facility. The project is anticipated to have negligible impacts on telecommunication, electric, and natural gas utilities.

Transportation

Impacts on railroads would be negligible as the applicant proposes to install the pipeline under all railroads, well beneath the surface of the tracks, using HDD or bore methods. These trenchless construction methods would not disturb the railroads and would allow the railroads to operate normally during and after construction. In addition, the applicant would need to obtain a permit from the railroads to be sure the pipeline crossing is conducted in accordance with each railroad's standards.

RA-North would cross 26 roads, RA-Hybrid would cross 32 roads, and RA-South would cross 25 roads. All three routes cross MnDOT ROW in three places. RA-North would cross State Highway 9 and US Highway 75, and RA-Hybrid and RA-South would cross State Highway 210 and US Highway 75. At these crossings, the applicant would coordinate with MnDOT regarding work within MnDOT ROW and follow MnDOT mitigation suggestions regarding pipeline and boring pit locations and depth.

The existing road network is anticipated to be able to accommodate vehicles accessing the proposed capture facility during construction and operation of the project, including I-94, State Highway 210, and County Road 116. The applicant would conduct pre-construction surveys to document pre-existing roadway conditions. Local roadways would experience a temporary increase in traffic during construction activities. This increase would be more noticeable on some of the lesser travelled roads crossed by the project, but the increase would be for less than 30 days in most locations. Traffic levels would return to pre-construction conditions quickly after construction activities conclude. Although traffic levels would increase during construction as compared to baseline conditions, the additional traffic from 200 vehicles would not result in notable impacts.

Construction is expected to take 6 months or less, with construction crews generally working 6 days per week from 7:00 a.m. to 10:00 p.m. The project would require about 200 vehicles to support construction. Vehicles would include stringing trucks, welding rigs, water trucks, fuel trucks, mechanic trucks, flatbed and lowboy trailer trucks, graders, hydrostatic equipment trucks, and construction staff vehicles. The construction vehicles would generally be spread over the pipeline route, with more concentrated activities in some areas depending on the type of activities occurring. Construction would generally progress in a linear fashion, with levels of traffic rising when work is in each area and falling as the progress of construction moves on. The daily commute of construction workers and the delivery of equipment and materials to the project would add an incremental increase in the traffic found along existing transportation networks at specific locations, such as intersections and locations where the pipeline crosses a road. Increased vehicle traffic would be encountered during morning and evening peak times corresponding to normal workday hours. Major roads would be able to handle the minor and temporary increase of vehicles. The temporary increase in traffic during construction activities would be

more noticeable on some of the lesser travelled roads. The increase would occur for fewer than 30 days in most locations.

Construction workers would drive personal or company vehicles directly to the project area and park in designated areas, such as along the construction workspace or on landowner property with landowner permission. The need for parking and the decision of where workers park would vary over time depending on the location and accessibility of the work area and the space available on the construction workspace. Workers who support construction of the capture facility would park on-site at the ethanol plant. There would be no long-term parking needs along the construction workspace for any of the route alternatives. If maintenance work is required, adequate parking space would be available for workers to temporarily park along the operational ROW or in safe locations, as agreed to with local landowners.

The CO₂ capture facility would be located at the existing ethanol plant, which already experiences daily vehicle and truck traffic from employees, vendors, and farmers with corn deliveries. The CO₂ capture facility is anticipated to take about 6 to 7 months to construct, with crews working 6 days per week. Workers commuting for the project would increase the number of vehicles on principal roadways, generally prior to peak morning and after peak afternoon/evening workday rush-hour times.

Materials and equipment delivery traffic would be dispersed throughout normal workday hours. The local road network would be able to accommodate construction traffic. The applicant would construct a permanent access road to the CO₂ capture facility to allow for efficient travel to the construction site and daily access to the CO₂ capture facility during operation of the project. Construction equipment could track sediment onto paved roads when leaving the construction workspace.

The applicant plans to HDD or bore all paved roads to minimize impacts on traffic. This construction technique should prevent the need for road closures and allow traffic to operate normally.

Fergus Falls Municipal Airport-Einar Mickelson Field is within the ROI for RA-South, but outside the route width, and would not be impacted by construction or operation of the project.

Sewer, Water, and Waste Management

A minor, temporary increase in water and sewer use is anticipated due to the influx of construction workers using temporary housing, such as hotels/motels, recreational vehicle parks, and campgrounds. The existing water and sewer capacity of local community water and sewer utilities would be sufficient for the influx of temporary construction workers. Water supply for operation of the capture facility is discussed in Section 5.7.8.

Solid waste would be generated by the construction of the project, including excess soils and rocks, timber slash, garbage generated by construction crews, timber mat debris, erosion control measures no longer in use, and other construction-related materials, such as cardboard, plastic, and other packaging materials. The applicant would remove waste from the construction workspace on a daily basis and dispose of it using a licensed waste hauler, as required by applicable permits and regulations. Wastewater generated by use of portable toilets during construction would be transported via truck to a licensed facility for proper disposal.

5.4.9.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) includes the following mitigation for public services and infrastructure:

- “During construction, the Permittee shall minimize any disruption to public services or public utilities. To the extent disruptions to public services or public utilities occur these would be temporary, and the Permittee will restore service promptly. Where any impacts to utilities have the potential to occur the Permittee will work with both landowners and local agencies to determine the most appropriate mitigation measures if not already considered as part of this permit” (**Appendix H**, Section 7.6, Public Services, Public Utilities, and Existing Easements).
- “The Permittee shall cooperate with all entities that have existing easements or infrastructure within the pipeline route to ensure minimal disturbance to existing or planned developments” (**Appendix H**, Section 7.6, Public Services, Public Utilities, and Existing Easements).
- “The Permittee shall advise the appropriate governing bodies having jurisdiction over all state, county, city or township roads that will be used during the construction phase of the project” (**Appendix H**, Section 7.18, Roads).
- “Where practical, existing roadways shall be used for all activities associated with construction of the facility. Oversize or overweight loads associated with the facility shall not be hauled across public roads without required permits and approvals” (**Appendix H**, Section 7.18, Roads).
- “The Permittee shall construct the least number of site access roads it can. Access roads shall not be constructed across streams and drainage ways without the required permits and approvals. Access roads shall be constructed in accordance with all necessary township, county or state road requirements and permits” (**Appendix H**, Section 7.18, Roads).
- “The Permittee shall promptly repair private roads or lanes damaged when moving equipment or when accessing construction workspace, unless otherwise negotiated with the affected landowner” (**Appendix H**, Section 7.18, Roads).
- “The Permittee shall be responsible for compliance with all laws applicable to the generation, storage, transportation, clean up and disposal of all wastes generated during pipeline construction and restoration of the right-of-way” (**Appendix H**, Section 7.22, Pollution and Hazardous Wastes).
- “All waste and scrap that is the product of construction shall be removed from the right-of-way and all premises on which construction activities were conducted and properly disposed of upon completion of each task. Personal litter, including bottles, cans, and paper from construction activities shall be removed on a daily basis” (**Appendix H**, Section 7.23, Cleanup).

Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant would coordinate with Gopher State One Call to determine the locations of existing underground utilities before beginning any ground-disturbing activity.

Use of the HDD or bore method to install the pipeline beneath railroads would avoid impacts on the railroad.

The applicant has met with county engineers and other road authorities to discuss crossing methods, construction traffic, use and repair of roadways, and similar issues. The applicant indicates it would develop and enter into road agreements with each county to address these issues. Additionally, the following measures would be implemented to mitigate impacts on roadways during and after construction:

- Assigning traffic control personnel in areas of temporary lane closures (for example, when construction equipment is pulling off the construction workspace and onto a public road) or heavy traffic.
- Restoring road surfaces damaged by construction to pre-existing conditions or better.
- Removing access points installed to facilitate ingress/egress to the construction workspace and restoring affected areas.
- Reducing equipment and vehicle access to the construction workspace where practicable and installing rock access pads or construction pads in accordance with permits and by federal, state, and/or local specifications.
- Crossing all paved roads by HDD or bore techniques to minimize impacts on traffic by preventing the need for road closures and allowing traffic to operate normally.

No mitigation measures specific to sewer, water, and waste management are proposed by the applicant.

Mitigation Proposed During Comment Periods

MnDOT would require mitigation at crossings of MnDOT ROW, as noted during scoping. These measures would include depth and casing requirements, restrictions on boring pit locations, avoiding intersecting other roads with MnDOT ROW, and setbacks for existing utilities and structures. MnDOT noted that the applicant should coordinate project construction activities, including plans for hauling oversized loads, with MnDOT staff and should stay current on MnDOT's highway construction activities that could affect project construction.

Mitigation Recommended by EERA Staff

None recommended.

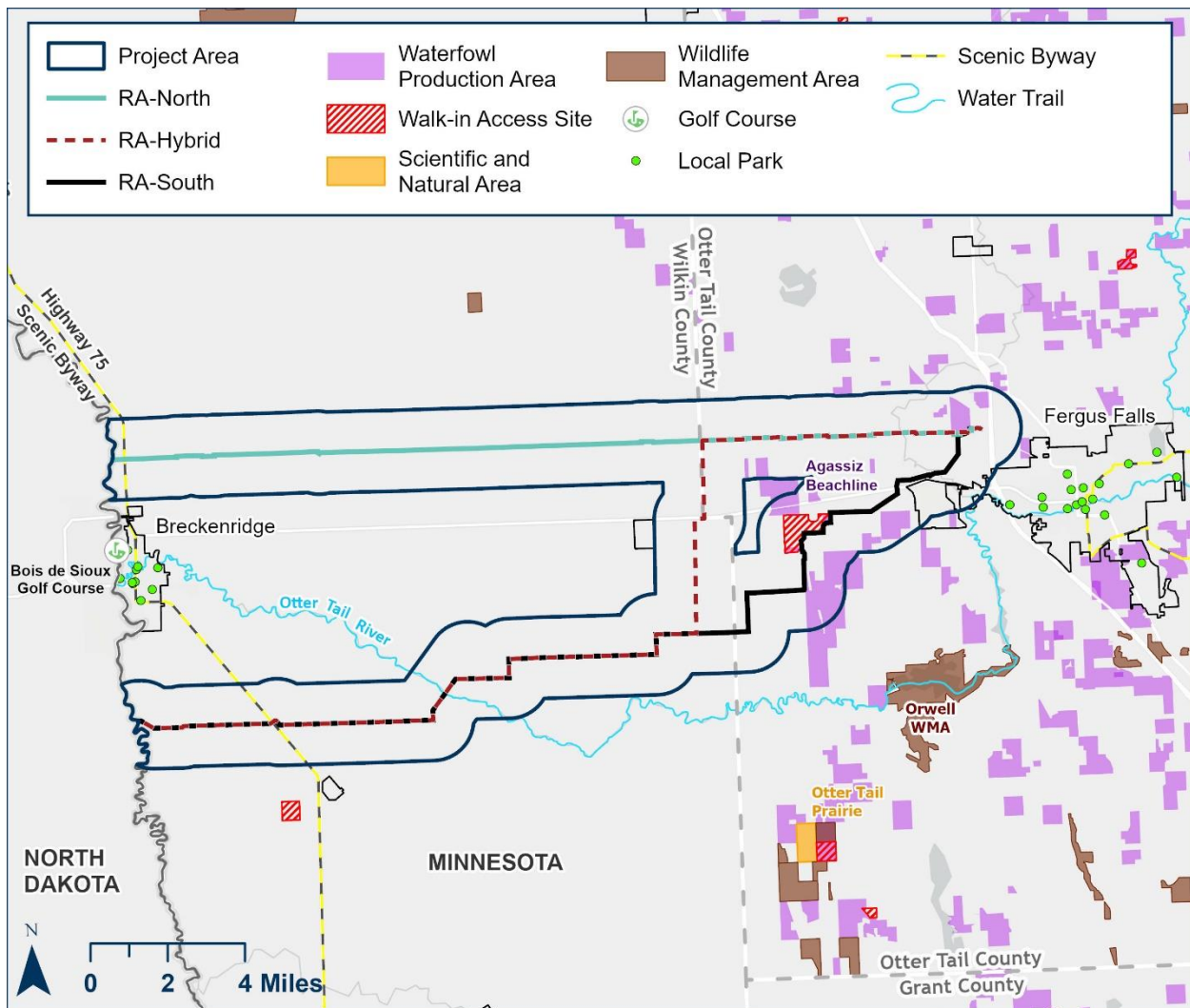
5.4.10 Recreation

The ROI for recreation is the local vicinity (area within 1,600 feet of the route width). Recreational facilities could be affected by construction-related impacts on aesthetics, noise, and air quality. All three route alternatives would cross the King of Trails Scenic Byway (US Highway 75). RA-Hybrid and RA-South would cross the Otter Tail River, a state-designated water trail. The project could temporarily impact these recreational resources during construction due to the presence of equipment in the viewshed, generation of dust, removal of vegetation in the viewshed, and increased noise. RA-South would pass through the Fergus Falls Fish & Game Club's Orwell property. The applicant would continue to communicate with the club to minimize visual and noise impacts during construction. RA-North would not cross the Otter Tail River or the Orwell property and would be anticipated to have fewer impacts on recreation than the other two route alternatives. Operation of the project would not cause visual or noise impacts on recreational resources. Recreation impacts are anticipated to be short term and minimal to moderate.

5.4.10.1 Existing Conditions

Recreational spaces and opportunities are present within Otter Tail and Wilkin Counties. Recreational opportunities within the counties include nature preserves, hiking trails, biking trails, fishing, hunting, snowmobiling, boating, canoeing, kayaking, and swimming. The recreational activities in the area are typically associated with various natural resources, such as lakes (fishing, boating, etc.) and parks (hiking, biking, etc.). All proposed routes for the project pass through primarily rural/agricultural land, avoiding proximity to available recreational spaces. Recreational facilities in the vicinity of the project are shown in **Figure 5-8**.

Figure 5-8 Recreational Facilities in the Project Vicinity



Note: Walk-in Access Sites are open to individuals with a Walk-In Access validation for hunting from September 1 to May 31 during legal hunting hours and open seasons from a half-hour before sunrise to a half-hour after sunset with no landowner contact necessary.

5.4.10.2 Potential Impacts

RA-North and RA-Hybrid would be near, but more than 1,600 feet away from, the Agassiz Beachline Waterfowl Production Area, which is a nature preserve.

RA-Hybrid and RA-South cross the Otter Tail River, a state-designated water trail, which is the location of a Buffalo-Red River Watershed District and USACE-sponsored stream restoration project. All three routes would also cross the King of Trails Scenic Byway (US Highway 75). The pipeline would be installed underneath both the Otter Tail River and the scenic byway using HDD techniques, which would avoid vegetation clearing between the HDD entry and exit points. After construction, the applicant would generally maintain the 50-foot-wide operational ROW over the pipeline by mowing and removing woody vegetation taller than 15 feet in non-cultivated areas. Exceptions include the area between HDD entry and exit points where the vegetation would not be maintained and at riparian buffers adjacent to waterbodies where only a 10-foot-wide corridor would be maintained.

RA-South would pass through the Fergus Falls Fish & Game Club's Orwell property. Short-term, minimal to moderate impacts on aesthetics and noise would occur during construction. RA-North would not cross the Otter Tail River or the Orwell property and would be anticipated to have fewer impacts on recreation than the other two route alternatives.

The project may have short-term, minimal to moderate impacts on recreational resources and recreational activities, such as fishing and hunting, during construction due to the presence of equipment in the viewshed and increased noise while equipment is operating.

During construction, vehicles and equipment would produce noise (see Section 5.4.5) and dust that would be perceptible to nearby users. The removal of vegetation in construction workspaces and placement of construction vehicles and equipment would alter the viewshed temporarily. The project would not result in temporary closures of recreational areas.

Aside from the presence of the maintained operational ROW, which generally would not be noticeable in cultivated areas, the project would not cause visual or noise impacts on recreational resources once construction is complete. After restoration is complete, operation of the project would not result in visual impacts on users of the recreational areas because the pipeline facilities would be mostly underground. Aboveground facilities along the length of the pipeline would include MLVs and both temporary and permanent access roads.

5.4.10.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include mitigation measures specific to recreation. However, the following measures to mitigate aesthetics and noise would also mitigate impacts on recreation:

- "Care shall be used to preserve the natural landscape, minimize tree removal, and prevent any unnecessary destruction of the natural surroundings in the vicinity of all pipeline construction and restoration activities" (**Appendix H**, Section 7.11, Landscape Preservation).
- "The Permittee shall clear the permanent right-of-way and temporary right-of-way preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation in areas such as trail and stream crossings where vegetative screening may minimize aesthetic impacts, to the extent that such actions do not impact the safe operation, maintenance, and inspection of the pipeline and are in compliance with all applicable laws and regulations" (**Appendix H**, Section 7.14, Vegetation Management).
- "The Permittee shall comply with noise standards established under Minnesota Rules 7030.0100 to 7030.0080, at all times at all appropriate locations during operation of the facility."

Construction and maintenance activities shall be limited to daytime working hours to the extent practicable to ensure nighttime noise level standards will not be exceeded” (**Appendix H**, Section 7.7, Noise).

- Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant states that it would continue to communicate with the Fergus Falls Fish & Game Club to minimize visual and noise impacts during construction. In testimony, the applicant committed to the EERA staff-recommended mitigation that it provide documentation of coordination with the Fergus Falls Fish & Game Club, if issued a route permit for the project (see Appendix I).

Mitigation Proposed During Comment Periods

No mitigation specific to recreation was proposed by commenters.

Mitigation Recommended by EERA Staff

None proposed.

5.4.11 Socioeconomics

The ROI for socioeconomics is Otter Tail and Wilkin Counties. Socioeconomics assesses overall social and economic character of an area and the project’s effects on the well-being of current and future residents of the affected community. Most impacts would be beneficial. Construction would result in a temporary increase in local population associated with the workers and associated spending from lodging, transportation, and food. The nearby cities have adequate housing and infrastructure to support the additional workers for all three route alternatives. Local labor would also be used, increasing employment in the surrounding area. The applicant estimates the total cost for the project to be \$69.75 million for RA-North, \$70.12 million for RA-Hybrid, and \$66.75 million for RA-South, with a construction payroll of \$37,411,000. The project would increase tax revenues, benefiting the counties and state. Socioeconomic impacts are anticipated to be minimal, short to long term, and similar across the three route alternatives.

5.4.11.1 Existing Conditions

Data from the United States Census Bureau on population and income^{95, 96} and data from the Minnesota Department of Employment and Economic Development on labor force and unemployment⁹⁷ were reviewed to obtain information regarding the current socioeconomic conditions of the counties.

Table 5-18 summarizes the socioeconomic conditions in the ROI, as well as the state of Minnesota and city of Fergus Falls.

Table 5-18 Population, Income, and Employment

State/ County/City	Population (July 2022)	Population Density (people/square mile, 2020)	Per Capita Income (2017–2021, in 2021 dollars)	Labor Force Participation Rate, 2021 (percent)	2021 Total Labor Force	2021 Unemployment Rate (percent)
Minnesota	5,717,184	72	\$41,204	69.2	3,109,419	4.0
Otter Tail County	60,519	31	\$34,380	62.6	30,121	4.4
Wilkin County	6,350	9	\$34,945	64.0	3,285	4.0
City of Fergus Falls	14,187	982	\$31,737	62.1	N/A	N/A
City of Breckenridge	3,430	1,394	N/A	N/A	N/A	N/A

N/A = not available

Between 2010 and 2020, the population of Otter Tail County increased by 4.8 percent, and the population of Wilkin County decreased by 1.1 percent. In 2022, Otter Tail County had a population of 60,519, and Wilkin County had a population of 6,350. Fergus Falls is the largest city in either county, with a 2022 population of 14,187.⁹⁸

The ethanol plant, the proposed capture facility, and the easternmost point of all three route alternatives are all near Fergus Falls, just north and outside of the Fergus Falls city limits. The city of Breckenridge in Wilkin County, on the Minnesota-North Dakota border, lies between the westernmost point of all three route alternatives. Breckenridge's population in 2020 was 3,430.⁹⁹ The City of Foxhome, with a 2020 population of 126,¹⁰⁰ is within 1 mile of RA-Hybrid.

Based on 2021 data, unemployment rates are generally low, ranging from 4.0 percent (Wilkin County) to 4.4 percent (Otter Tail County), and similar to the state average of 4.0 percent. Per capita income, \$34,380 in Otter Tail County and \$34,945 in Wilkin County, is lower than the state average. Manufacturing and educational, health, and social services are generally the largest economic industries for employment in both counties.¹⁰¹

Approximately 200 construction-related jobs would be created during the construction of the project. For the construction of the project, 100 percent of the workforce would be union employees, with 50 percent of the personnel sourced from local union halls (see response to Supplemental Information Inquiry #5 in **Appendix I**). However, due to the comparatively low unemployment rates in Otter Tail and Wilkin Counties, potential local labor shortages, specialized skill needs, and the relatively short construction schedule, additional labor would likely need to be sourced from other areas of the state or other states. For the purpose of this analysis, it is assumed that 100 construction workers could come from outside of the ROI and require temporary housing.

Temporary housing is available in Fergus Falls near the capture facility and the eastern end of the pipeline. As shown in **Table 5-19**, there is sufficient housing available for workers, including 9,596 units available in Otter Tail County, 37 units available in Wilkin County, and 84 units available in the Fergus Falls for seasonal, recreational, or occasional use.¹⁰² A total of 69 hotels and motels are available in Otter

Tail and Wilkin Counties, with a minimum of 215 rooms available in Fergus Falls.¹⁰³ Additional temporary housing is available in Breckenridge and Wahpeton, North Dakota, near the western end of the project.

Table 5-19 Temporary Housing in Otter Tail and Wilkin Counties^{104, 105}

County/ City	Housing Units for Rent	For Seasonal, Recreational, or Occasional Use	For Migrant Workers	Other Vacant	Hotels and Motels	Campgrounds/ Other ^a
Otter Tail County	527	9,596	10	798	67	16
Wilkin County	57	37	1	95	2	0
City of Fergus Falls	228	84	0	137	6	1

^a Other includes resorts and RV parks.

The applicant estimates the total cost for the project to be \$69.75 million for RA-North, \$70.12 million for RA-Hybrid, and \$66.75 million for RA-South (plus or minus 15 percent). Based on the applicant's current schedule, pipeline construction would occur from August 2025 to October 2025, and the CO₂ capture facility would be constructed from August 2025 to March 2026 (see response to Supplemental Information Inquiry #13 in **Appendix I**).

During operation, the applicant plans to employ three full time employees, two pipeline technicians and one capture facility operator, who may be hired from the project area or elsewhere depending on availability of personnel with specialized skill requirements.

5.4.11.2 Potential Impacts

Construction of the project would result in a temporary increase in local population associated with the workers who would come from outside the ROI. The increase would not have a significant effect on the population of Otter Tail and Wilkin Counties.

The project would temporarily increase employment in the ROI by about 200 jobs during construction. The applicant estimates a construction employment expenditure of \$37,411,000.¹⁰⁶ The applicant states that half of the workers would come from local unions, so a maximum of 100 workers could come from outside Otter Tail and Wilkin Counties and could require temporary housing. As shown in **Table 5-19** above, adequate temporary housing is available for these workers. Impacts on temporary housing would be beneficial as vacant units are rented by workers. However, impacts could be adverse if increased competition increases rental rates or displaces tourists. The impacts would be short term and minimal.

The applicant and its contractors would also purchase some goods and services in the counties crossed by the project during construction and operation, which would have a moderate short-term and negligible to minimal long-term beneficial impact on the local economy. Individual landowners would be compensated for operational pipeline easements as well as for use of temporary construction workspaces.

The project would increase tax revenues in the short and long term, resulting in a minimal beneficial impact on the counties. In Minnesota, a CO₂ pipeline would be subject to property tax and its value would be assessed annually by the Commissioner of Revenue. The market value of a centrally assessed property is set forth in Administrative Rule 8100 and generally requires the operating property of the entire pipeline to be valued as a unit using a combination of the income and cost approaches. The unit value would then be allocated back to Minnesota and to each county and local taxing district in which

the CO₂ pipeline is located. The tax would be administered by the treasurer's office for each county, which would issue property tax statements and distribute the tax collected in the same manner as other property taxes.

Two socioeconomic studies were conducted for the MCE Project. Results from these studies are presented below and are solely for informational purposes; the studies were not used to analyze potential socioeconomic impacts.

The first study, prepared by Ernst and Young, was commissioned by the applicant in 2022 for the MCE Project. This study estimated that total capital expenditures (direct, indirect, and induced impacts, including the applicant's contribution, its contractors' contributions, and suppliers' contributions) would be \$39,193,000 in Otter Tail County and \$42,631,000 in Wilkin County.¹⁰⁷

The second study, conducted by North Star Policy Action (NSPA), also assessed the socioeconomic impacts of the applicant's MCE Project.¹⁰⁹ This analysis stated that the Ernst and Young analysis underestimated the economic benefits of the MCE Project. The NSPA analysis estimated that the total economic benefit to Minnesota would be \$64,140,267 if 10 percent of workers were local and \$122,511,116 if 50 percent of workers were local. Additionally, the NSPA analysis stated that the Ernst and Young report undervalued the long-term economic benefit of introducing local workers to the construction workforce.¹¹⁰

5.4.11.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include mitigation measures specific to socioeconomics. The sample routing permit states that "the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations" (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant does not propose mitigation measures.

Mitigation Proposed During Comment Periods

No mitigation specific to socioeconomics was proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended.

5.4.12 Tribal Treaty Rights

The ROI for Tribal treaty rights is the project area (area within 1 mile of the route width). Lands in the local vicinity of the project were ceded to the United States government in two 1851 treaties, and neither treaty that ceded lands within the project area established government-recognized usufructuary hunting or gathering rights within the ceded lands. Therefore, potential impacts on Tribal treaty rights along each of the three route alternatives during construction and operation of the project are expected to be negligible.

5.4.12.1 Existing Conditions

The project area has been home to various peoples and cultures since time immemorial. In the early to mid-1800s, the project area was populated primarily by Dakota Tribes (Sioux) and Ojibwe (Chippewa) until the Ojibwe relinquished their claims to the area in 1825. In 1851, most lands in southern and central Minnesota, including lands in the vicinity of the project, were ceded to the United States government in two treaties: the Treaty with the Sioux-Sisseton and Wahpeton Bands, signed July 23, 1851, and the Treaty with the Sioux-Mdewakanton and Wahpakoota Bands, signed August 5, 1851.

Royce's Schedule of Indian Land Cessions lists land cessions from 1784 to 1894, descriptions of the land ceded, and the names of the tribes affected. The area that was ceded in 1851, which includes the project area, is described under Royce's Schedule of Indian Land Cessions number 289 (see **Figure 5-9**).¹¹²

The area on the west side of the Bois de Sioux River was ceded under Royce's Schedule of Indian Land Cessions number 538, which occurred under an 1872 treaty in which the Sisseton and Wahpeton Bands of the Sioux ceded claims to all lands outside of permanent reservations (Rev. Stat. 1050).¹¹³ Additionally, the project area is about 30 miles upstream from areas ceded under the 1855 Treaty with the Chippewa-Mississippi and Pillager Bands (10 Stat. 1165), which is described under Royce's Schedule of Indian Land Cessions number 357,¹¹⁴ and under the 1863 Treaty with the Chippewa-Red Lake and Pembina Bands (13 Stat. 667), which is described under Royce's Schedule of Indian Cessions number 445.¹¹⁵

Treaty with the Sioux-Sisseton and Wahpeton Bands (10 Stat. 949)

The Treaty with the Sioux-Sisseton and Wahpeton Bands, signed in 1851, is also commonly referred to as the Treaty with the Dakota at Traverse des Sioux. This treaty ceded all lands of the Sioux-Sisseton and Wahpeton Bands of Dakota in the state of Iowa. It also ceded all lands in the then Minnesota Territory. The area was bounded to the west by the western bank of the Red River (along the Minnesota-North Dakota border) starting at its junction with the Buffalo River (about 12 miles north of Fargo, North Dakota), extending south along the Red River as it transitions into the Bois de Sioux River in Wahpeton, continuing south until reaching the southernmost tip of Lake Traverse, then extending straight west into South Dakota until reaching the junction of Kampeska Lake with the Big Sioux River, then along the western bank of the Big Sioux River running southwest until reaching the northwestern corner of the state of Iowa.¹¹⁶

Under this treaty, "the Sisseton and Wahpeton [B]ands of the Dakota ceded 21 million acres for \$1,665,000, or about 7.5 cents an acre.... The U.S. government kept more than 80 percent of the money (\$1,360,000), with the Dakota receiving only the interest on the amount, at 5 percent for 50 years."¹¹⁷ This treaty did not establish government-recognized usufructuary hunting or gathering rights within the ceded lands. Instead, it established Dakota reservation lands surrounding the Minnesota River for about 10 miles northeast and southwest of the river, bounded in Minnesota by the Yellow Medicine River to the southeast.¹¹⁸ This reservation land is not located within the project area (see **Figure 5-9**).

The reservation land within Minnesota was possessed by the United States government in an 1858 Treaty with the Dakota and the 1863 Dakota Expulsion Act. "In 1858, a month after Minnesota became the 32nd state in the union, a group of Dakota leaders were summoned to Washington, DC, where they were detained until they signed another treaty relinquishing all land north and east of the Minnesota River to the United States. Dakota title to a 10-by-150-mile strip of land—a portion of the land designated a reservation in 1851—was acknowledged through this treaty. Authority was given to allot individual claims on this reservation land to Dakota farmers."¹¹⁹ In 1863, "a federal law, the Dakota

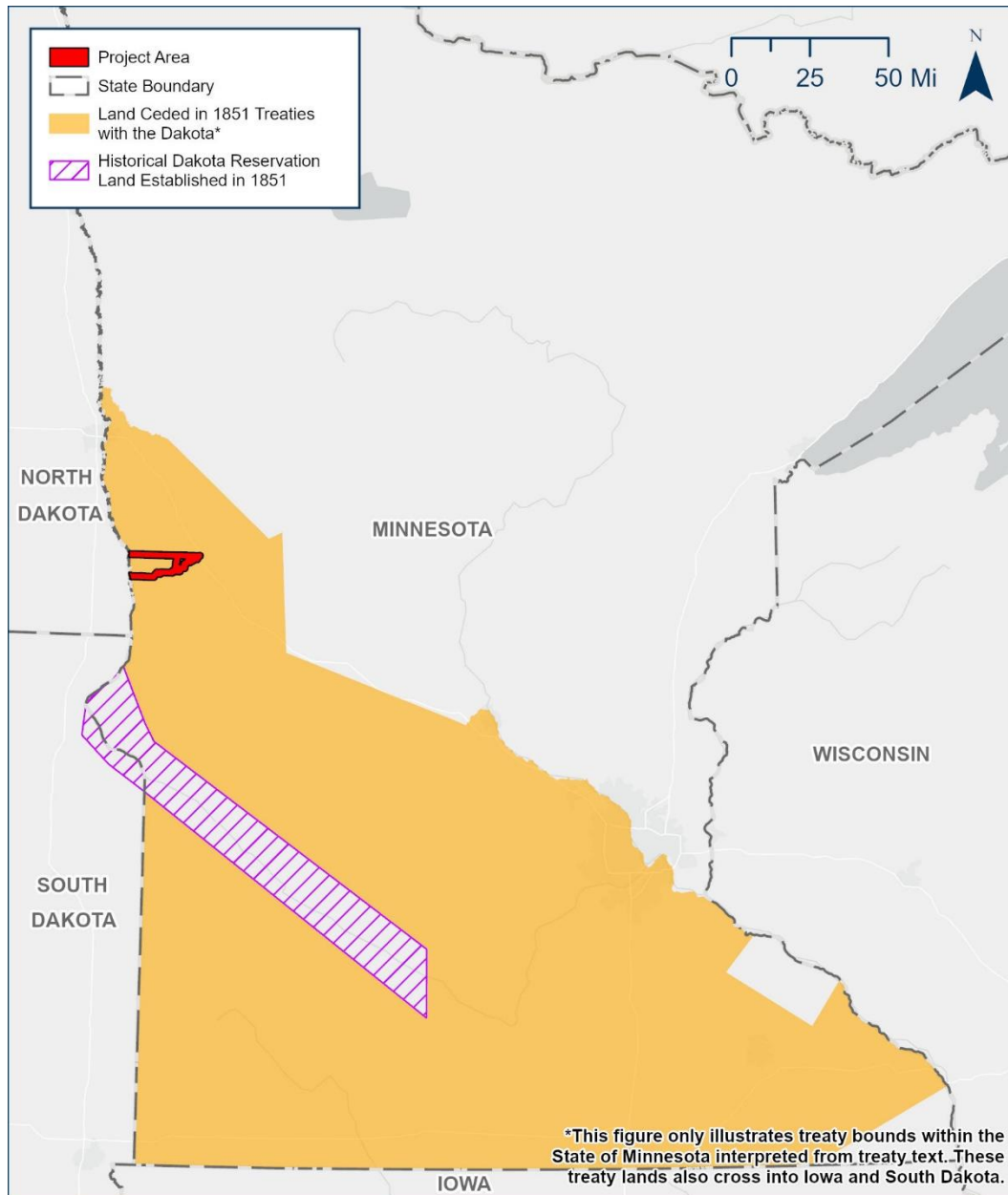
Expulsion Act, abrogates all Dakota treaties and makes it illegal for Dakota to live in the state of Minnesota. The act applies to all Dakota, regardless of whether they joined the [U.S.-Dakota] war in 1862.”¹²⁰ The reservation land within Minnesota was taken back by the United States government and a reservation was established outside of the state boundaries at Crow Creek in the Dakota Territory. This reservation was located along Big Stone Lake northwest of present-day Big Stone City in South Dakota.¹²¹

Treaty with the Sioux-Mdewakanton and Wahpakoota Bands (10 Stat. 954)

The Treaty with the Sioux-Mdewakanton and Wahpakoota Bands, also signed in 1851, is known as the Treaty with the Dakota at Mendota. This treaty relinquished “all [the Bands’] lands and all their right, title and claim to any lands whether in the Territory of Minnesota, or in the State of Iowa.”

Under this treaty “the bands were to receive the interest on \$1,410,000 that was to be applied to agricultural implements, provisions, education, and annuities in return for relocating to the Lower Sioux Agency near present-day Morton and ceding much of their remaining territory in southwestern Minnesota. Exasperated, Little Crow and other leaders who initially refused to sign, did so based on promises that funds would be paid from previously unpaid treaty agreements. The treaty was ratified by congress and these promises did not come to pass.”¹²² The treaty did not establish government-recognized usufructuary hunting or gathering rights within the ceded lands. The bands were given 1 year to move to the same reservation land along the Minnesota River outlined above in the Treaty with the Sioux-Sisseton and Wahpeton Bands.¹²³ As indicated above, this reservation land within Minnesota was quickly possessed by the United States government through an 1858 Treaty with the Dakota and the 1863 Dakota Expulsion Act, and a reservation was established outside of the state boundaries at Crow Creek in the Dakota Territory.

Figure 5-9 Historical Treaty and Reservation Boundaries



The land covered by these treaties encompasses all three route alternatives. The historical reservation land established in 1851 was not located within the project area.

5.4.12.2 Potential Impacts

Neither treaty that ceded lands within the project area established government-recognized usufructuary hunting or gathering rights within the ceded lands. Therefore, the project is not anticipated to impact usufructuary hunting or gathering rights along any of the route alternatives.

5.4.12.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include mitigation measures specific to Tribal treaty rights. The sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

None proposed.

Mitigation Proposed During Comment Periods

No mitigation specific to Tribal treaty rights was proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended.

5.5 Economies

5.5.1 Agriculture

The ROI for agriculture is the local vicinity (area within 1,600 feet of the route width). Short-term agricultural impacts would be minimal across the three route alternatives. Long-term agricultural impacts would also be minimal. Agricultural land, including prime farmland, is found across the three route alternatives in similar acreages. During construction, lands would not be available for agricultural production. Easement agreements can compensate landowners for lost crops due to construction. Following construction of the pipeline, agricultural land would be restored, and agricultural activities could resume. Crop production could be reduced in areas disturbed by construction, resulting in long-term impacts from disturbance to soils. Anticipated impacts would be similar across the three route alternatives.

5.5.1.1 Existing Conditions

For the purposes of this analysis, agricultural land is defined as cultivated cropland and grassland and includes activities such as organic farming, crop harvesting, livestock grazing, and dairy production. It can include prime farmland, which is land with areas of soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, as defined by the USDA Natural Resources Conservation Service and described in more detail below. Prime farmland definitions are based on soil types; therefore, this land can include agricultural land as defined above or land that is not currently being used for agricultural production.

Farming occurs in Otter Tail and Wilkin Counties; however, it constitutes a small percentage of overall state agriculture sales at just 3 percent. The following summary is based on information from the Census of Agriculture, which is conducted by USDA.¹²⁴ The agricultural census is a complete count of farms, ranches, and the people who operate them, including small plots with at least \$1,000 in annual sales. The most recent agricultural census was completed in 2022.

In 2022, there were 358 individual farms using 401,044 acres of farmland in Wilkin County—an 8 percent decrease in the overall number of farms and 6 percent decrease in acres from 2017—and 2,497 individual farms using 770,922 acres of farmland in Otter Tail County—a 2 percent decrease in the

number of farms and 3 percent decrease in the number of acres from 2017. The value of the products sold, both crop sales and livestock sales, rose approximately 37 percent in Wilkin County and 58 percent in Otter Tail County from 2017.¹²⁶ **Table 5-20** summarizes each county's agricultural activity.

Table 5-20 USDA Summary for Otter Tail and Wilkin Counties¹²⁷

Item	Otter Tail County (2022)	Wilkin County (2022)
Farms (number)	2,497	358
Land in Farms (acres)	770,922	401,044
Average size of Farm (acres)	309	1,120
Median size of Farm (acres)	134	326
Estimated market value of land and building per farm (dollars)	1,185,597	6,068,987
Estimated market value of land and building per acre (dollars)	3,840	5,418
Estimated market value of all machinery and equipment (dollars)	446,155,000	185,963,000
Average per farm (dollars)	178,676	519,451
Total cropland (acres)	545,784	387,669
Market value of agricultural products sold (dollars)	551,279,000	254,790,000
Average per farm (dollars)	220,776	711,704

Organic Farming

Organic is a labeling term that indicates that the food or other agricultural product has been produced through approved methods. The organic standards describe the specific requirements that must be verified by a USDA-accredited certifying agent before products can be labeled USDA organic. MDA estimates that about 700 organic certified farms were located in Minnesota as of 2022.

Several databases were searched to identify organic farming operations in the project area. The *Directory of Minnesota Organic Farms* and the *Minnesota Grown Directory*, both maintained by MDA, did not identify any organic farms within the project area.^{128, 129} *DriftWatch* "is a voluntary communication tool that enables crop producers, beekeepers, and pesticide applicators to work together to protect specialty crops and apiaries through use of mapping programs." No farms within the project area are registered with this program.¹³⁰ The *Organic Integrity* database is maintained by USDA. This database "contains up-to-date and accurate information about operations that may and may not sell as organic," and is maintained by organic certifiers. No farms within the project area are registered with this program.¹³¹

Farmland Class

There are differences in the quality and suitability of land for agricultural production. Federal regulation 7 CFR Section 657.5(a)(1) defines prime farmland, in part, as:

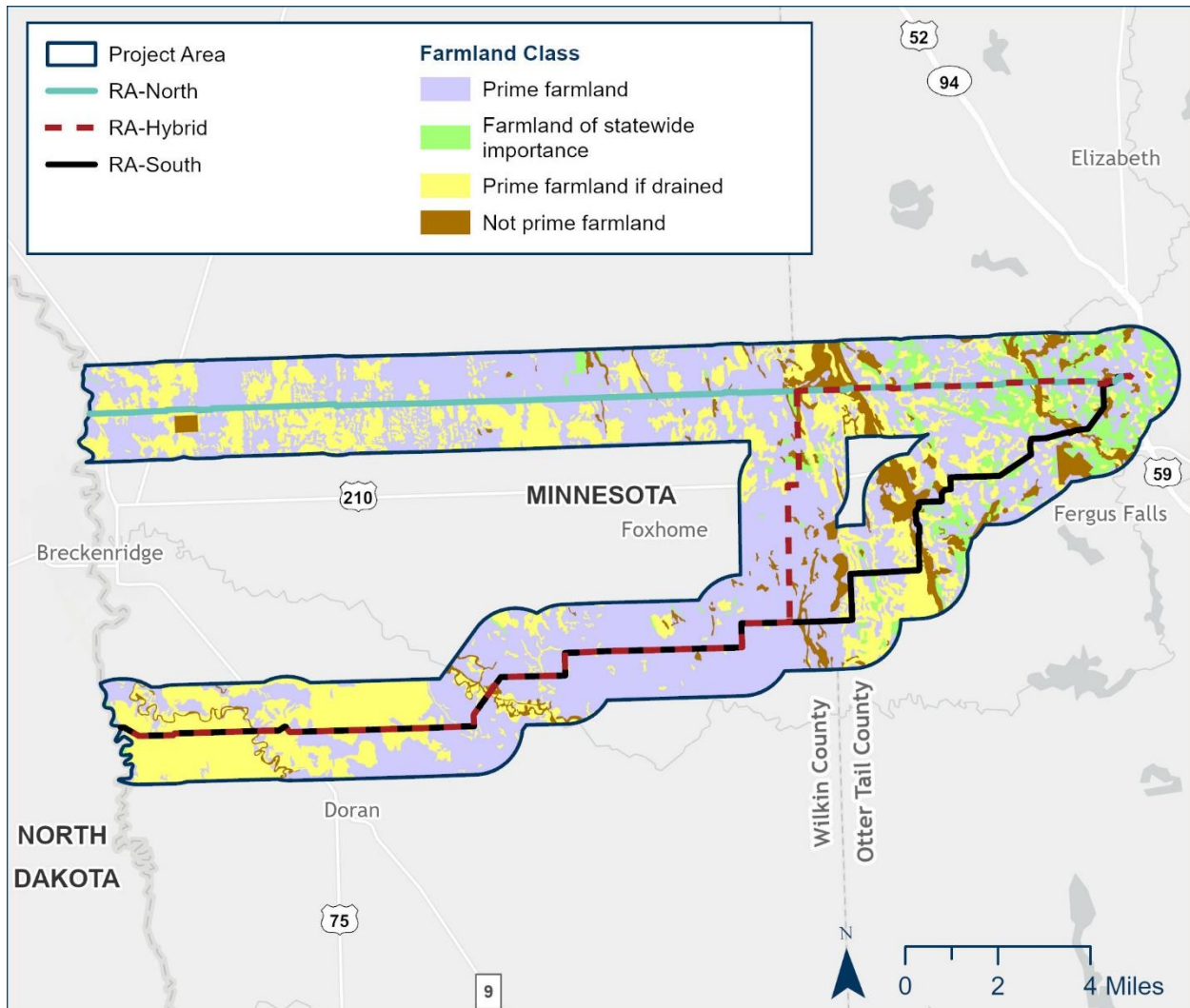
Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water

management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.

Although prime farmland characteristics are the same nationwide, certain soils that do not meet these specific characteristics are nevertheless important at a statewide level. Farmland of statewide importance is land, in addition to prime and unique farmlands, that is of statewide importance to produce food, feed, fiber, forage, and oil seed crops.

Criteria for defining and delineating farmland of statewide importance are determined by the appropriate state agency or agencies. Generally, additional farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some soils might produce as high a yield as prime farmlands, if conditions are favorable. In some states, additional farmlands of statewide importance may include tracts of land that have been designated for agriculture by law.

The Soil Survey Geographic Database (SSURGO) contains soil information collected by the USDA National Cooperative Soil Survey. **Figure 5-10** shows soils classified by SSURGO as either prime farmland or farmland of statewide importance. About 53 percent of soil types in Otter Tail County are considered prime farmland or farmland of statewide importance, and about 92 percent of soil types in Wilkin County are considered prime farmland or farmland of statewide importance.¹³² As such, the different route alternatives cross prime farmland: 1,695 acres within the ROI for RA-South, 1,762 acres within the ROI for RA-Hybrid, and 1,324 acres within the ROI for RA-North have soils that are classified as prime farmland, farmland of statewide importance, or prime farmland if drained.

Figure 5-10 Prime Farmlands in the Local Vicinity of the Route Alternatives

Notes: SSURGO data and NLCD data are unrelated—SSURGO data show soil types; NLCD data show land use/cover types regardless of the underlying soil.

5.5.1.2 Potential Impacts

Construction activities would impact agricultural land within the construction workspace. Impacts on agricultural land include clearing of existing crops during site preparation and construction. Topsoil would be segregated and stockpiled. Soils would be replaced after the trench is backfilled. During the construction period, lands within the construction workspace would not be available for agricultural use, and crops could not be produced. These impacts would be temporary and limited mostly to the length of the construction period of 6 months or less. However, the disturbance from construction could result in reduced crop production post construction. These impacts would typically be long term because of changes in soils from the construction disturbance.

Operation of the pipeline would result in minimal impacts on agricultural lands. The pipeline would be buried with a cover depth of 54 inches, which is below the depth at which normal agricultural operations occur, so agricultural activities would be allowed to resume within the operational ROW after final restoration activities.

Impacts described for construction have the potential to lead to financial impacts, for example, lost farm revenue. Compensation for crop loss would be negotiated between the applicant and the landowner. These agreements are outside the scope of this EIS. Should ongoing issues with lost or diminished crop values occur, an individual can file a complaint with the Commission.

A commenter noted that the trend in the production of corn and similar industrial crops is for larger and larger farms, where technology has increasingly been substituted for labor.¹³³ If the project were to contribute to the current trend of larger, more technologically advanced farms, the local farm workforce could be adversely impacted.

Organic Farming

Impacts on organic farming are not expected because no organic farms were identified in the route width for any route alternative.

Farmland Class

Table 5-21 shows the acres of prime farmland and farmland of statewide importance crossed by the construction and operational ROW for each route alternative. About 90 percent of the land crossed by all route alternatives is classified as prime farmland. About 5 percent of the construction and operation footprints for both RA-North and RA-South and about 4 percent of RA-Hybrid cross soils classified as farmland of statewide importance. Differences are insignificant, and potential impacts on soils classified as prime farmland and farmland of statewide importance during both construction and operation of the project would be similar for all route alternatives. Operation of the project would result in long-term impacts on prime farmland and farmland of statewide importance at the capture facility, MLVs, and permanent access roads, although the capture facility site is not currently in agricultural use.

Table 5-21 Prime Farmland and Farmland of Statewide Importance Impacts¹³⁴

		Prime Farmland		Farmland of Statewide Importance	
Alternative Route	Total Footprint Acreage	Acres	Percent of Total Acreage	Acres	Percent of Total Acreage
RA-North					
Construction Footprint	289.8	262.3	90.5	15.8	5.4
Operation Footprint	139.4	125.4	90.0	7.6	5.4
RA-Hybrid					
Construction Footprint	361.9	327.0	90.3	15.7	4.3
Operation Footprint	176.6	158.3	89.6	7.6	4.3
RA-South					
Construction Footprint	348.8	317.7	91.1	17.8	5.1
Operation Footprint	170.1	153.6	90.3	8.5	5.0

During construction, existing vegetation would be cleared and topsoil would be removed. This could expose soils classified as prime farmland and farmland of statewide importance to wind and water erosion. Topsoil classified as prime farmland and farmland of statewide importance could be lost due to improper handling or erosion along the pipeline. Potential impacts from soil erosion would be limited to the length of the construction period until the construction workspace has been restored. Section 5.7.6 provides further discussion of potential impacts on soils from construction and operation of the pipeline.

As shown in **Table 5-21**, the amount of prime farmland and farmland of statewide importance that would not be available for farming because of the capture facility, MLVs, and permanent access roads would be minimal. While the soils underlying the capture facility site are classified as prime farmland, they are not currently used for agriculture.

5.5.1.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) includes the following mitigation for agricultural impacts:

- “The Permittee shall comply with the Agricultural Protection Plan (APP).... The obligation to comply with the APP as a condition of this permit shall expire with the termination of Commission jurisdiction over this permit as prescribed by Minn. R. 7852.3900, unless otherwise specified in the APP. The Minnesota Department of Agriculture must approve of any amendments to the APP. The Permittee shall file the amended APP with the Commission within

10 days of Minnesota Department of Agriculture approval” (**Appendix H**, Section 6.4, Agricultural Protection Plan).

- “The Permittee shall at least 14 days prior to the start of construction provide notice to all landowners affected by construction with the name, telephone number and email address of the Agricultural Monitor and County inspector designated by the County, if appointed” (**Appendix H**, Section 7.4, Agricultural Monitor and County Inspector Notification Requirements).
- “Areas disturbed by construction activities shall be restored to pre-construction conditions.” (**Appendix H**, Section 7.13, Wetlands and Water Resources).

Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant proposes the following mitigation measures to minimize impacts on agricultural lands:

- Landowners would be compensated for lost crops due to construction according to the terms of their individual easement agreements.
- Operations and maintenance activities would be coordinated with the landowner.

Additionally, the applicant proposes several measures to minimize or avoid impacts from excessive soil crowning or subsidence in agricultural lands, as discussed in more detail in its Minnesota APP (**Appendix E**). These mitigation measures include:

- Following completion of construction in agricultural lands, the applicant would restore the construction workspace to as close to the original pre-construction contours as practicable, except at aboveground facilities (MLV sites and access roads). If uneven settling occurs or surface drainage problems develop as a result of pipeline construction, the applicant would provide additional land leveling services after receiving a landowner’s written notice, weather and soil conditions permitting. Alternatively, the applicant would negotiate with the landowner for reasonable compensation in lieu of restoration.
- The applicant's Minnesota APP (**Appendix E**) specifies the procedures and timelines for repair of drain tiles disturbed during construction in Section 6.7. The APP notes that tile disturbed or damaged by pipeline construction would be repaired to its original or better condition, and permanent repairs would be completed within 21 days after the pipeline is installed in accordance with the applicant's Minnesota ECP (**Appendix D**).
- During trench backfilling, subsoil material would be replaced first, followed by topsoil. Subsoil would be backfilled and compacted to prevent subsidence. Compaction by operating construction equipment along the trench is acceptable.
- During frozen conditions in agricultural lands, the applicant would minimize final clean-up activities. Frozen conditions can preclude effective topsoil replacement, removal of construction debris, removal of excess rock, decompaction of soil as required, final grading, and installation of long-term erosion control structures. If seasonal or other weather conditions preclude final clean-up activities, the trench would be backfilled and stabilized, and temporary erosion control measures would be installed until restoration can be completed. Frozen topsoil would not be

placed back into the trench until thawing has occurred to prevent soil settlement in the trench. If topsoil/spoil piles remain throughout the winter, the topsoil/spoil piles would be stabilized by methods approved by the regulatory authority. To prevent subsidence, backfill operations would resume when the ground is thawed, and the subsoil would be compacted (as needed) prior to final clean-up activities. The applicant would monitor these areas until final restoration is complete.

Mitigation Proposed During Comment Periods

Commenters suggested that the pipeline be buried deeper to avoid interference with drain tile and plowing and that an arbitration board be established to resolve disputes between the applicant and landowners.

Mitigation Recommended by EERA Staff

None recommended.

5.5.2 Industrial

The ROI for industrial economies is the local vicinity (area within 1,600 feet of the route width). Industrial economies encompass industrial property and businesses. An ethanol plant is located at the east end of the three route alternatives. No other industrial facilities exist within the route width of the three alternatives. Construction of the pipeline and capture facility might result in temporary, localized traffic delays for workers and delivery of raw materials and products to and from the ethanol plant. Impacts during operation of the pipeline and capture facility are not anticipated. Impacts would be short-term and negligible across the three route alternatives.

5.5.2.1 Existing Conditions

An ethanol plant is located at the east end of the three route alternatives. No other industrial facilities exist within the route widths of the three route alternatives.

5.5.2.2 Potential Impacts

A potential impact during construction of the pipeline and capture facility (located southeast of the ethanol plant) may consist of short-term, localized traffic delays. Local roadways would experience a temporary increase in traffic during construction activities. After construction activities have concluded, traffic levels would be anticipated to return to pre-construction conditions quickly. Impacts from traffic on industrial economies would be negligible. Traffic impacts are described in further detail in Section 5.4.9. Impacts during operation of the pipeline and capture facility are not anticipated.

As discussed in Section 5.4.4, Otter Tail County has not established zoning specific to land uses. The Wilkin County Zoning Ordinance establishes zoning ordinances for various land uses within Wilkin County; however, zoning maps are not publicly available online. As development within the ROI continues, future industrial facilities have the potential to be located adjacent to the ethanol plant or pipeline ROW.

The presence of the capture facility would preclude construction of new industrial facilities at that location. No new industrial facilities would be allowed within the operational pipeline ROW.

5.5.2.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include mitigation measures specific to industrial properties. The sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

Additional mitigation for traffic impacts that could be applicable to industrial properties is addressed in Section 5.4.9.

Mitigation Proposed During Comment Periods

No mitigation specific to industrial properties was proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended.

5.5.3 Tourism

The ROI for tourism economies is the local vicinity (area within 1,600 feet of the route width). Tourism includes traveling to a destination for recreation or relaxation related activities. Otter Tail and Wilkin Counties offer a variety of recreational opportunities as their primary tourist attraction, such as nature preserves, hiking trails, biking trails, fishing, hunting, snowmobiling, boating, canoeing, kayaking, and swimming. Tourism opportunities are similar for the three route alternatives. Construction would result in temporary and minimal noise, dust, and visual impacts within the local vicinity that could be experienced by tourists in the area. The pipeline facilities would be almost entirely underground during operation and create minimal visual impacts on surrounding areas. The carbon capture facility would be adjacent to the ethanol plant and compatible with its surrounding viewshed. Once construction is finished and the project is in operation, it is not expected to cause any noise or dust impacts on adjacent tourism areas. The project’s impacts on tourism economies would be negligible during operation. Impacts on tourism across the three route alternatives would be similar—short term and negligible to minimal.

5.5.3.1 Existing Conditions

The three route alternatives all pass through Otter Tail and Wilkin Counties. These counties offer a variety of recreational opportunities. Tourists visiting either county may enjoy recreational activities such as nature preserves, hiking trails, biking trails, fishing, hunting, snowmobiling, boating, canoeing, kayaking, and swimming. Most of the recreational tourism activities occur within or near lakes or parks.^{135, 136, 137, 138} Recreational facilities are shown in **Figure 5-8** in Section 5.4.10.

Otter Tail Lakes Country Association provides an online map¹³⁹ that displays the location of places and businesses of interest for visitors. While the project is located west of I-94, most of the locations on the Otter Tail Lakes Country map are east of I-94, with the exception of a restaurant (Mabel Murphy’s). The restaurant is over 5,500 feet away from RA-South, the closest proposed route.

Wilkin County’s website does not provide tourist or visitor information, but the city of Breckenridge provides a list of locations of interest for visitors.¹⁴⁰ The closest attraction is the Bois de Sioux Golf Course, which is over 2 miles from RA-North. Welles Memorial Park is located between the proposed

routes and is over 3 miles away from any route. The Breckenridge Family Aquatic Center is nearly 3 miles from RA-North.

The King of Trails Scenic Byway (US Highway 75) is located within the ROI of the project in Wilkin County. This historic highway parallels Minnesota's western border, provides travelers an opportunity to experience the state's historic and natural beauty, and draws people into the local communities.¹⁴¹ This highway is central to the tourism economy of the communities along its length, including in Wilkin County, and facilitates coordinated events that attract visitors.¹⁴²

5.5.3.2 Potential Impacts

The project would result in short-term, minimal to moderate visual and noise impacts on recreational facilities (see section 5.4.10) during construction. The project would not cause any impacts on noise levels or the surrounding viewshed at recreational facilities during operation. Because impacts on recreation are expected to be minimal, the project's impacts on tourism economies would also be short term and minimal during construction and negligible during operation.

5.5.3.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include mitigation measures specific to tourism. The sample routing permit states that "the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations" (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant did not identify mitigation measures specifically for tourism but would comply with state and county regulations regarding noise.

Mitigation Proposed During Comment Periods

No mitigation specific to tourism was proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended.

5.6 Archaeological and Historic Resources

5.6.1 Archaeological Resources

The ROI for archaeological resources is the project area (area within 1 mile of the route width). Archaeological resources or unrecorded historic cemeteries identified within the project area, but outside the route width, are not expected to be impacted by the project. Known archaeological resources were identified within the route widths for all route alternatives, but none have been determined to be Eligible for or Listed in the National Register of Historic Places (NRHP).

Archaeological potential is based on proximity to waterbodies and the number of previously identified archaeological resources within the ROI. Of the three route alternatives, RA-South crosses or is near the most waterbodies, increasing its overall archaeological potential, which is evidenced by the number of sites identified by the applicant's survey. Overall, RA-South has the greatest potential for archaeological resources to be present, RA-North has the lowest potential. If the previously

identified archaeological sites within the route widths that have not been evaluated for the NRHP are determined to be Eligible for listing in the NRHP, construction of the project could result in moderate, permanent adverse impacts from direct construction activities. If previously identified archaeological resources are determined Not Eligible for listing in the NRHP, construction of the project could result in negligible impacts from direct construction activities.

5.6.1.1 Existing Conditions

The Minnesota State Historic Preservation Office (SHPO) inventory files and the Minnesota Office of the State Archaeologist online portal were used to identify known Precontact and Post-Contact archaeological resources and unrecorded historic cemeteries within the project area identified for each route alternative. In addition, a Phase I archaeological reconnaissance survey was completed between 2021¹⁴³ and 2022.¹⁴⁴ Within the 300-foot-wide corridor for the route alternatives, the applicant has surveyed for archaeological resources and facilitated Tribal cultural resources surveys for about 1 percent of RA-North, about 60 percent of RA-Hybrid, and about 89 percent of RA-South.

Prior to the survey, the applicant's surveyor submitted the archaeological survey protocol *Archaeological Survey Methodology and Protocols for Minnesota, Summit Carbon Solutions (09/20/2021)* to SHPO for review and comment on August 30, 2021. This was followed by a meeting between the applicant and SHPO staff on October 7, 2021, to discuss the survey strategy protocol. SHPO responded in a letter dated October 14, 2021, stating it had reviewed the survey protocol and assessed it as appropriate for the project. The survey protocol was designed following Minnesota state methodological guidelines defined in the Minnesota State Historic Preservation Office Manual for Archaeological Projects in Minnesota,¹⁴⁵ the State Archaeologist's Manual for Archaeological Projects in Minnesota,¹⁴⁶ and national guidelines as outlined in the Secretary of the Interior's Guidelines for Archaeology and Historic Preservation (48 CFR 44716). Methods used during the archaeological survey align with the protocols SHPO approved prior to survey initiation.

Portions of the field survey were completed in coordination with Tribal representatives. The Mille Lacs Band of Ojibwe, the Upper Sioux Community, and the Sisseton Wahpeton Oyate of the Lake Traverse Reservation supported the Phase I archaeological reconnaissance survey effort as Tribal monitors to the surveyors.

Archaeological resources within the project area and route width for each route alternative are summarized in **Table 5-22**.

Table 5-22 Summary of Archaeological Resources and Unrecorded Historic Cemeteries per Alternative Route

Alternative Route	Archaeological Resources within Project Area	Archaeological Resources within Route Width	Unrecorded Historic Cemeteries within Project Area	Unrecorded Historic Cemeteries within Route Width
RA-North	8	1	2	0
RA-Hybrid	10	4	0	0
RA-South	15	6	0	0

RA-North

Eight archaeological resources were identified within the project area for RA-North. One of these resources is located within the route width (21WL0029).

Seven of the identified sites are Precontact in origin. These sites range from isolated finds (usually a single lithic flake) to artifact scatters and lithic reduction sites (stone tool making sites). The ghost town site of Ames is Post-Contact in origin (21OTat).

Seven of the eight sites have not been evaluated for NRHP listing, and one site has been evaluated and recommended Not Eligible for the NRHP (21OT0228).

Table 5-23 Archaeological Resources within RA-North Project Area

Site No.	Site Name	Township, Range, Section	Description	National Register Status	Within Route Width
21OT0228	No Name	T133N, R43W, S31	Precontact: Isolated Find	Recommended Not Eligible	No
21OTat	Ames	T133N, R44W, S32	Post-Contact: Ghost Town	Not Evaluated	No
21WL0029	Hlubeck	T133N, R47W, S21, 28	Precontact: Lithic Reduction Site	Not Evaluated	Yes
21WL0030	Radig	T133N, R47W, S28	Precontact, Woodland Period: Artifact Scatter	Not Evaluated	No
21WL0044	No Name	T133N, R47W, S34	Precontact: Isolated Find	Not Evaluated	No
21WL0049	No Name	T133N, R47W, S28	Precontact: Artifact Scatter	Not Evaluated	No
21WL0050	No Name	T133N, R47W, 28	Precontact: Isolated Find	Not Evaluated	No
21WL0051	No Name	T133N, R47W, S28	Precontact: Lithic Reduction Site	Not Evaluated	No

Two unrecorded historic cemeteries at the east end of the project area have been identified within the project area for RA-North. The cemeteries are not located within the route width.

Table 5-24 Unrecorded Historic Cemeteries within RA-North Project Area

Cemetery ID	Cemetery Name	Township, Range, Section	Notes ^a
22952	Rosley Meder Cemetery	T133N, R44W, S24	Pope and Fee 1998 ¹⁴⁷ has this listed as "Cemetery;" name is from the Minnesota Cemetery Project; ¹⁴⁸ Inactive; Est. 1890. Confidential location information for this cemetery has been omitted.
22951	Unknown – Cemetery	T133N, R44W, S24	From Pope and Fee 1998 ¹⁴⁹

^a From Terrell and Vermeer 2011¹⁵⁰

RA-Hybrid

Ten archaeological resources were identified within the project area for RA-Hybrid. Four of these resources are located within the route width (21WL0005, 21WL0075, 21WL0107, 21WL0108).

Eight of the identified sites are Precontact in origin. These sites range from isolated finds (usually a single lithic flake) to artifact scatters and village sites.

One site, the ghost town site of Ames, is Post-Contact in origin (21OTat). One site is indigenous in origin, but of indeterminate age (21WL0107).

Four of these sites have not been evaluated for listing in the NRHP. Three sites have been evaluated and recommended Not Eligible, and three have been evaluated and determined by SHPO as Not Eligible for the NRHP.

Table 5-25 Archaeological Resources within RA-Hybrid Project Area

Site No.	Site Name	Township, Range, Section	Description	National Register Status	Within Route Width
21OT0228	No Name	T133N, R43W, S31	Precontact: Isolated Find	Recommended Not Eligible	No
21OTat	Ames	T133N, R44W, S32	Post-Contact: Ghost Town	Not Evaluated	No
21WL0003	No Name	T131N, R46W, S4	Precontact: Artifact Scatter	Not Evaluated	No
21WL0005	No Name	T132N, R46W, S24	Precontact: Village	Not Eligible	Yes
21WL0075	No Name	T132N, R47W, S25	Precontact: Lithic Scatter	Recommended Not Eligible	Yes
21WL0076	No Name	T132N, R46W, S30	Precontact: Isolated Find	Recommended Not Eligible	No
21WL0097	Leinen	T132N, R47W, S27	Precontact: Isolated Find	Not Evaluated	No
21WL0098	Dohman 3	T132N, R47W, S27	Precontact, Archaic and Woodland Periods: Artifact Scatter	Not Evaluated	No
21WL0107	No Name	T132N, R46W, S24	Indeterminate: Isolated Find	Not Eligible	Yes
21WL0108	No Name	T132N, R46W, S33	Precontact: Lithic Scatter	Not Eligible	Yes

Two unrecorded historic cemeteries at the east end of the project area have been identified within the project area for RA-Hybrid. The cemeteries are not located within the route width.

Table 5-26 Unrecorded Historic Cemeteries within RA-Hybrid Project Area

Cemetery ID	Cemetery Name	Township, Range, Section	Notes ^a
22952	Rosley Meder Cemetery	T133N, R44W, S24	Pope and Fee 1998 ¹⁵¹ has this listed as "Cemetery"; name is from the Minnesota Cemetery project; ¹⁵² Inactive; Est. 1890. Confidential location information for this cemetery has been omitted.
22951	Unknown – Cemetery	T133N, R44W, S24	From Pope and Fee 1998 ¹⁵³

^a From Terrell and Vermeer 2011¹⁵⁴

RA-South

Fifteen archaeological resources were identified within the project area for RA-South. Six of these resources are located within the route width (21OT0228, 21OT0235, 21WL0005, 21WL0075, 21WL0107, and 21WL0108).

Thirteen of the identified sites are Precontact in origin. These sites range from isolated finds (usually a single lithic flake) to artifact scatters and village sites.

One site, the ghost town site of Ames, is Post-Contact in origin (21OTat). One site is indigenous in origin, but of indeterminate age (21WL0107).

Seven of these sites have not been evaluated for listing in the NRHP, four sites have been evaluated and recommended Not Eligible for the NRHP, and the remaining four sites have been evaluated and determined by SHPO to be Not Eligible for the NRHP. No unrecorded historic cemeteries were identified in the project area for RA-South.

Table 5-27 Archaeological Resources within RA-South Project Area

Site No.	Site Name	Township, Range, Section	Description	National Register Status	Within Route Width
21OT0136	No Name	T133N, R43W, S31	Precontact: Isolated Find	Not Evaluated	No
21OT0137	No Name	T133N, R43W, S31	Precontact: Lithic Scatter	Not Evaluated	No
21OT0138	No Name	T133N, R43W, S31	Precontact: Isolated Find	Not Evaluated	No
21OT0228	No Name	T133N, R43W, S31	Precontact: Isolated Find	Recommended Not Eligible	Yes
21OT0229	No Name	T132N, R44W, S3	Precontact: Isolated Find	Not Eligible	No
21OT0235	No Name	T133N, R44W, S36	Precontact: Isolated Find	Recommended Not Eligible	Yes
21OTat	Ames	T133N, R44W, S32	Post-Contact: Ghost Town	Not Evaluated	No

Site No.	Site Name	Township, Range, Section	Description	National Register Status	Within Route Width
21WL0003	No Name	T131N, R46W, S4	Precontact: Artifact Scatter	Not Evaluated	No
21WL0005	No Name	T132N, R46W, S24	Precontact: Village	Not Eligible	Yes
21WL0075	No Name	T132N, R47W, S25	Precontact: Lithic Scatter	Recommended Not Eligible	Yes
21WL0076	No Name	T132N, R46W, S30	Precontact: Isolated Find	Recommended Not Eligible	No
21WL0097	Leinen	T132N, R47W, S27	Precontact: Single Artifact	Not Evaluated	No
21WL0098	Dohman 3	T132N, R47W, S27	Precontact, Archaic and Woodland Periods: Artifact Scatter	Not Evaluated	No
21WL0107	No Name	T132N, R46W, S24	Indeterminate: Isolated Find	Not Eligible	Yes
21WL0108	No Name	T132N, R46W, S33	Precontact: Lithic Scatter	Not Eligible	Yes

A Phase I archaeological reconnaissance survey was completed for RA-South between 2021¹⁵⁵ and 2022.¹⁵⁶ This survey included a combination of systematically walking the route width along stretches of reasonable surface visibility (plowed agricultural fields, for example). The surveyor dug holes about 3 feet deep by hand at 50-foot intervals along stretches where surface visibility was too low, or around areas where artifacts were identified during the Phase I archaeological reconnaissance survey.

Portions of the field survey were completed in coordination with Tribal representatives. The Mille Lacs Band of Ojibwe, the Upper Sioux Community, and the Sisseton Wahpeton Oyate of the Lake Traverse Reservation supported the Phase I archaeological reconnaissance survey effort as Tribal monitors to the surveyors. Most of the route width was surveyed, except for about 255 acres between south of 210th Street and east of the 138th Avenue/220th Street intersection in Orwell Township, Otter Tail County. Survey was instead conducted southeast of this stretch outside of the route width. Surveys between 2021 and 2022 identified seven archaeological sites: 21OT0228, 21OT0229, 21OT0235, 21WL0075, 21WL0076, 21WL0107, and 21WL0108.

5.6.1.2 Potential Impacts

Archaeological resources or unrecorded historic cemeteries identified within the project area, but outside the route width, are not expected to be impacted by the project.

Archaeological resources were identified within the route width for all route alternatives. None of the archaeological sites within the route width for the route alternatives have been determined to be Eligible for or Listed in the NRHP. However, not all sites have been previously evaluated to determine their NRHP eligibility, but they have the potential to be found Eligible. No unrecorded historic cemeteries are located within the route widths for any route alternative.

RA-North

The route width for RA-North contains one archaeological resource (21WL0029, Precontact lithic reduction) that would be impacted by the project. This site has not been evaluated for the NRHP. If the archaeological resource is determined to be Eligible for or Listed in the NRHP, construction of the project could result in moderate, permanent adverse impacts from direct construction activities if the site cannot be avoided. If the archaeological resource is determined Not Eligible, or is avoided, construction of the project could result in negligible impacts from direct construction activities.

Only a small portion of the route width for RA-North (about 1 percent) has been surveyed for archaeological, historical, and Tribal cultural resources. There is a potential for unknown archaeological resources to exist within the unsurveyed portion. RA-North crosses and runs near the fewest waterbodies of the three route alternatives, which decreases its overall archaeological potential compared to the other two route alternatives.

While RA-North has not been extensively archaeologically surveyed, its lack of archaeological potential compared to RA-Hybrid and RA-South indicates it would likely have the least impact on archaeological resources of the three route alternatives.

RA-Hybrid

The route width for RA-Hybrid contains four archaeological resources (21WL0005, 21WL0075, 21WL0107, and 21WL0108) that would be impacted by the project. Three resources have been evaluated and determined Not Eligible under the NRHP program; the remaining site has been evaluated and recommended Not Eligible. Construction of the project would result in negligible impacts on these resources. Construction of the project would result in negligible impacts on the previously identified Not Eligible archaeological resources within the ROI.

Only a portion of the route width for RA-Hybrid has been surveyed (about 60 percent) for archaeological, historical, and Tribal cultural resources. There is a potential for unknown archaeological resources to exist within the unsurveyed portion.

RA-Hybrid crosses the same rivers and streams as RA-South but runs near fewer lakes overall. Comparatively, it has more potential for unknown archaeological resources to exist than RA-North, but less than RA-South.

RA-South

The route width for RA-South contains six archaeological resources (21OT0228, 21OT0235, 21WL0005, 21WL0075, 21WL0107, and 21WL0108) and would be impacted by the project.

Three resources have been evaluated and recommended to be Not Eligible and three have been determined by SHPO to be Not Eligible under the NRHP program. Construction of the project would result in negligible impacts on these resources.

RA-South has more known archaeological sites within its route width. The applicant has surveyed for archaeological resources and facilitated Tribal cultural resources surveys for about 89 percent of a 300-foot-wide corridor along the pipeline centerline for RA-South. This is about 37 percent of the route width. The majority of RA-North and a large portion of RA-Hybrid have not been surveyed by the applicant. Of the three route alternatives, RA-South crosses or is near the most waterbodies, increasing its overall archaeological potential, which is evidenced by the number of sites identified during the survey.

5.6.1.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) includes the following measures to mitigate impacts on archaeological resources:

- “The Permittee shall make every effort to avoid impacts to identified archaeological and historic resources when constructing the transmission facility. In the event that a resource is encountered, the Permittee shall contact and consult with the State Historic Preservation Office and the State Archaeologist. Where feasible, avoidance of the resource is required. Where not feasible, mitigation must include an effort to minimize project impacts on the resource consistent with State Historic Preservation Office and State Archaeologist requirements” (**Appendix H**, Section 7.19, Archaeological and Historic Resources).
- “Prior to construction, workers shall be trained about the need to avoid cultural properties, how to identify cultural properties, and procedures to follow if undocumented cultural properties, including gravesites, are found during construction. If human remains are encountered during construction, the Permittee shall immediately halt construction and promptly notify local law enforcement and the State Archaeologist. Construction at such location shall not proceed until authorized by local law enforcement or the State Archaeologist” (**Appendix H**, Section 7.19, Archaeological and Historic Resources)

Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant has prepared a Minnesota Unanticipated Discoveries Plan (**Appendix L**) that will be implemented should an unanticipated cultural discovery (archaeological find or human remains) occur during the construction phase of the project. The applicant stated that all construction personnel would receive training on unanticipated discovery procedures and notification protocols. In the event an unanticipated discovery is encountered, the applicant would immediately halt all construction activities within a 100-foot radius, notify the environmental inspector, and implement the notification procedures listed in the Unanticipated Discoveries Plan.

Impacts on all archaeological sites and historic structures eligible for listing in the NRHP would be avoided through adoption of reroutes or construction methodology (for example, HDD). If additional eligible sites, identified after surveys completed in 2022, cannot be avoided through design or construction efforts, the applicant would conduct formal evaluations in consultation with SHPO and develop avoidance or treatment plans to minimize or mitigate effects on those sites.

If the applicant discovers significant cultural resources findings in or adjacent to MnDOT ROW, the applicant will contact the MnDOT Cultural Resource Unit and prepare a Post Review Discovery Plan. The Post Review Discovery Plan would be submitted to the MnDOT Cultural Resource Unit for review. The plan will outline the steps to be taken in the event of an unanticipated discovery of archaeological materials, human remains, or burials, and include language specific to the coordination with MnDOT when a discovery is in MnDOT ROW. MnDOT Cultural Resource Unit staff should be notified within 24 hours in the event of an unanticipated find on or adjacent to MnDOT property during construction.¹⁵⁷

Mitigation Proposed During Comment Periods

SHPO recommended completing surveys of historic and archaeological resources within the route corridors for each of the project alternatives.

Mitigation Recommended by EERA Staff

Should the Commission issue a pipeline routing permit, appropriate surveys for archaeological resources that meet state standards and guidelines should occur, regardless of which route alternative is selected. If archaeological resources are found, consultation with Tribes, SHPO, and the Office of the State Archaeologist should be conducted, as appropriate, to provide the opportunity to review and comment on the results, determine if additional studies to evaluate the NRHP eligibility of the resources are warranted, and develop appropriate avoidance or treatment plans.

5.6.2 *Historic Architectural Resources*

The ROI for historic architectural resources is the project area (area within 1 mile of the route width). Historic architectural resources identified within the project area of the route alternatives, but outside the route width, are not expected to be impacted by the project. Historic architectural resources were identified within the route widths for all alternatives, but none have been determined to be Eligible for or Listed in the NRHP. Construction of the project would result in negligible impacts on the previously identified Not Eligible historic architectural resources within the ROI.

5.6.2.1 **Existing Conditions**

SHPO inventory files, through the online Minnesota Statewide Historic Inventory Portal, were used to identify previously recorded historic architectural resources within the project area for each route alternative. Additionally, the National Park Service online NRHP database was reviewed to identify if NRHP Listed or Eligible Historic Properties or National Historic Landmarks are present within the project area. A summary of historic architectural resources within the project area and route width for each route alternative is presented in **Table 5-28**.

Table 5-28 Summary of Historic Architectural Resources per Alternative Route

Alternative Route	Number within Project Area	Number within Route Width
RA-North	7	2
RA-Hybrid	6	4
RA-South	2	2

RA-North

Seven historic architectural resources were previously identified within the project area for RA-North. Three of these resources are located within the route width (WL-CON-00018, XX-ROD-00020 and XX-ROD-00053). These sites consist of highways, bridges and culverts, and a rural school. All seven previously identified historic architectural resources are Not Eligible for the NRHP.

Table 5-29 Historic Architecture Resources within RA-North Project Area

Site No.	Site Name	Township, Range, Section	Description	National Register Status	Within Route Width
OT-CAR-00001	Culvert 91674	T133N, R44W, S24	Culvert	Not Eligible	No
OT-CAR-00003	Culvert 91800	T133N, R44W, S30	Culvert	Not Eligible	No
WL-NIL-00001	Rural School	T133N, R46W, S29	School	Not Eligible	No
WL-CON-00018	Bridge 8382	T133N, R47W, S21	Bridge	Not Eligible	Yes
WL-NIL-00004	Culvert 97511	T133N, R46W, S20	Culvert	Not Eligible	No
XX-ROD-00020	Trunk Highway/US Highway 75 (formerly Trunk Highway 6)	T133N, R47W, S27	Highway	Not Eligible	Yes
XX-ROD-00053	Trunk Highway 9	T133N, R47W, S26	Highway	Not Eligible	Yes

RA-Hybrid

Six historic architectural resources were previously identified within the project area for RA-Hybrid. Four of these resources are located within the route width (XX-ROD-00020 XX-ROD-00053, XX-ROD-00153, and XX-RRD-NPR038). These sites consist of a highway, culverts, and a railroad. All six previously identified historic architectural resources are Not Eligible for the NRHP.

Table 5-30 Historic Architecture Resources within RA-Hybrid Project Area

Site No.	Site Name	Township, Range, Section	Description	National Register Status	Within Route Width
OT-CAR-00001	Culvert 91674	T133N, R44W, S24	Culvert	Not Eligible	No
OT-CAR-00003	Culvert 91800	T133N, R44W, S30	Culvert	Not Eligible	No
XX-ROD-00020	Trunk Highway/US Highway 75 (formerly Trunk Highway 6)	T132N, R47W, S25	Highway	Not Eligible	Yes
XX-ROD-00053	Trunk Highway 9	T133N, R47W, S26	Highway	Not Eligible	Yes
XX-ROD-00153	Trunk Highway 210	T133N, R44W, S36	Highway	Not Eligible	Yes
XX-RRD-NPR038	Northern Pacific Fergus and Black Hills Railroad Company/Northern Pacific Railway Company	T132N, R45W, S1	Railroad	Not Eligible	Yes

RA-South

Two historic architectural resources were previously identified within the project area for RA-South. Both of these resources are located within the route width (XX-ROD-00020 and XX-ROD-00153). These sites are highways. Both of the previously identified historic architectural resources are Not Eligible for the NRHP.

Table 5-31 Historic Architecture Resources within RA-South Project Area

Site No.	Site Name	Township, Range, Section	Description	National Register Status	Within Route Width
XX-ROD-00020	Trunk Highway/US Highway 75 (formerly Trunk Highway 6)	T132N, R47W, S25	Highway	Not Eligible	Yes
XX-ROD-00153	Trunk Highway 210	T133N, R44W, S36	Highway	Not Eligible	Yes

5.6.2.2 Potential Impacts

Historic architectural resources identified within the project area of the route alternatives, but outside the route width, are not expected to be impacted by the project. Known historic architectural resources were identified within the route widths for all alternatives. None of the known historic architectural resources within the route widths for the route alternatives have been determined to be Eligible for or Listed in the NRHP.

RA-North

The route width for RA-North contains two historic architectural resources that would be impacted. The two sites have been evaluated and determined Not Eligible. Not all of the project area for RA-North has been surveyed for historic architectural resources, so there is the potential for unknown historic architectural resources to exist within the route width. Construction of the project would result in negligible impacts on the previously identified Not Eligible historic architectural resources within the ROI.

RA-Hybrid

The route width for RA-Hybrid contains four historic architectural resources that would be impacted. The four sites have been evaluated and determined Not Eligible. Not all of the project area for RA-Hybrid has been surveyed for historic architectural resources, so there is the potential for unknown historic architectural resources to exist within the route width. Construction of the project would result in negligible impacts on the previously identified not eligible historic architectural resources within the ROI.

RA-South

The route width for RA-South contains two historic architectural resources that would be impacted. The two sites have been evaluated and determined Not Eligible. Not all of the project area for RA-South has been surveyed for historic architectural resources, so there is the potential for unknown historic architectural resources to exist within the route width. Construction of the project would result in negligible impacts on the previously identified Not Eligible historic architectural resources within the ROI.

5.6.2.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) includes the following measures to mitigate impacts on historic resources: “The Permittee shall make every effort to avoid impacts to identified archaeological and historic resources when constructing the transmission facility. In the event that a resource is encountered, the Permittee shall contact and consult with the State Historic Preservation Office and the State Archaeologist. Where feasible, avoidance of the resource is required. Where not feasible, mitigation must include an effort to minimize project impacts on the resource consistent with State Historic Preservation Office and State Archaeologist requirements” (**Appendix H**, Section 7.19, Archaeological and Historic Resources).

Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

Impacts on all historic structures eligible for listing in the NRHP will be avoided through adoption of reroutes or construction methodology (for example, HDD). If additional eligible sites, identified after surveys completed in 2022, cannot be avoided through design or construction efforts, the applicant would conduct formal evaluations in consultation with SHPO and develop avoidance or treatment plans to minimize or mitigate effects on those sites.

Mitigation Proposed During Comment Periods

SHPO recommended completing a survey of historic and archaeological resources within the route corridors for each of the Project alternatives. No properties listed in the State or National Register of Historic Places, nor the State Historic Sites Network, have been inventoried previously within the route widths for the route alternatives. Therefore, further review pursuant to the Minnesota Historic Sites Act is not warranted. If federal permits are needed, compliance with Section 106 may be required, and historic architectural surveys would be completed if determined necessary by the lead federal agency.

Mitigation Recommended by EERA Staff

None recommended.

5.7 Natural Environment

5.7.1 Air Quality and Greenhouse Gas Emissions

The ROI for air quality is Otter Tail and Wilkin Counties. Air quality and greenhouse gas (GHG) emission impacts from the project could contribute to increased levels of air pollution in Minnesota. The project would capture and sequester the biogenic CO₂ produced by the ethanol fermentation process at the ethanol plant. The analysis presented includes both air pollutant and GHG emissions from fossil fuel sources that would be used during construction and operation. However, by capturing and sequestering CO₂ underground, the project would provide a net benefit to GHG emissions because the CO₂ sequestered from ongoing annual operations would outweigh construction and operation emissions. This benefit would vary depending on the capture rate and final end use of the captured CO₂. Construction impacts would include emissions from construction equipment and vehicles, as well as temporary changes in land use along the pipeline ROW. Operational impacts

would include emissions from operation of the pipeline and the CO₂ capture facility, including equipment leaks. Construction emissions for the route alternatives would be directly proportional to their lengths. In other words, RA-North would have somewhat lower construction emissions and RA-Hybrid would have somewhat higher emissions compared to RA-South. Operational impacts on air quality would be minimal and would not differ depending on the route alternative.

5.7.1.1 Regulatory Framework

Federal Clean Air Act

The Clean Air Act is the principal federal statute governing air pollution. The Clean Air Act empowered the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. These pollutants are called “criteria” air pollutants and include:

- Ozone
- Particulate matter equal to or less than 10 microns in diameter (PM₁₀)
- Fine particulate matter equal to or less than 2.5 microns in diameter (PM_{2.5})
- Carbon monoxide (CO)
- Nitrogen dioxide (NO₂)
- Sulfur dioxide (SO₂)
- Lead

NAAQS include primary standards designed to protect human health and secondary standards to protect public welfare, including visibility and damage to crops and vegetation (see **Table 5-32**).

Table 5-32 National Ambient Air Quality Standards¹⁵⁸

Pollutant	Averaging Time	National Standards	
		Primary	Secondary
Ozone	1 hour	-	Same as Primary Standard
	8 hour	0.07 ppm ^a	
PM ₁₀	24 hour	150 µg/m ³	Same as Primary Standard
	Annual	-	
PM _{2.5}	24 hour	35 µg/m ³	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m ³	15 µg/m ³
CO	1 hour	35 ppm	-
	8 hour	9 ppm	-
NO ₂	1 hour	100 ppb	-
	Annual Arithmetic Mean	0.053 ppm ^b	Same as Primary Standard
SO ₂	1 hour	75 ppb ^c	-
	3 hour	-	0.5 ppm
	24 hour	0.14 ppm	-
	Annual Arithmetic Mean	0.03 ppm	-

Pollutant	Averaging Time	National Standards	
		Primary	Secondary
Lead ^d	30-day Average	-	-
	Calendar Quarter	1.5 µg/m ³	Same as Primary Standard
	Rolling 3-month Average	0.15 µg/m ³	

CO = carbon monoxide, NO₂ = nitrogen dioxide, PM₁₀ = particulate matter less than or equal to 10 microns in diameter, PM_{2.5} = fine particulate matter less than or equal to 2.5 microns in diameter, ppb = parts per billion, ppm = parts per million, SO₂ = sulfur dioxide, µg/m³ = micrograms per cubic meter

^a Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) ozone standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) ozone standards.

^b The level of the annual NO₂ standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

^c The previous SO₂ standards (0.14 ppm 24-hour and 0.03 ppm annual) will remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO₂ standards or is not meeting the requirements of a State Implementation Plan (SIP) call under the previous SO₂ standards (40 CFR Section 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS.

^d In areas designated nonattainment for the lead standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m³ as a calendar quarter average) also remain in effect.

Minnesota Administrative Rule 7009.0080

Minnesota has adopted state standards for air quality that include standards for criteria pollutants and hydrogen sulfide and retain a standard for total suspended particulates. State air quality standards cannot be less stringent than the NAAQS. The Minnesota Ambient Air Quality Standards, consistent with Minnesota Administrative Rule 7009.0080, are shown in **Table 5-33**.

Table 5-33 Minnesota Ambient Air Quality Standards¹⁵⁹

Air Pollutant	Averaging Time	Level of Primary Standard	Level of Secondary Standard	Form of the Standard
H ₂ S	30-minutes	0.05 ppmv (70.0 µg/m ³)	--	30-minute average not to be exceeded more than two times in 1 year
H ₂ S	30-minutes	0.03 ppmv (42.0 µg/m ³)	--	30-minute average not to be exceeded more than two times in 5 consecutive days
Ozone	8-hour	70 ppbv (137 µg/m ³)	70 ppbv (137 µg/m ³)	3-year average of the annual fourth high daily maximum 8-hour concentration does not exceed standard
CO	8-hour	9 ppmv (10 mg/m ³)	--	Annual second-high 8-hour concentration does not exceed standard
CO	1-hour	35 ppmv (40 mg/m ³)	--	Annual second-high 1-hour concentration does not exceed standard
SO ₂	Annual	30 ppbv (79 µg/m ³)	--	Annual average concentration does not exceed standard

Air Pollutant	Averaging Time	Level of Primary Standard	Level of Secondary Standard	Form of the Standard
SO ₂	24-hour	140 ppb (367 µg/m ³)	--	Annual second-high 24-hour concentration does not exceed standard
SO ₂	3-hour		500 ppbv (1,310 µg/m ³)	Annual second-high 3-hour concentration does not exceed the standard
SO ₂	1-hour	75 ppb (197 µg/m ³)	--	3-year average of the annual 99th percentile of daily maximum 1-hour concentrations does not exceed standard
TSP	Annual	75 µg/m ³	60 µg/m ³	Annual geometric mean concentration does not exceed standard
TSP	24-hour	260 µg/m ³	150 µg/m ³	Annual second-high 24-hour concentration does not exceed standard
NO ₂	Annual	53 ppbv (100 µg/m ³)	53 ppbv (100 µg/m ³)	Annual average concentration does not exceed standard
NO ₂	1-hour	100 ppbv (188 µg/m ³)	--	3-year average of the annual 98th percentile of daily maximum 1-hour concentrations does not exceed standard
Lead	Rolling 3-month average	0.15 µg/m ³	0.15 µg/m ³	Maximum 3-month rolling average from 3 consecutive years does not exceed the standard
PM ₁₀	24-hour	150 µg/m ³	150 µg/m ³	3-year average of the annual estimated exceedance days is less than or equal to 1
PM _{2.5}	24-hour	35 µg/m ³	35 µg/m ³	3-year average of the annual 98th percentile of 24-hour concentrations does not exceed the standard
PM _{2.5}	Annual	12 µg/m ³	15 µg/m ³	3-year average of the annual seasonally weighted average does not exceed the standard

CO = carbon monoxide, H₂S = hydrogen sulfide, NO₂ = nitrogen dioxide, PM₁₀ = suspended particulate matter less than or equal to 10 microns in diameter, PM_{2.5} = fine particulate matter less than or equal to 2.5 microns in diameter, ppbv = parts per billion by volume, ppmv = parts per million by volume, SO₂ = sulfur dioxide, µg/m³ = micrograms per cubic meter, TSP = total suspended particulates

MDH has developed health-based air guidance values that may be used by the public, industry, state and local risk managers and other stakeholders to assist in evaluating potential health risks to people from exposures to a chemical in air.

5.7.1.2 Existing Conditions

Air Quality

Regional Attainment Status

Regions of the country that do not meet the NAAQS are designated as “nonattainment” areas. Certain rural parts of the country do not have extensive air quality monitoring networks. These areas are considered “unclassifiable” and are presumed to be in attainment with the NAAQS. Compliance with the national and state air quality standards in the state of Minnesota is assessed at the county level.

Both Otter Tail and Wilkin Counties are designated as in attainment or unclassifiable for the NAAQS (40 CFR Section 81.324), which means they are also designated as Class II areas by the Clean Air Act. Class II areas allow for a moderate amount of air quality deterioration.¹⁶⁰

Local Ambient Air Quality

The existing air quality in the project area can be described using data from air pollution control monitors and from predictive models. EPA and the MPCA operate a series of over 50 air pollution control monitors throughout the state. These monitors collect data on criteria pollutants that are used to calculate the daily Air Quality Index (AQI). The AQI scores are divided into five air quality categories: good, moderate, unhealthy for sensitive groups, unhealthy, and very unhealthy.

The air monitoring station nearest to the project area is in Detroit Lakes, Minnesota (**Table 5-34**). Prior to 2021, a second air monitoring station was located in Moorhead, Minnesota (**Table 5-35**). The AQI shows good air quality for most days from 2017 to 2021. In 2021, the most recent data available, the Detroit Lakes station, which is 38.6 miles away from the project area and 39.2 miles from the ethanol plant, recorded 6 days of unhealthy AQI for sensitive groups and 5 days of unhealthy AQI. These events were due to PM_{2.5} pollution (including dust and smoke) and occurred during the months of July and August in an extended period without rain. While there are additional air monitoring stations in neighboring North Dakota and within Minnesota, the monitoring data and MnRISKS data presented in this analysis sufficiently represents the ambient air quality in the ROI.

Table 5-34 Air Quality Index Category by Day (Detroit Lakes, Minnesota)¹⁶¹

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2021	252	94	6	5	0
2020	343	22	1	0	0
2019	335	23	1	0	0
2018	332	36	0	0	0
2017	341	23	0	0	0

Table 5-35 Air Quality Index Category by Day (Moorhead, Minnesota)¹⁶²

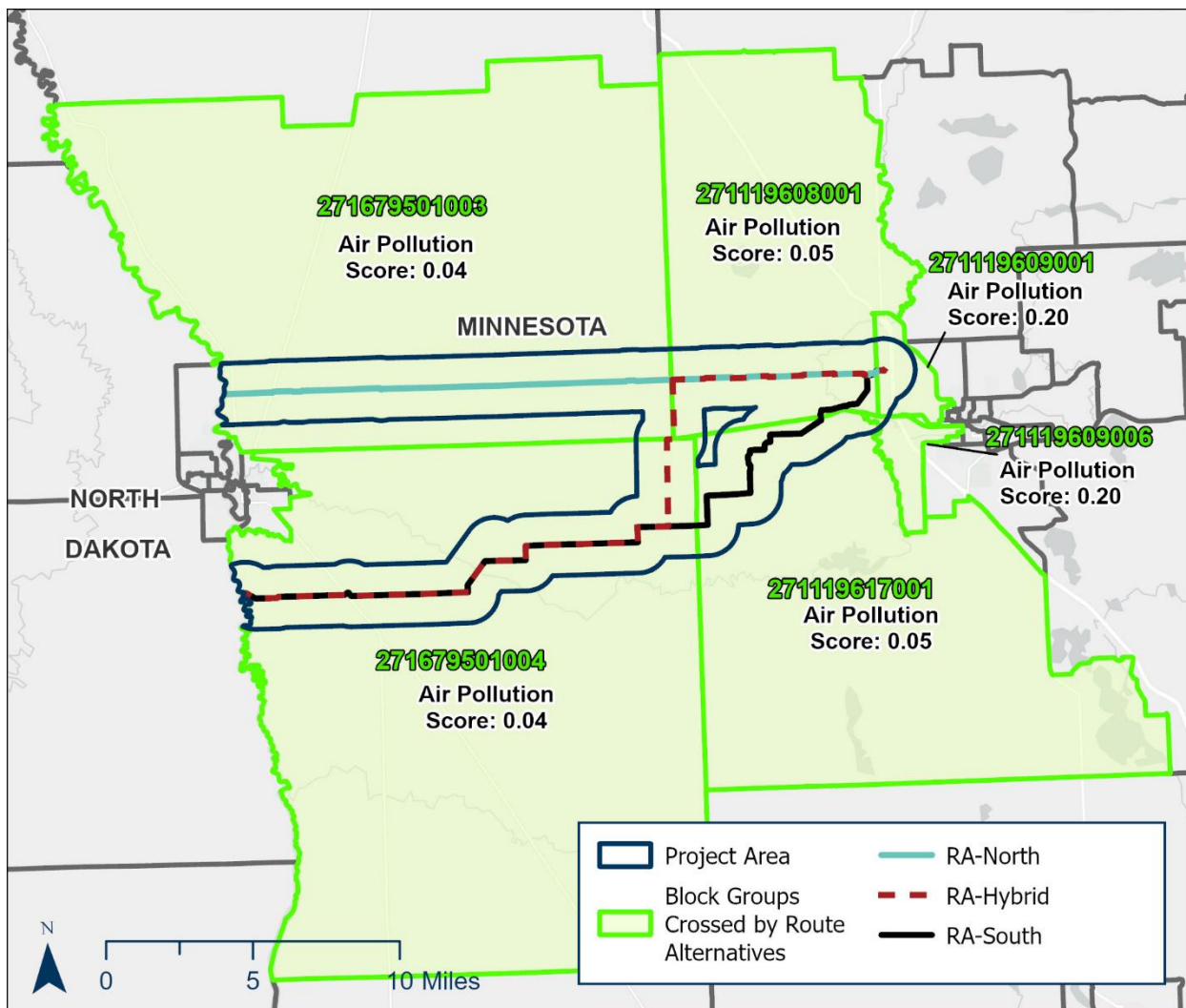
Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2020	335	27	0	0	0
2019	327	33	1	1	0
2018	300	42	1	0	0
2017	309	53	0	0	0

MPCA developed the MnRISKS tool to compare existing air pollution levels against health benchmarks and estimate the potential for negative health effects. MnRISKS calculates an air pollution score for each census block group in the state. An air pollution score equal to 1 means that air pollution levels are at the health benchmarks. A score less than 1 means that air pollution levels are below the health

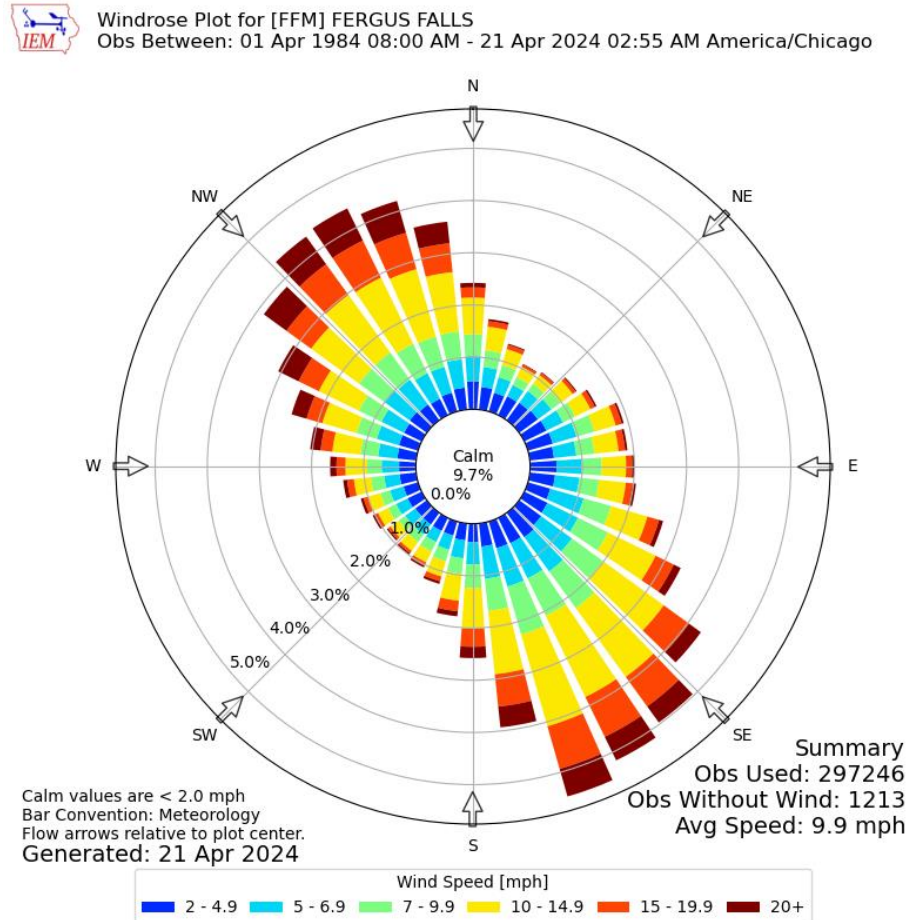
benchmarks and that health effects are unlikely to result after a lifetime of exposure. A score greater than 1 means that air pollution levels are above the health benchmarks and there might be potential for negative health effects.

As shown in **Figure 5-11**, the project area encompasses six census block groups, which all have air pollution scores less than one. The predominant MnRISKS pollutants anticipated in the area include acetamide, ammonia, benzene, 1,3-butadiene, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and nitrogen dioxide. These pollutants primarily originate from sources such as agriculture and farm equipment, traffic, boats, recreational vehicles, burning of yard or agricultural waste or wood, and permitted industrial activities.

Figure 5-11 MPCA Air Pollution Score for Census Block Groups in the Project Area¹⁶³



The wind rose for the ethanol plant's location, depicted in **Figure 5-12**, was obtained from the nearest weather automated surface observing systems (ASOS) station using the Iowa Environmental Mesonet website.¹⁶⁴ This station is at the Fergus Falls Municipal Airport (46.28439, -96.15669) and is the closest ASOS station to the ethanol plant. As illustrated in **Figure 5-12**, prevailing winds originate primarily from the northwest and southeast.

Figure 5-12 Wind Rose for Fergus Falls Municipal Airport

GHG Emissions

GHGs, such as CO₂, methane (CH₄), nitrous oxide (N₂O), and fluorinated gases, play a crucial role in global warming. They trap heat in the Earth's atmosphere, a process known as the "greenhouse gas effect," leading to rising temperatures. This warming effect, influenced by the concentration of GHGs, contributes to climate changes, affecting precipitation, flooding, and storms. The global warming potential measures the energy absorbed by 1 ton of GHG over time, with CO₂ having the lowest global warming potential, followed by CH₄, N₂O, and fluorinated gases. To facilitate comparison, global warming potential is calculated relative to the energy absorption of 1 ton of CO₂, and emissions are expressed as carbon dioxide equivalents (CO₂e).

Minnesota has taken action to decrease GHG emissions since 2005. From 2005 to 2020, Minnesota GHG emissions decreased 23 percent across all industry sectors. In 2007, Minnesota established a goal of reducing emissions by 30 percent by 2025. In 2022, the Minnesota Climate Action Framework updated the goal to reduce emissions by 50 percent by 2030 and achieve net-zero emissions by 2050. To meet this goal, Minnesota Climate Action Framework identified steps and actions to reduce GHG emissions. One step is to transition to low-carbon fuels.¹⁶⁵

In 2020, Minnesota produced a total of 137 million tons of CO₂e across all economic sectors. The top three sectors that produced the most CO₂e are transportation (26 percent), agriculture forestry and land

use (21 percent), and electrical generation (19 percent).¹⁶⁶ Other sectors that produce GHGs include residential, industrial, commercial, and waste.

The existing ethanol plant requires an air permit for the emissions emitted during ethanol production. Maximum potential emissions from the ethanol plant under the air permit are shown in **Table 5-36**.

Table 5-36 Ethanol Plant Wet Scrubber Emissions Summary

Description	Emissions (tpy)							
	Criteria Pollutants ^a						GHGs ^b	HAPs
	NO _x	CO	VOC	SO ₂	PM ₁₀	PM _{2.5}	CO ₂ e	Total
Wet Scrubber	—	—	49.41	—	—	—	204,428	4.36

CO = carbon monoxide, CO₂e = carbon dioxide equivalents, GHG = greenhouse gas, HAP = hazardous air pollutant, NO_x = nitrogen oxides, PM₁₀ = suspended particulate matter less than or equal to 10 microns in diameter, PM_{2.5} = fine PM less than or equal to 2.5 microns in diameter, SO₂ = sulfur dioxide, tpy = tons per year, VOC = volatile organic compound

^a Source: Green Plains Otter Tail LLC Air Permit (permit number 11100077-101). No information provided for criteria pollutants except for VOC.

^b CO₂e emission rates based on a conversion factor of 6.2901 pounds (lbs) of CO₂ per gallon of ethanol produced and assume a maximum production rate of 65 million gallons of ethanol per year. [CO₂e (lbs) = 3,785.41 cubic centimeters/gallon ethanol x 0.789 grams ethanol/cubic centimeter / (46.07 grams ethanol/44.01 grams CO₂) x 0.0022046 lbs CO₂/gram CO₂].

5.7.1.3 Potential Impacts

Construction

Construction of the project facilities, including the CO₂ capture facility and pipeline, would result in temporary and intermittent air quality and GHG impacts. Emissions would include criteria pollutants, GHGs (including CO₂, CH₄, and N₂O), and hazardous air pollutants (HAP) from internal combustion engines. Sources of emissions would include:

- **Off-road construction equipment engine emissions.** Off-road equipment may include HDD equipment, a guided bore machine, crane, loaders, trackhoes, welders, compressors, dozers, pumps, excavators, graders, generators, light towers, etc. Estimates of the horsepower, hours, quantities, and load factors were used in calculating the criteria pollutant and GHG emissions from these engines. All off-road construction equipment was assumed to meet the Tier 2 emission standard and the analysis used EPA Tier 2 engine emission factors.
- **Mobile (vehicle) emissions from workers and material deliveries.** Emissions from gasoline and diesel engines from worker, delivery, and construction vehicles would meet the standards for mobile sources established by the EPA's mobile source emission regulations codified in 40 CFR Part 85. In addition, the EPA stipulates that the maximum sulfur content of diesel fuel for highway vehicles is 15 parts per million (ppm). During the peak of construction at the CO₂ capture facility, 80 to 100 workers would be traveling to and from the project site daily. During the peak of pipeline construction, 150 workers would be traveling to and from the pipeline construction workspace.
- **Fugitive dust (PM) emissions from vehicle travel on unpaved roads and earthmoving.** Dust emissions would be dependent on the moisture content and texture of the soils disturbed, the type of construction equipment used, recent precipitation, and wind. Fugitive dust emissions are especially a concern near residential areas, farm dwellings, roads, or when strong wind conditions are present during dry conditions. Most pipeline construction activities in any given

area would be completed within a 30-day period. Therefore, fugitive dust emissions during construction would be restricted to the brief active construction period along each segment of the pipeline route,⁵⁻⁹⁵ with construction impacts diminishing once construction activities end and after disturbed areas are restored. Fugitive dust impacts from construction activities would be short in duration and would be managed by watering the areas of exposed soil, as needed. Fugitive dust emissions were calculated using guidance and equations from *AP-42 Section 13.2.2, Unpaved Roads*, for equipment and vehicle travel and *AP-42 Section 11.9, Western Surface Coal Mining*, for earthmoving activities. Each vehicle was assumed to travel 0.5 mile per day on site.

- Area emissions from any land use changes.** The project area along the pipeline route is mostly agricultural land. Construction would result in a temporary land use change as crops would not be able to be grown for one growing season. In the long term, the land would return to agricultural use. The capture facility would be located adjacent to the existing ethanol plant where the land is already industrial. Limited tree removal would occur. Therefore, any changes to air emissions resulting from land use changes would be negligible.

This analysis evaluates the emissions for the three route alternatives. Construction emissions have been scaled by route distance for RA-North and RA-Hybrid based on the emissions for the RA-South alternative. RA-Hybrid is 29.0 miles long (or 3.2 percent longer than RA-South) and RA-North is 23.0 miles long (or 18.1 percent shorter than RA-South). It is assumed that construction activities would be similar for all alternatives, so the off-road engine and earthmoving emissions would scale accordingly. Unpaved road emissions were assumed to be constant for all alternatives. Construction emissions for each alternative are summarized in **Table 5-37**.

Table 5-37 Pipeline and Capture Facility Construction Emissions Summary

Description	Emissions (tpy)							
	Criteria Pollutants						GHGs	HAPs
	NO _x	CO	VOC	SO ₂	PM ₁₀	PM _{2.5}	CO _{2e}	Total
RA-North								
Off-Road Engine	63.74	14.49	4.83	0.03	2.64	2.63	2899.93	0.85
Unpaved Roads	–	–	–	–	9.49	0.95	–	–
Earthmoving	–	–	–	–	4.65	0.49	–	–
Total	63.74	14.49	4.83	0.03	16.77	4.07	2899.93	0.85
RA-Hybrid								
Off-Road Engine	77.88	17.70	5.90	0.04	3.22	3.21	3542.95	1.04
Unpaved Roads	–	–	–	–	9.49	0.95	–	–
Earthmoving	–	–	–	–	5.68	0.60	–	–
Total	77.88	17.70	5.90	0.04	18.39	4.76	3542.95	1.04

Description	Emissions (tpy)							
	Criteria Pollutants						GHGs	HAPs
	NO _x	CO	VOC	SO ₂	PM ₁₀	PM _{2.5}	CO ₂ e	Total
RA-South								
Off-Road Engine	75.46	17.15	5.72	0.04	3.12	3.11	3433	1.01
Unpaved Roads	–	–	–	–	9.49	0.95	–	–
Earthmoving	–	–	–	–	5.5	0.58	–	–
Total	75.46	17.15	5.72	0.04	18.11	4.65	3433	1.01

tpy = tons per year; GHG = greenhouse gas; HAP = hazardous air pollutant; NO_x = nitrogen oxides; CO = carbon monoxide; VOC = volatile organic compounds; SO₂ = sulfur dioxide; PM₁₀ = particulate matter less than 10 microns in diameter; PM_{2.5} = particulate matter less than 2.5 microns in diameter; and CO₂e = carbon dioxide equivalent

Because both Otter Tail and Wilkin Counties are designated as in attainment or unclassifiable for NAAQS, as demonstrated in **Table 5-37**, construction emissions are not expected to cause or significantly contribute to a violation of an applicable ambient air quality standard. Any odors from construction would be associated with the use of construction equipment and would be negligible and temporary.

Operations

Green Plains Ethanol Plant and CO₂ Capture Facility

The project would include operation of a CO₂ capture facility, located at the ethanol plant, to collect CO₂ gas produced during the plant's ethanol fermentation process and subsequently compress, dehydrate, and cool the gas to form CO₂ in a dense phase for transportation.

The capture facility is designed to capture 100 percent of the CO₂ produced by the ethanol plant. The applicant states that the industry standard methodology to capture the most CO₂ at an ethanol plant is to tie-in a connection at the CO₂ scrubber stack and then process the CO₂ to the desired chemistry to transport or store the CO₂. The project design follows this methodology, using reciprocating compressors to pressurize the CO₂ into a supercritical phase, and a triethylene glycol dewatering system to remove any excess water from the CO₂.

The capacity of the capture facility was determined based on the current ethanol production and potential growth at the ethanol plant. The equipment, piping, and ancillary components have been designed or sized to accommodate 100 percent of the CO₂ production. The capture facility would achieve this capture rate by adhering to standard operating procedures and minimizing equipment downtime through preventative maintenance programs. According to the applicant, this is the only commercially viable capture methodology that has a proven ability to remove 100 percent of the CO₂ emissions. Other capture methodologies would have lower capture rates and higher resulting GHG emissions.

During operation of the capture facility, emissions would include stationary source emissions from the carbon capture facility and fugitive emissions from equipment leaks. Small amounts of lubricants may be used as part of the facility's normal operations and preventative maintenance program on an as-needed basis and are not expected to produce significant emissions. Electricity would be the only source of power, and the capture facility would include instrumentation to allow metering as well as onsite and remote operation. Use of electricity would result in indirect GHG emissions.

The applicant anticipates to staff one full-time equivalent position at the CO₂ capture facility for about one additional commuter vehicle per day. This additional vehicle would be limited primarily to existing driving and parking areas at the ethanol plant. Additional vehicle emissions may be required for future maintenance activities for the capture facilities. These would be infrequent, short term, and temporary in nature. Operational emissions are not expected to impact the air pollution score in the project area.

The estimated annual operating emissions from the capture facility are shown in **Table 5-38**. During operation, the capture facility would include the following potential new sources of emissions:

- Startup, shutdown, malfunction (SSM) vent
- Dehydration unit vent
- Cooling tower
- Space heating
- Fugitives from equipment leaks

Table 5-38 Capture Facility Emissions Summary and Air Permit Thresholds¹⁶⁷

Description	Emissions (tpy)							HAPs Total
	Criteria Pollutants						GHGs	
	NO _x	CO	VOC	SO ₂	PM ₁₀	PM _{2.5}	CO ₂ e	
SSM Vent	–	–	1.81	–	–	–	7,001	0.13
Dehydration Unit Vent	–	–	32.33	–	–	–	10,221	0.92
Space Heating ^a	0.17	0.07	0.01	–	0.01	0.01	218	–
Cooling Tower	–	–	–	–	0.16	–	–	–
Equipment Leaks	–	–	3.83	–	–	–	25	0.28
Total	0.17	0.07	37.99	–	0.17	0.01	17,465	1.32
Air Permit Thresholds	100	100	100	50	25	100	100,000	10

^a Space heating emissions assume year-round usage of natural gas. The final facility may use electric space heating, which would not produce emissions at the capture facility. Therefore, the emissions presented in Table 5-38 are a conservative estimate.

The capture facility may need to bypass the capture system and vent emissions directly to the atmosphere during periods of SSM. SSM emissions would be vented out a separate stack located on the capture facility site, referred to as the SSM stack, which is synonymous with SSM vent. These emissions would not be generated by the capture facility; rather, this exhaust stream would come directly from the ethanol plant to be vented in the new location.

Potential emissions from the SSM vent and dehydration unit vent were calculated in accordance with the emission rates listed in the air permit application. Space heating emission calculations used *AP-42 Section 1.4*, while cooling tower emission calculations used assumptions from EPA AP-42 Chapter 13.4.

Equipment leak emission factors were taken from *EPA-453/R-95-017, Equipment Leak Emission Estimates*.

A Title V air permit is required if CO₂e emissions are above the federal emissions threshold of 100,000 tons per year (tpy) for stationary facilities. There is no state level emissions threshold for CO₂e emissions. As shown in **Table 5-38**, operating emissions at the capture facility would be below Title V air permit thresholds. The applicant submitted an Air Permit Applicability Determination Request for the capture facility to MPCA in September 2022, and MPCA provided a response on December 9, 2022. MPCA determined that the capture facility would be required to limit CO₂ emissions to below 100,000 tpy through an air permit. On February 8, 2023, the applicant submitted an Option D registration permit application for operation of the capture facility.

Operation of the ethanol plant and capture facility would not differ depending on the location of the pipeline. Ethanol production could increase or decrease but would be required to remain within the limits of the MPCA air permit.

Pipeline

Emissions from operation and maintenance of the pipeline would include dust and exhaust emissions from occasional worker vehicles at MLVs/cathodic protection system sites and CO₂ from fugitive leaks at aboveground pipeline facilities, such as MLVs and the pig launcher. Potential emissions from the pipeline facilities are estimated at 0.20 ton per year of CO₂, which is negligible.

Vehicle traffic would be limited primarily to public roads and permanent access roads and would be infrequent, intermittent, and short term in nature. During operation, the pipeline would not include any stationary sources of criteria pollutants or HAP emissions. Dust related impacts are not expected. Operational impacts on air quality would be minimal and would not differ depending on the route alternative.

GHG Emissions Summary

The project would have a normal planned capacity to capture and transport 524 metric tons per day of CO₂ (about 0.19 MMTPA assuming a 355-day operational year) from the ethanol fermentation process based on the ethanol plant's permitted production capacity. As described in Chapter 1, the project would interconnect to a larger, five-state CO₂ pipeline capture and sequestration system known as the MCE Project. While the project reviewed in this EIS ends at the Minnesota-North Dakota border, the pipeline itself would continue into North Dakota and interconnect with the larger pipeline system to transport the CO₂ to a sequestration area in North Dakota. By capturing and sequestering the CO₂ underground, and assuming a capture rate of 100 percent, as proposed, the project would provide a net benefit to GHG emissions and lower the carbon intensity of the ethanol plant because the emissions sequestered from ongoing annual operations would outweigh the capture facility's construction and operation emissions (see **Table 5-39**). **Table 5-39** summarizes GHG emissions for CO₂ capture rates of 70 percent, 40 percent, and 10 percent. There would still be a net benefit to GHG emissions for the 70 and 40 percent capture rates.

Table 5-39 GHG Emissions Summary

	GHG Emissions (MTCO ₂ e/yr) ^a 100% Capture	GHG Emissions (MTCO ₂ e/yr) 70% Capture	GHG Emissions (MTCO ₂ e/yr) 40% Capture	GHG Emissions (MTCO ₂ e/yr) 10% Capture
Year 1 Estimate of Construction Emissions^b	3,114	3,114	3,114	3,114
Ongoing Annual Operations Emissions				
CO ₂ Captured ^c	(185,454)	(129,818)	(74,182)	(18,545)
Capture Facility ^d	15,624	15,624	15,624	15,624
Electricity Use ^e	5,090	5,090	5,090	5,090
Total Annual Operations^f	(161,626)	(105,990)	(50,354)	5,282
Total Project Lifetime Impact (25-Year Operational Period)	(4,040,653)	(2,649,748)	(1,258,843)	132,062

^a To convert from short tons to metric tons, multiply by 0.907185.

^b Conservatively assumes that all construction occurs in 1 year and that no carbon capture occurs in the same year as construction.

^c See **Table 5-36**.

^d CO₂ emissions generated from operation of the capture facility or from the fermentation process not captured due to system maintenance, repairs, or upset conditions.

^e Calculated using Lake Region Electric Cooperative (LREC) emission factor of 291.4 lb CO₂eO₂e/MWh, which is equal to 132.2 gCO₂e/kWh. Annual estimated project electricity use is 38,501,733 kWh. [CO₂e (metric tpy) = 38,501,733 kWh x 132.2 gCO₂e/kWh x 0.0022046 lbCO₂/gCO₂/2000 lb/ton x 0.907185 metric ton/ton]

^f Does not include fugitive CO₂ emissions that may occur from leaks at MLVs.

Consistency with Plans

The Minnesota Next Generation Energy Act, signed in 2007, required the state to reduce GHG emissions by 80 percent between 2005 and 2050, from 174.6 million tpy (158.4 MMTPA) of CO₂e down to 34.9 million tpy (31.7 MMTPA). In 2022, Minnesota's Climate Action Framework updated this goal to achieve net zero by 2050, as codified in the 2023 Minnesota Statutes 216H.01 and 216H.02. Section 216H.01, Definitions, states that statewide GHG emissions include anthropogenic sources within the state and generation of electricity imported from outside the state and consumed in Minnesota. Section 216H.02, Greenhouse Gas Emissions Control, set a goal of reducing statewide GHG emissions by 30 percent by 2025, 50 percent by 2030, and net zero by 2050. The CO₂ capture facility would capture CO₂ releases at the ethanol plant and reduce CO₂ emissions in Minnesota, which would be consistent with Minnesota Statutes 216H.01 and 216H.02.

Odors

Carbon dioxide is odorless. Any fugitive CO₂ emissions at the capture facility from equipment leaks during operation or blowdowns that may occur during periods of SSM are not expected to cause an odor nuisance.

5.7.1.4 Mitigation

Air Quality

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not contain mitigation measures specific to air quality. The sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

During construction, dust control measures would include periodically spraying the ground with watering trucks or sprinklers and placing curtains to prevent wind-blown particles from reaching residences or public buildings. The applicant would monitor dust activity.

The project would include the following measures to avoid, minimize, or mitigate adverse effects from stationary source emissions:

- The SSM vent would be used only during periods of facility startup, shutdown, and unforeseen equipment malfunctions.
- The cooling tower would be equipped with mist eliminators to control PM₁₀ and PM_{2.5} emissions.
- Space heating would occur only on an as-needed basis during cold weather conditions.
- Stationary source emissions would be minimized by operating and maintaining the equipment according to manufacturer specifications.

Mitigation Proposed During Comment Periods

No mitigation specific to air quality was proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended.

GHG Emissions

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include additional mitigation measures specific to GHG emissions. The sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant identifies monitoring, reporting, and verification requirements for its CO₂ emission reductions to comply with regulatory requirements or carbon market requirements. Because the project would provide a net benefit to GHG emissions, assuming a capture rate of 100 percent, as proposed, no mitigation is proposed. The applicant would minimize the release of CO₂ during the separating process by adhering to proper operations and routine maintenance of the equipment at the capture facility.

Mitigation Proposed During Scoping

No mitigation specific to GHGs was proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended.

5.7.2 *Climate Change*

Climate change is expected to result in increasing temperatures and a greater frequency and intensity of extreme weather events. In Minnesota, climate models have identified the potential for increased rainfall, heat, localized flooding, and persisting drought conditions. The project would contribute to a beneficial effect on climate change, because it would capture and store CO₂ emissions from the ethanol plant.

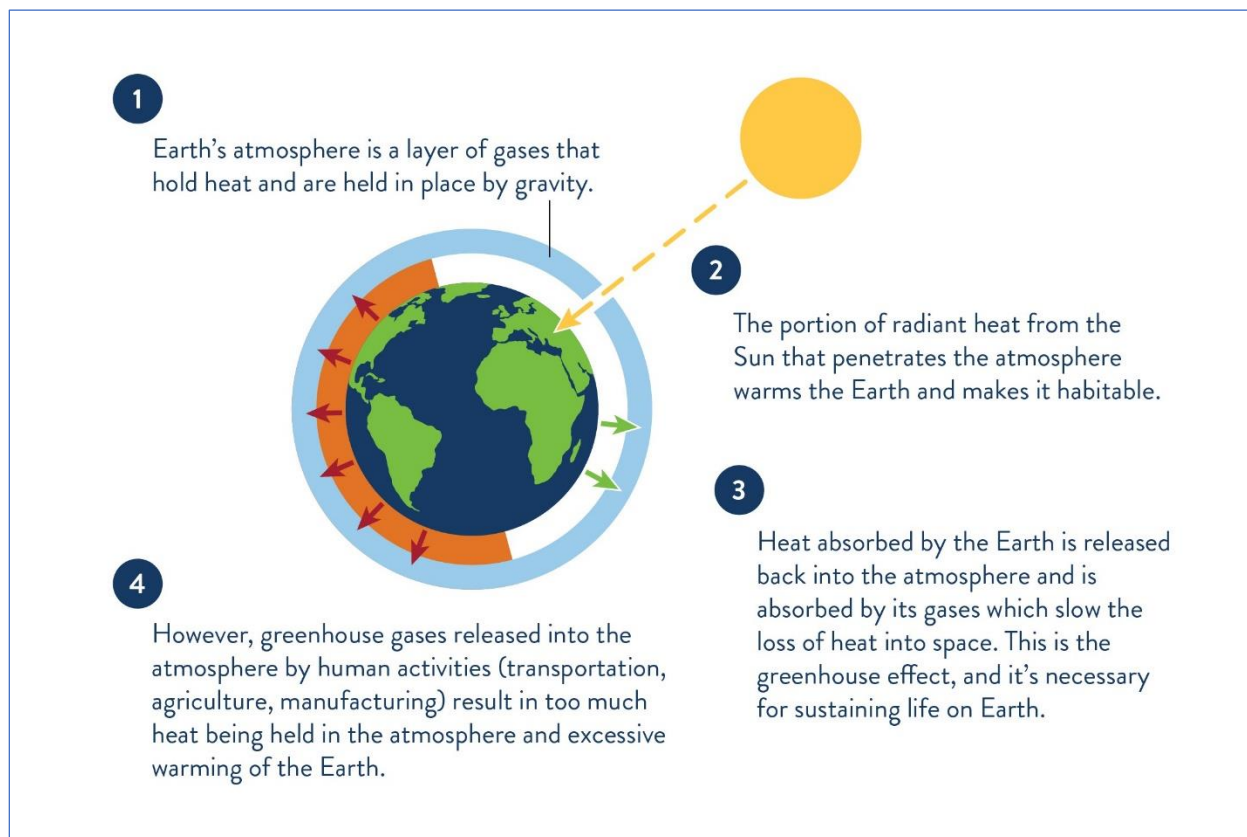
With respect to climate resiliency, the pipeline would be buried underground with sufficient cover to protect it from flooding and scour during operation of the project. Any MLVs located in floodplains would be constructed in accordance with floodplain permitting requirements. Drought conditions might require contingency water sources. All route alternatives would face similar impacts resulting from climate change. These impacts would generally be short term and negligible to minimal for construction and long term and negligible for operations.

Concerns were raised during scoping and in comments on the draft EIS that the captured CO₂ from this project would be used for enhanced oil recovery (EOR). Commenters noted that EOR would contribute to further fossil fuel extraction and GHG emissions and defeat the stated purpose of injecting CO₂ into Class VI wells for permanent sequestration. The applicant has indicated that it does not propose or plan to use CO₂ transported by the project for EOR.

5.7.2.1 Existing Conditions

Climate change is the change in global or regional climate patterns over time. Climate change is caused by an increase in atmospheric GHG concentrations from the incremental addition of GHG emissions from a vast multitude of individual sources. **Figure 5-13** illustrates the effect of GHGs in the atmosphere. The totality of climate change impacts is not attributable to any single action but is exacerbated by a series of actions and interrelated systems.

Figure 5-13 Greenhouse Gases in the Environment



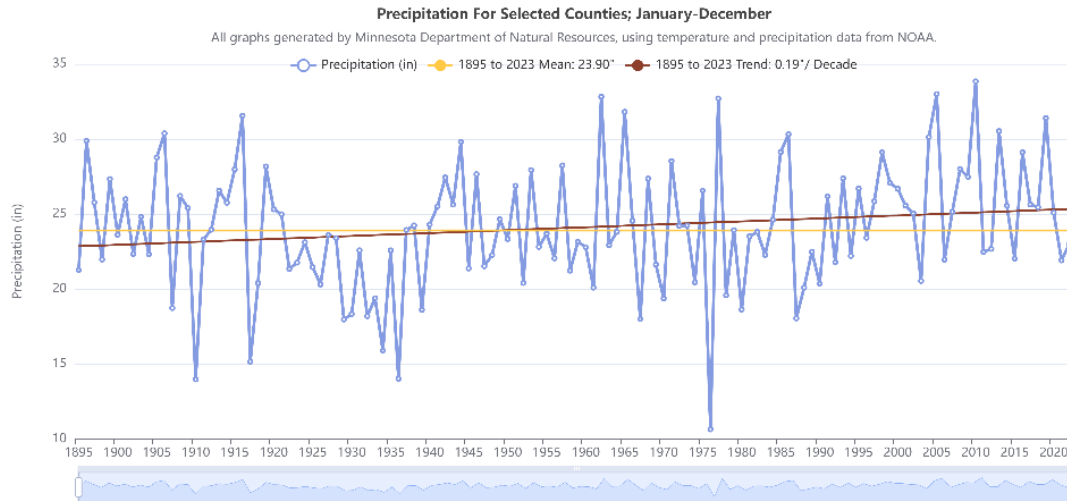
Minnesota's central location in North America exposes the state to a wide range of extreme weather conditions, including blizzards, heatwaves, strong wind, thunderstorms, and heavy rains. The state faces ongoing climate change impacts with projections suggesting significant and rapid shifts in Minnesota's climate in the 21st century. Current and projected future changes in Minnesota's climate include greater intensity rainfall events, more localized flooding, more frequent (repeated) freeze/thaw cycles, lack of snow cover, increased heat, etc., which can damage infrastructure and create safety risks.¹⁶⁸

Minnesota's average temperature has increased by 3.0°F between 1895 and 2022. Most of this warming is concentrated in recent decades, particularly since 1970. Most of the temperature increase has occurred in the winter season, such that the winter season has warmed two to three times faster than summer.¹⁶⁹ Minnesota might experience intense summer heat waves, yet summer heat waves have not worsened compared to historical patterns. However, climate models used in the 2014 National Climate Assessment have projected a greater tendency toward extreme heat.¹⁷⁰

The state's annual rainfall has increased by over 3 inches from 1895 to 2020. The occurrence of heavy rains, including 3-inch rains, has become more frequent in Minnesota since 2000. Climate projections suggest a continued increase in such substantial rainfall events in the future.¹⁷¹ While the specific impact of climate change on drought occurrences in Minnesota remains uncertain, it is evident that drought and dry periods will persist as regular events in the state. There is currently no indication that climate change is altering the character of Minnesota's tornadoes and severe thunderstorms.¹⁷² However, changes to severe weather patterns could occur.

The climate trends for Otter Tail and Wilkin Counties are similar to the overall trends in Minnesota. The Minnesota Climate Trends historical data shows that, for Otter Tail and Wilkin Counties, the temperature has risen by an average of 0.22°F and 0.25°F per decade, respectively, from 1895 to 2022. As shown in **Figure 5-14**, annual precipitation in Otter Tail and Wilkin Counties has shown a slight increase from 1895 to 2022 (0.19-inch increase per decade). Current climate models from Minnesota Climate Explorer anticipate similar annual precipitation through the mid-century and slightly higher precipitation through the late-century.¹⁷³

Figure 5-14 Precipitation History for Otter Tail and Wilkin Counties



Climate change could result in an increased risk of flooding in the project area due to more frequent large storms. Looking specifically at flood risk for the project based on climate change over the next 30 years, the data shows that 14 percent of Otter Tail County and 23 percent of Wilkin County have a greater than 26 percent chance of being severely affected by flooding. In Otter Tail County, these areas are mostly to the north and east of Fergus Falls and are not concentrated near the project area. In Wilkin County, these areas are concentrated near the Otter Tail and Bois de Sioux Rivers. Overall, both counties have a minor risk of flooding, meaning flooding has the potential to impact day-to-day life in the community.¹⁷⁴

5.7.2.2 Potential Impacts

General

The primary driver for climate change is the rapid increase in GHG emissions. CO₂ is the predominant contributor, making up 79 percent of total United States GHG emissions in 2021.¹⁷⁵ The project would capture and sequester the CO₂ emissions from the ethanol plant underground. Details of GHG emissions and potential sequestration quantities can be found in Section 5.7.1.3.

The project's design incorporates elements that minimize impacts from the increase in extreme weather events, such as increased flooding, storms, and heat wave events that are expected to accompany a warming climate. **Table 5-40** describes possible interactions between proposed activities and climate trends.

Table 5-40 Project's Proposed Activities and Interactions with Climate Trends

Resource Category	Climate Considerations	Project Information	Adaptations
Project Design	Climate change could result in increased risk of flooding or drought conditions.	The pipeline would be buried underground with a minimum depth of cover of 60 inches at waterbody crossings; the depth would be greater at the waterbody crossings installed via HDD. The MLVs can be operated in flooded conditions and would not change floodplain elevations. Drought could affect the project's ability to appropriate water.	Contingency water sources would be required by permits should water not be available due to drought conditions.
Land Use	Impacts could occur should the project result in a change in land cover.	The project would result in very little change to land cover; most land would revert to its prior use following construction.	None proposed.
Water Resources and Wetlands	Impacts could occur from increased chance of flooding or stormwater damage or should discharge of wastewater or appropriation of water cause watershed impacts. Water use could be limited.	The project is mostly underground. MLVs could be operated remotely in case of flooding, allowing the operator to close MLVs using remote capabilities, even during flooding. Stormwater would be managed under MPCA's stormwater permit programs for construction and operation. Minimal use of water and discharge of water is planned. Drought could affect the project's ability to appropriate water. Impacts on most wetlands would be minimal, and impacts on forested wetlands would be long term.	Contingency water sources would be required by permits should water not be available due to drought conditions.
Contamination/Hazardous Materials/Wastes	None identified	The project is not expected to generate hazardous waste, and minimal hazardous materials are expected to be used/stored during construction and operation.	None proposed.

Resource Category	Climate Considerations	Project Information	Adaptations
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Impacts could occur should the project result in a change in land cover and therefore habitat.	Most activities would occur in land that is already actively farmed or developed, minimizing impact on habitat.	None proposed.

Construction

Construction activities are anticipated to be short term and generally unaffected by long-term climate trends. However, possible flooding or drought conditions could lead to short-term delays in construction activities. In the event of drought, the applicant's ability to obtain water from preferred sources might be hindered if water appropriation permissions by DNR are denied or revoked due to drought conditions, making the need for a contingency water source necessary.

Construction emissions would have a short-term, negligible increase in GHGs that contribute to climate change, as demonstrated in Section 5.7.1.

Operations

The project would capture and sequester the CO₂ emissions from the ethanol plant underground, which would contribute to a beneficial impact on climate change.

Climate change could impact the project. Water availability is critical to growing corn, operating the ethanol plant (for example, process water, cooling water), and operating the capture facility cooling system. Drought conditions could cause a reduction in CO₂ capture capacity or a temporary shutdown of the project.

Climate change could result in an increased risk of flooding in the project area. The applicant has not proposed any specific changes in project design to account for increased flooding. Installation of the pipeline under waterbodies in accordance with depth of cover requirements would protect the pipeline from the effects of flooding. At the larger waterbodies, the pipeline would be installed with HDD at depths greater than 25 feet.

Following construction, the integrity of the pipeline is not expected to be impacted in flood prone areas because the pipeline would be below-ground and would not be impacted by flooding. All perennial streams would be crossed by HDD or bore, as shown in Tables 5-48 through 5-50. Other streams that would be crossed are intermittent or ephemeral streams, many of which are drainage ditches, and they would not be at significant risk of flooding-related problems like scour. Any MLVs located in floodplains, such as MLV-321-04 near MP 27.4 on RA-South, would be constructed in accordance with floodplain permitting requirements. Due to the small footprint (less than 0.1 acre), negligible impacts on the floodplain and floodplain elevations would be anticipated.

5.7.2.3 Enhanced Oil Recovery

Between 5 and 20 percent of in-place oil is recovered when an oilfield is initially developed and produced. Additional oil can be recovered using secondary methods of injecting either water or natural gas, or a combination of the two, into the reservoir for maintaining pressure and to act as a driver to displace oil. EOR refers to methods used to recover oil not recovered by secondary processes.¹⁷⁶ CO₂ injection is one of these methods. EOR methods used in the Bakken Formation (the shale oil formation in North Dakota) include CO₂ injection as well as hydraulic fracturing, steam injection, horizontal drilling, and nanotechnology.¹⁷⁷ The Weyburn field in Saskatchewan, Canada is one example where CO₂ has been

used for EOR. At this field, the CO₂ transported by pipeline from a synfuels plant near Beulah, North Dakota has been used to increase oil production by 16,000 to 28,000 barrels per day.¹⁷⁸

The applicant has indicated that it does not propose or plan to use CO₂ transported by the project for EOR; however, concerns were raised during scoping and during the draft EIS comment period that the captured CO₂ from this project would be used for EOR. For example, according to a news article, one of the applicant's officials stated, "Today, we don't have any shippers who want to ship CO₂ for EOR. When that changes, we will likely move it for that purpose."¹⁷⁹ As indicated by commenters, this could contribute to further fossil fuel extraction and GHG emissions and defeat the stated purpose of injecting CO₂ into Class VI wells for permanent sequestration.¹⁸⁰

The project's sequestration facilities are located in Oliver and Morton Counties, North Dakota, which do not have oil or gas fields. For the CO₂ to be used in EOR, another pipeline would need to be constructed to transport the CO₂ to an oil or gas field where it is needed. Alternatively, a pipeline would need to be constructed to Beulah, North Dakota, (also in Oliver County) where an existing CO₂ pipeline operated by Souris Valley Pipeline, Ltd., exists. This pipeline transports CO₂ captured at a synthetic natural gas plant and transports it to oil fields in Canada.¹⁸¹ The terminus of the proposed MCE project is about 16 miles from Beulah. EERA staff is unaware if connecting to this pipeline is possible or, if so, if the pipeline could handle additional capacity.

EOR Process

The EOR process using CO₂ consists of injecting CO₂ into the oil reservoir where it helps to move the oil toward a production well. Often, these CO₂ "floods" involve the injection of volumes of CO₂ alternated with volumes of water.¹⁸² Depending on subsurface temperature and pressure conditions, CO₂ will dissolve in the residual oil still in place (miscible conditions) or remain as a separate phase (immiscible conditions). CO₂-enhanced oil recovery under miscible conditions is more effective because CO₂ reduces the viscosity and density of the oil, making it easier to extract.

When CO₂ injection is used for EOR, some of the CO₂ remains in the subsurface and is sequestered.¹⁸³ California's Low Carbon Fuel Standards allow for CO₂ to be sequestered permanently through EOR.¹⁸⁴ The amount of CO₂ retained in the subsurface is variable and depends in part on the geology of the oil reservoir, such as the rock type and whether fractures are present.¹⁸⁵ The amount of CO₂ retained in the subsurface is also influenced by the number and geometry of injection and production wells and the recovery method (for example, whether the CO₂ injection is continuous or alternates with water injection).

The CO₂ injected for EOR that does not remain in the subsurface will return to the surface with the recovered oil. This CO₂ is released into the atmosphere unless it is separated and reinjected to form a closed loop. A closed loop system will result in permanent CO₂ storage.

CO₂ Credits

A carbon renewal credit associated with storing CO₂ underground can only be counted once: either it can reduce the emissions from the original source when it was captured or it can reduce the emissions from oil production.¹⁸⁶ Consequently, for a situation in which the CO₂ from the ethanol plant would be used for EOR, the credit would be given to the ethanol plant for avoiding CO₂ emissions. Carbon credits are described more fully in Section 6.2.3.

Section 45Q of the United States tax code provides for a tax credit for CO₂ sequestration.¹⁸⁷ The CO₂ must be captured from an industrial source by carbon capture equipment or be captured directly from

the ambient air. The CO₂ must be measured at the source of capture and the measurement must be verified at the point of disposal, injection, or utilization.

The monetary credit is currently \$85/ton CO₂ for carbon capture and geologic storage. It is \$60/ton CO₂ for carbon capture and storage via utilization, which includes EOR. One commenter¹⁸⁸ suggested that, although the tax credit is greater for sequestered CO₂ than for EOR use, this difference likely would not discourage use of the CO₂ for EOR. The commenter notes that oil companies could pay the CO₂ owners \$25 or more per ton to acquire it, which is within the range of historical prices for CO₂ paid by EOR projects.

Consequences of Diverting CO₂ for EOR

If all the CO₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO₂, other gases, thermal methods, or chemical methods. Production of oil through EOR would not be dependent on the availability of CO₂ produced by the ethanol plant.

It is possible that diverting some or all the CO₂ produced by the ethanol plant from permanent sequestration to EOR would result in some amount of oil being produced that would not otherwise be produced. As staff understands it, the amount of oil produced and the amount of injected CO₂ needed to produce it, however, is based on many site-specific variables (for example, the porosity of the geologic formation, the vertical and measured depths of the well, the fluid column needed to be lifted, temperature, and pressure, among other factors). Additionally, the rate at which a company chooses to recover the oil can make a significant difference; that is, recovering the oil as fast as possible or letting the well produce over the long term. Given the number of variables, quantifying this amount could not be done with any reasonable certainty, and a generalized formula to predict oil extraction could not be identified.

For illustrative purposes, in 2019, an estimated 300 kilograms CO₂ to 600 kilograms CO₂ was injected in EOR processes to produce a barrel of oil in the United States.¹⁸⁹ Based on these numbers, the proposed project—capturing 0.19 MMTA (190 million kilograms per year) of CO₂—could, theoretically, help to produce about 316,700 to 633,300 barrels of oil annually. This estimate assumes a capture rate of 100 percent, as proposed by the applicant.

Using the EPA Greenhouse Gases Equivalencies Calculator,¹⁹⁰ 316,700 to 633,300 barrels of oil annually would result in between 136,181 and 272,319 metric tons of CO₂ emissions per year. If the CO₂ capture rate is less than 100 percent, less oil would be produced and resulting emissions would be proportionally lower. **Table 5-41** shows the theoretical range of volumes of produced oil and resulting CO₂ emissions for the different capture rates used in this EIS.

Table 5-41 Estimated Volumes of Produced Oil and CO₂ Emissions from EOR

Capture Rate	Produced Oil (barrels per year)	CO ₂ Emissions (metric tons per year)
100	316,700 – 633,300	136,181 – 272,319
70	221,690 – 443,310	95,327 – 190,623
40	126,650 – 253,300	54,472 – 108,928
10	31,670 – 63,330	13,618 – 27,232

EOR Conclusion

The applicant proposes to inject CO₂ into Class VI wells for sequestration. If CO₂ was used for EOR, it is likely not all the CO₂ would be sequestered.

Because there are multiple variables that would affect the retention of CO₂ in the subsurface during the EOR process, the amount of CO₂ that would be released at the surface cannot be quantified with a reasonable degree of certainty.

CO₂ from the ethanol plant might contribute to further fossil fuel extraction; however, it would be speculative to conclude whether the availability or absence of CO₂ from the ethanol plant would have a significant effect on future oil production.

5.7.2.4 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include mitigation measures specific to climate change. The sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

Through its lifetime, the project, as proposed, would capture and sequester CO₂. No additional mitigation is proposed.

Mitigation Proposed During Comment Periods

No mitigation specific to climate change was proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended.

5.7.3 Geology and Topography

The ROI for geologic features is the area within the construction workspace. The surficial geology is unconsolidated deposits consisting of till and sandy/silty glacial lake sediment from Pleistocene continental glaciation. The topography in the project area is relatively flat with localized areas of steeper slopes occurring adjacent to waterbodies. Bedrock is generally deeper than 50 feet. No mineral resources are within the ROI. The risk to the project facilities from geologic hazards, such as earthquakes and landslides, is low. Surface contours would be restored after construction; however, differential settling could occur, causing crowning or subsidence (low areas). The applicant would monitor for and rectify areas of crowning or subsidence caused by settling. With these measures, impacts on geology and topography would be short term and minimal. Impacts would not vary among the route alternatives.

5.7.3.1 Existing Conditions

Based on a review of regional maps¹⁹¹ and local well records,¹⁹² depth to bedrock throughout the project area generally exceeds 50 feet and can exceed 450 feet.¹⁹³

Surficial geology within the ROI for each route alternative is primarily characterized by unconsolidated deposits consisting of till and sandy/silty glacial lake sediment from Pleistocene continental glaciation. The project would not cross karst terrain.¹⁹⁴

Elevations range from about 1,250 feet above sea level at the capture facility to 960 feet at the Minnesota-North Dakota border for each of the route alternatives. The capture facility would be located at the ethanol plant, which is on relatively flat terrain. Topography along the ROI for RA-North, RA-Hybrid, and RA-South is generally flat (3 to 5 percent slopes). Localized areas of short, steep slopes commonly occur at road crossings and drainage ditches. Additionally, areas of steep slopes occur at the stream and river crossings listed below:

- RA-North:
 - Pelican River (up to 20 percent slope)
 - Unnamed creek (up to 17 percent slope)
- RA-Hybrid:
 - Pelican River (up to 20 percent slope)
 - Unnamed creek (up to 17 percent slope)
 - Otter Tail River (up to 16 percent slope)
 - Unnamed stream (up to 28 percent slope)
 - Bois de Sioux River (up to 16 percent slope)
- RA-South:
 - Pelican River (up to 26 percent slope)
 - Unnamed stream (up to 20 percent slope)
 - Unnamed stream (up to 30 percent slope)
 - Otter Tail River (up to 16 percent slope)
 - Unnamed stream (up to 28 percent slope)
 - Bois de Sioux River (up to 16 percent slope)

As described in Section 5.5.5, no mining or quarry operations are present within the ROI for the route alternatives. No oil or gas wells are located within the ROI for the route alternatives.¹⁹⁵

5.7.3.2 Geologic Hazards

Minnesota has one of the lowest occurrence levels of earthquakes in the United States, and the project crosses areas with a low probability of earthquakes of significant intensity.¹⁹⁶

The type of landslide most common in Minnesota is shallow slope failure triggered by a heavy rain event. This slope failure is generally less than 3 feet deep but can erode the entire length of a slope. Deeper landslides, mudflows, and debris flows are much less common in Minnesota than in more mountainous areas.

Less destructive landslides, such as slow-moving earthflows and soil creep, can also occur when soil moisture and shallow groundwater saturate sediments during heaving rain events or snowmelt. Human factors including inadequate storm water management, undercutting of slopes, placement of artificial fill, and land-use changes, such as urbanization and agricultural practices, can lead to erosion and landslides.¹⁹⁷ The U.S. Geological Survey's United States Landslide Inventory¹⁹⁸ has no records of landslides within the vicinity of the project.

The potential hazards of shrink-swell soils and frost heaving are addressed in Section 5.7.6.2.

5.7.3.3 Potential Impacts

Construction of the pipeline and capture facility would result in minimal and temporary impacts on topography due to grading and excavation operations. The pipeline trench would be about 6 feet deep, and excavations for footings at the capture facility would be approximately 5 to 6 feet deep. Given the depth of the excavations compared to the depth of bedrock in the project area, there is a low likelihood that the project would cause impacts on bedrock geology.

Once construction is complete, disturbed areas would be regraded to restore original surface contours and revegetated. However, there is potential for uneven settling over the trench area over time, resulting in crowning or subsidence that could affect surface drainage patterns. For example, low areas from subsidence can cause water to pond, and crowning can block surface water flow. The applicant would monitor the pipeline ROW and remediate areas of settling and uneven ground in accordance with requirements in state permits and landowner agreements as stated in Section 8.2 of the Minnesota ECP.

The potential risk to the pipeline from geologic hazards, such as earthquakes and landslides, is low because of the relatively flat terrain and low levels of earthquake occurrence in the ROI. As described in more detail in Chapter 8, in 2020 a landslide triggered by heavy rain led to the rupture of a CO₂ pipeline in Satartia, Mississippi. The area where the pipeline rupture occurred was hilly, unlike the area of the proposed project, which has a low risk of landslides.

The applicant has completed geotechnical evaluations for HDD crossings on RA-South at the Otter Tail River and the Bois de Sioux River. The applicant plans to conduct an investigation at the Pelican River once access permission is obtained. The purpose of these investigations is to obtain information on subsurface conditions to be used for assessing the feasibility of the HDD and preparing the HDD engineering design. The soil profile encountered in four borings at the Otter Tail River was generally composed of alluvial soils consisting primarily of lean clay with varying amounts of sand and silt. Discontinuous sand layers 3 to 10 feet thick were encountered at various depths. The applicant conducted a 50-foot-deep geotechnical boring on each side of the Bois de Sioux River. These borings encountered soils consisting primarily of clays, sandy clays, and clayey sands. The applicant states that soils in the area are suitable for HDDs based on the geotechnical work completed to date.

During HDD installation it is possible to encounter existing weak areas in the ground where pressurized drilling mud can escape into the surrounding matrix. These can include unconsolidated gravel, coarse sand, soil fissures, and fractured bedrock. Additionally, hydraulic fracturing can occur during drilling when the pressure of the drilling fluid exceeds the strength and confining stress of the surrounding soils. These conditions can result in the release of mud as it follows the path of least resistance. If the mud reaches the surface, it is referred to as an inadvertent release or return. If an inadvertent release occurs within a waterbody, it would cause an increase in turbidity and sedimentation, as described in Section 5.7.8. An inadvertent release could also occur in wetlands or upland areas and could require clean-up actions, depending on the location and extent. Other circumstances can result in abandoning the drill hole, such as refusal of the drill bit by a boulder or collapse of the drill hole in sandy soil.

5.7.3.4 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) includes the following mitigation measure relevant to geology and topography: “Areas disturbed by construction activities shall be restored to pre-construction conditions.” Additionally, the sample routing permit states that “the Permittee shall comply with all

applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

After pipeline installation, the applicant would backfill trenches with native material, respread topsoil, and restore the surface topography to pre-construction conditions. Once the construction of the capture facility is complete, the surface topography at the capture facility would be returned to pre-construction conditions, except where facilities have been constructed.

The applicant would develop a contingency plan to address the unintended release of drilling mud to the environment during the execution of each HDD. It would also include contingencies in the event the HDD cannot be completed as planned.

After construction, the applicant would monitor the pipeline ROW to identify areas where remedial measures are required to establish a stable surface for reclamation to be successful. This may include regrading, re-seeding, remulching, and additional monitoring. Section 5.5.1 provides more details regarding mitigation for settling in agricultural areas.

The applicant would consult with geotechnical engineers across its footprint and develop a Phase I Geohazard Assessment for the project. The Phase I Geohazard Assessment is designed to comply with the recommendations within PHMSA Advisory Bulletin 2022-01,¹⁹⁹ which advises operators to identify areas surrounding a pipeline that may be prone to large earth movement, including but not limited to slope instability, subsidence, frost heave, soil settlement, erosion, earthquakes, and other dynamic geologic conditions that may pose a safety risk. Depending on the results of the Phase I assessment, Phase II and Phase III assessments would be conducted as needed. The assessments would identify best management practices during pipeline construction and operation to avoid, mitigate, and/or monitor possible geohazards. In addition, the applicant would run an inertial measurement unit (IMU) smart tool as part of the baseline assessment after construction. During operations, the applicant would have the ability to run additional IMU smart tools to track movement, strain, and stress within the pipeline.

Mitigation Proposed During Comment Periods

DNR recommends that unintentional release evaluations should be conducted for waterbody crossings proposed to be installed via HDD to ensure the soils are amenable to HDD. As stated above, the applicant has completed geotechnical evaluations for two of the three HDD crossings at waterbodies and plans to conduct an investigation at the third once access is obtained. An assessment of the potential for an inadvertent release of drilling mud is part of the feasibility analysis and design for HDDs.

Mitigation Recommended by EERA Staff

EERA staff believes that the results of the Phase I Geohazard Assessment and any subsequent Phase II and Phase III assessments should be provided to the Commission as a pre-construction filing.

5.7.4 Public and Designated Lands

The ROI for public and designated lands is the route width of each route alternative. The only direct impact on public and designated lands would be at one Waterfowl Production Area (WPA), which would be crossed by all three route alternatives. Impacts on the wetland associated with this WPA are not expected. The route width of RA-South would partially overlap with two other WPAs; however, the WPAs would be outside of the construction workspace. Potential project impacts on public and designated lands for all three route alternatives would be short term and negligible.

5.7.4.1 Existing Conditions

Public and designated lands include federal, regional, state, and locally managed lands that are owned collectively by the public and are intended for recreation or the preservation of natural areas and wildlife.

In the project area, public and designated lands and their management are as follows:

- Wildlife Management Areas (WMA), managed by DNR
- Aquatic Management Areas, managed by DNR
- Parks, managed locally at the municipal or county level
- WPAs, managed by the United States Fish and Wildlife Service (USFWS)
- Scientific and Natural Areas, managed by DNR

These areas are further discussed in Section 5.7.5.

5.7.4.2 Potential Impacts

All three route alternatives would cross or abut WPA parcels managed by USFWS in Otter Tail County. The detailed route maps in **Appendix B** show the WPA parcels, route widths, and construction workspaces for each route alternative. All three route alternatives would cross an unnamed WPA at MP 0.3. The route width of RA-South would also overlap with the boundary of a WPA at MP 5.2; however, the centerline of RA-South would not cross the WPA. There are four other WPAs within the RA-South route width, as listed in **Table 5-42**. The route widths of RA-North and RA-Hybrid abut, but do not cross, another WPA. No other DNR lands, wilderness areas, or federal lands occur within the route widths for the three route alternatives.

The route width for RA-South does intersect with several WPAs; however, the WPAs do not cross the centerline for RA-South, and they would not be impacted by the construction workspace.

Table 5-42 Otter Tail County Waterfowl Protection Areas Crossed by the Route Widths

Route Alternative	WPA Unit Name	Parcel Number	Area of WPA within Route Width (Acres)	Crossed by Centerline?	Nearest MP at Crossing
RA-North	N/A	26000190121000	8.52	Yes	0.3
RA-Hybrid	N/A	26000190121000	8.51	Yes	0.3
RA-South	Ridgeway WPA	44000160070000	0.11	No	N/A
RA-South	Ridgeway WPA	44000090040000	8.86	No	N/A
RA-South	N/A	26000190121000	5.17	Yes	0.3
RA-South	N/A	44000040016002	6.43	No	N/A
RA-South	N/A	44000050025000	9.43	No	N/A

N/A = not available

All three route alternatives would cross one WPA parcel at MP 0.3, near the ethanol plant where the three route alternatives follow the same route. The applicant stated that USFWS staff confirmed the conservation easement is limited to the wetlands on the parcel, and all three route alternatives would avoid all wetland impacts on the parcel.

Four other WPA parcels, including portions of the Ridgeway WPA, are within the route width for RA-South. These areas would be avoided during construction. The parcels would not be impacted by the applicant's proposed construction workspace.

5.7.4.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not include mitigation measures for public and designated lands. The sample routing permit states that "the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations" (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant committed to avoiding the wetlands within the WPA parcel at MP 0.3.

Mitigation Proposed During Comment Periods

No mitigation specific to public and designated lands was proposed by commenters.

Mitigation Recommended by EERA Staff

None recommended.

5.7.5 Rare and Unique Resources

The ROI for rare and unique species is the area within 1 mile of the route widths. Most vegetation cover occurring along all route alternatives does not provide suitable habitat for rare and unique species. Potential impacts for all three route alternatives would be unique to individual listed species, could vary widely, and would be highly localized and limited to specific habitats. No federally listed species are expected to be directly taken. Indirect impacts on federally listed species would be negligible and could be avoided by following USFWS guidance. No bald or golden eagle nests would be removed or disturbed. There is a potential for take of state-listed marbled godwits or their nests, which would be lessened or avoided by conducting nest surveys ahead of construction. Because this species is already rare, the potential for additional loss of nests during construction and operational maintenance may have a greater local impact. There is also a potential for direct take of four state-listed plants. The loss of individuals from local populations of state-listed plant species could also have a long-term, minimal impact on the population. Potential for take of state-listed plants would be lessened or avoided by conducting surveys ahead of construction as needed. Overall, for each of the three route alternatives, impacts on rare and unique species would be localized, negligible to minimal, and short term.

5.7.5.1 Existing Conditions

Federal Species

At the federal level, USFWS has a digital project planning tool, Information for Planning and Consultation (IPaC), that "provides information to project proponents to help determine whether a project will have effects on federally listed species or designated critical habitat, as well as other sensitive resources managed by USFWS."²⁰⁰ IPaC was accessed for information on the documented presence of federally listed species in the project area—federally listed species are potentially present in the ROIs of the route alternatives. These species are protected under the federal Endangered Species Act. IPaC was also used for the range-wide northern long-eared bat determination key, which provides a preliminary

determination of effect on northern long-eared bats. Federal candidate species receive no formal protection; however, they could be listed in the future. In addition, because USFWS is continually reviewing species for listing and designating critical habitat, the USFWS National Listing Workplan was accessed to identify those species not yet listed, but under consideration for listing decisions that could potentially occur during project construction and operation.²⁰¹

USFWS recommended field surveys along the RA-South route for four federally listed species. The four species, two butterflies and two vascular plants, are also state-listed species in Minnesota. The federal/state-listed species targeted for field surveys conducted by the applicant were:

- Dakota skipper (*Hesperia dakotae*), federally threatened, state endangered
- Poweshiek skipperling (*Oarisma poweshiek*), federally and state endangered
- Prairie bush clover (*Lespedeza leptostachya*), federally and state threatened
- Western prairie fringed-orchid, (*Platanthera praeclara*), federally threatened, state endangered

The field surveys also assessed habitat for the butterfly species.

State Species

The State of Minnesota provides varying degrees of protection for rare and unique species. The primary protections are statutory, under Minnesota Statutes 84.0895. This statute designates qualifying rare and unique species as “endangered,” “threatened,” or “special concern.” An endangered species is one that is threatened with extinction throughout all or a significant portion of its range in Minnesota. A threatened species is one likely to become extinct within the foreseeable future throughout all or a portion of its range in Minnesota. Endangered and threatened species in Minnesota may not be taken without a permit from DNR.

A special concern species is not endangered or threatened, but is uncommon in Minnesota, or has highly specific habitat requirements, and warrants monitoring of its status. Special concern species may be taken without a permit from DNR; however, special concern species may occur within other natural features—for example, Scientific and Natural Areas, Minnesota Biological Survey (MBS) sites, WPAs, WMAs, and similar areas managed by state or federal agencies.

The Division of Ecological and Water Resources within DNR manages the Natural Heritage Information System (NHIS). NHIS data includes federally endangered, threatened, or candidate plant species and endangered and threatened animal species. The system also includes state endangered, threatened, or special concern species. The NHIS database is a source of information in determining the potential for species presence, but not the sole source for identifying the presence or absence of these species, as some area surveys have not been conducted extensively or recently. NHIS data for the RA-South route was obtained by EERA staff through a licensed use, as that was the route originally proposed by the applicant. After receiving DNR comments on the draft EIS, EERA staff obtained Conservation Planning Reports for the RA-North and RA-Hybrid routes, which are included in **Attachment 2 of Appendix O**. EERA staff also consulted NHIS records through a licensed use to identify listed species in the project area. These reviews confirmed the absence of known northern long-eared bat hibernacula within 0.25 mile and the absence of known roost trees within 150 feet of the three route alternatives.

RA-North

Three federally listed species occur within the ROI of RA-North:

- Northern long-eared bat (*Myotis septentrionalis*), an endangered species
- Tricolored bat (*Perimyotis subflavus*), a proposed endangered species
- Monarch butterfly (*Danaus plexippus*), a candidate species

No federally designated critical habitat has been identified in the RA-North route segment.

In addition to species protected under the Endangered Species Act, bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are known to occur within the RA-North ROI. Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. Aerial nest surveys for bald and golden eagles have not been conducted along RA-North.

RA-Hybrid

Five federally listed species overlap the RA-Hybrid ROI:

- Northern long-eared bat, a federally endangered species
- Tricolored bat, a federally proposed endangered species
- Dakota skipper (*Hesperia dacotae*), a federally threatened species
- Monarch butterfly, a federal candidate species
- Western prairie fringed orchid (*Platanthera praeclara*), a federally threatened species

No federal critical habitats have been identified in the RA-Hybrid ROI. Aerial bald and golden eagle nest surveys have not been conducted along the portions of RA-Hybrid that are not the same as RA-South.

RA-South

Five federally listed species overlap the RA-South ROI:

- Northern long-eared bat, a federally endangered species
- Tricolored bat, a federally proposed endangered species
- Dakota skipper, a federally threatened species
- Monarch butterfly, a federal candidate species
- Western prairie fringed orchid, a federally threatened species

No federal critical habitats have been identified in the RA-South ROI. Field surveys conducted between May 31 and June 15, 2022, found suitable habitat for the butterfly species Dakota skipper and Poweshiek skipperling, although, neither the USFWS IPaC nor the DNR NHIS review identified any known locations of Poweshiek skipperling along the RA-South ROI. The field surveys found no federally listed plant species. However, suitable habitat rated as fair to poor quality for western prairie fringed-orchid was identified in one location. At that same location, the field surveys identified 17 individuals of the state special concern species small white lady's-slipper (*Cypripedium candidum*).

Aerial nest surveys for bald and golden eagles were performed along the RA South route in March 2022 and identified two active bald eagle nests. Both nests were outside of the disturbance buffer of 660 feet, as specified by USFWS.

Additional Species

In addition, over the next 3 to 4 years, USFWS may be considering potential listing and/or designation of critical habitat for 15 species in Minnesota. Of these, 12 species have no documented occurrences within Otter Tail and Wilkin Counties and/or have no suitable habitat within the ROIs of any of the three route alternatives.

The following three species, whose status will be reviewed and may change, have been documented in Otter Tail County:

- Blanding's turtle (*Emydoidea blandingii*) – a Minnesota threatened species, is up for federal listing consideration in 2024, with documented occurrences in Otter Tail County and no known occurrences with the ROIs of all three route alternatives.
- Plains spotted skunk (*Spilogale putorius interrupta*) – a Minnesota threatened species, is up for federal listing consideration in 2023–24, with documented occurrences in Otter Tail County and no known occurrences with the ROIs of all three route alternatives.
- Lake sturgeon (*Acipenser fulvescens*) – a Minnesota special concern species, was considered for federal listing in early 2024. However, USFWS announced its determination on April 23, 2024, that federal listing is not warranted at this time.²⁰² There are documented occurrences of lake sturgeon in the Otter Tail River well upstream of all three route alternatives. DNR has released lake sturgeon into the upper Otter Tail River dating back to 2001. In addition, DNR has recently tagged and released lake sturgeon into the lower Otter Tail River.

State-listed Species

Nine state-listed species occur within the ROI of RA-North:

- Franklin's Gull (*Leucophaeus pipixcan*), a special concern bird
- Marbled Godwit (*Limosa fedoa*), a special concern bird
- Greater Prairie-chicken (*Tympanuchus cupido*), a special concern bird
- Lark Sparrow (*Chondestes grammacus*), a special concern bird
- Small white lady's-slipper (*Cypripedium candidum*), a special concern plant
- Regal fritillary (*Argynnis idalia*), a special concern butterfly
- Northern gentian (*Gentiana affinis*), a special concern plant
- Nuttall's sunflower (*Helianthus nuttallii* ssp. *Rydbergii*), a special concern plant
- Black sandshell (*Ligumia recta*), a special concern mussel

Ten state-listed species occur within the ROI of RA-Hybrid:

- Franklin's Gull
- Marbled Godwit
- Greater Prairie-chicken
- Lark Sparrow
- Small white lady's-slipper
- Regal fritillary
- Northern gentian

- Nuttall’s sunflower
- Black sandshell
- Fluted-shell (*Lasmigona costata*), a special concern mussel

Five state-listed species occur within the ROI of RA-South:

- Marbled Godwit
- Greater Prairie-chicken
- Lark Sparrow
- Small white lady’s-slipper
- Fluted-shell

Minnesota Biological Survey Sites of Biodiversity Significance

At the state level, DNR maintains digitally available information on the location of Sites of Biodiversity Significance (SBS), WMAs, and Native Plant Community types. These sources were used to identify potential habitats for rare species. DNR also classifies rare plant or animal communities across the state. These include Scientific and Natural Areas, High Conservation Value Forest, and MBS Native Plant Communities and SBS.

MBS SBS are present in the ROI (within 1 mile of the route width). According to DNR, MBS SBS are ranked based on the presence of rare species populations, the size and condition of native plant communities within the site, and the landscape context of the site. There are four biodiversity ranks: Outstanding, High, Moderate, and Below.

An “Outstanding” site contains the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most ecologically intact or functional landscapes.

A “High” site contains very good quality of occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes.

A “Moderate” site contains occurrences of rare species, moderately disturbed native plant communities, and/or landscapes that have strong potential for recovery of native plant communities and characteristic ecological processes.

A “Below” site lacks occurrences of rare species and natural features or does not meet MBS standards for outstanding, high, or moderate rank. These sites may include areas of conservation value at the local level, such as habitat for native plants and animals, corridors for animal movement, buffers surrounding higher-quality natural areas, areas with high potential for restoration of native habitat, or open space.

MBS SBS in the ROI for each route alternative are shown in the detailed route maps in **Appendix B** and **Figure 5-15**, and include the following:

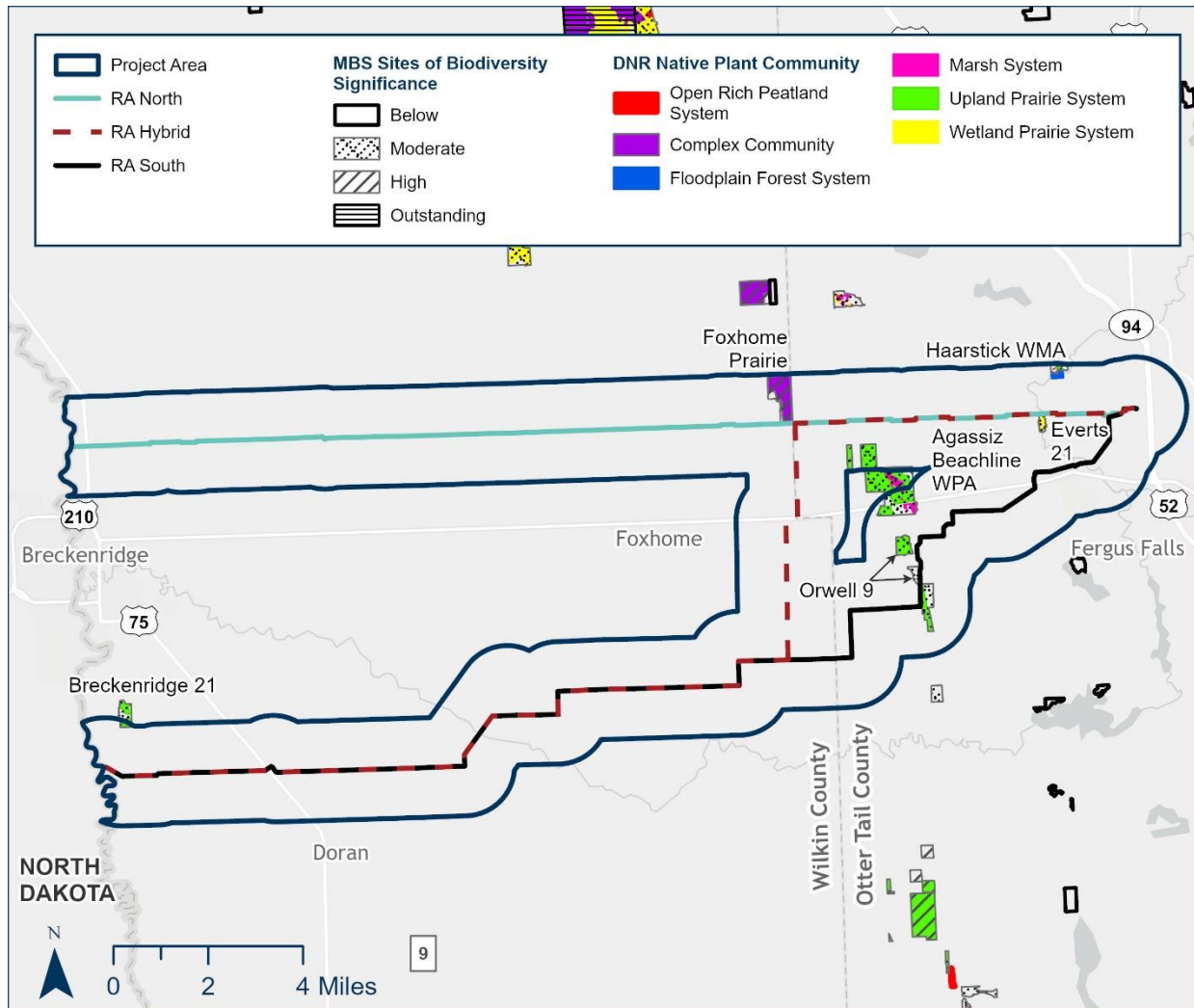
- RA-North: the Everts 21, Haarstrick WMA, and Agassiz Beachline WPA. These sites have a biodiversity rank of “Moderate.” About 2 acres of the Everts 21 site fall within the RA-North route width. Also within the RA-North ROI is the Foxhome Prairie site, which has a biodiversity rank of “High.” The Foxhome Prairie site abuts the north edge of the route width but does not overlap the construction workspace.

- RA-Hybrid: the Breckenridge 21, Everts 21, Haarstrick WMA, and Agassiz Beachline WPA. About 2 acres of the Everts 21 site are within the RA-Hybrid route width. Also within the RA-Hybrid ROI is the Foxhome Prairie site, which has a biodiversity rank of “High.” No other MBS sites intersect with the RA-Hybrid route width. The route width does not overlap the Foxhome Prairie site.
- RA-South: Breckenridge 21, Everts 21, Agassiz Beachline WPA, and Orwell 9. These sites have a biodiversity rank of “Moderate.” About 24 acres of the Orwell 9 site are within the RA-South route width.

According to the DNR Conservation Planning Report, the RA-North ROI intersects eight MBS Native Plant Communities. These sites are from the following classes: Cattail Marsh (Northern), Mesic Prairie (Northern), Wet Prairie (Northern), Prairie Wetland Complex, and Northern Floodplain Forest. One of these sites, Everts 21, is within the route width of RA-North but does not overlap with the construction workspace.

The RA-Hybrid ROI intersects nine MBS Native Plant Communities. These sites are from the following classes: Cattail Marsh (Northern), Mesic Prairie (Northern), Wet Prairie (Northern), Prairie Wetland Complex, and Northern Floodplain Forest. One of these sites, Everts 21, is within the route width of RA-Hybrid.

The RA-South ROI intersects five MBS Native Plant Communities. These sites are from the following classes: Cattail Marsh (Northern), Mesic Prairie (Northern), and Wet Prairie (Northern). Three of these sites, Agassiz Beachline WPA, Breckenridge 21, and Orwell 9, are within the route width of RA-South.

Figure 5-15 MBS Rare Plant Communities and Sites of Biodiversity Significance

5.7.5.2 Potential Impacts

Pipelines can impact rare and unique resources during construction and operation. Adverse impacts include the taking or displacement of individual plants or animals, invasive species introduction, habitat loss, and reduced community size.

Federally Listed Species

Project activities within the route alternatives would not have a significant direct impact on federally listed species. There would be no direct impact on the endangered northern long-eared bat or the proposed endangered tri-colored bat.

Effective March 31, 2023, the northern long-eared bat was listed as an endangered species.²⁰³ The IPaC range-wide northern long-eared bat determination key provided a preliminary determination that all three route alternatives “may affect, but are not likely to adversely affect” northern long-eared bat. According to the NHIS, there are no hibernacula or roost trees within the ROI of any routing alternative.

The federal listing of the tri-colored bat as an endangered species has not been finalized. Therefore, there are currently no USFWS protections in place for tri-colored bats. When the proposed ruling is finalized, restrictions would likely be similar to those for the northern long-eared bat.

Removal of current non-roost trees would be an alteration of local habitat availability. However, tree cover as a percentage of total vegetation cover removed would be less than 1 percent on all routes (see Section 5.7.7.2). Therefore, tree removal would have a negligible impact on potential habitat for bat species. Additional potential indirect impacts on either listed bat species include disturbance from construction noise, construction vehicle noise, and vibration. These impacts would be short term and minimal during pre-construction and construction of the project.

There would be no removal of western prairie fringed orchid and no anticipated take of federally threatened Dakota skipper.

Direct take and indirect impacts on the Monarch butterfly could result from removal of milkweed plants, the preferred forage and reproductive habitat for the species, during construction of the project. Direct take would result from removal of plants with Monarch eggs and early development stage larvae on the removed plants. Direct take would be short term and would have negligible impact on the local Monarch population size. Indirect impacts would result from decreased availability of milkweed. These impacts would be short term and minimal. Potential impacts would be localized, depending upon the existing distribution of milkweed species along the routes, and occur only in open, grassy areas and at the edges of forested, wetland, agricultural, and developed areas. No milkweed would be present within cultivated agricultural areas.

State-Listed Species

The project would potentially have localized impacts on state-listed species. These impacts would vary by habitat, time of year, and species type.

The potential for take of state-listed bird species is confined to native habitat types, especially short-grass prairie, wet-mesic prairie, wet meadows, and marsh areas. Direct take of state-listed bird species within the ROIs of any of the route alternatives could occur during both construction and operation of the project. Direct take of mature state-listed bird species is unlikely to occur, as this would involve an individual mature bird being struck by construction equipment or during tree clearing activities.

Direct take of active nests with eggs or young present is possible during the clearing and subsequent construction phases of the project. Marbled godwits will nest in short crop or roadside ditch cover if near larger wet prairie/wetland areas. As a result, there is a potential for take of this species and/or its nests. Lark sparrows tend to nest in trees but will also build ground nests. Conducting pre-construction nest surveys for these species and their nests, as described in the mitigation discussion below, would reduce the potential for taking marbled godwits, lark sparrows, or their nests. Take of nests of greater prairie chickens or Franklin's gulls in agricultural areas and woodlots is unlikely to occur because these species do not nest in the habitats known to occur within the ROIs of any of the route alternatives.

It is also possible that direct take of eggs or young could occur during operational maintenance. While the direct take of eggs and young would be significant and permanent to the individual birds, it would be a negligible, long-term impact on regional populations of the affected species. However, because these species are already rare, losing nests may have a greater local impact, especially if nest loss occurs

multiple times and over a longer duration, such as during construction and during operational maintenance.

Indirect impacts on state-listed birds include loss of habitat, which would be localized to specific habitat types, specifically short-grass prairie, wet-mesic prairie, wet meadows, and marsh areas. Disturbance in these areas would cause minimal and short-term impacts. Indirect habitat impacts in areas not restored to pre-construction vegetation cover (MLVs and the capture facility) would be long term and negligible due to the small footprint of the MLVs and the poor quality of habitat at the capture facility. Indirect impacts would be negligible in agricultural areas.

There is a potential for direct take of state-listed plants. The direct take of state-listed plants may occur within native habitat types, specifically wet prairie, mesic prairie, and wet meadows. There is additional potential for the direct take of state-listed species of special concern within several DNR-mapped locations within the ROI. Some of these locations are within a few hundred meters of the project area and are not within native habitat types (as defined by a location within a Native Plant Community or within an identified MBS site of biodiversity significance).

Direct take of known locations of state-listed plants within the ROIs of any of the route alternatives would be avoided through pre-construction coordination with DNR to identify potential sites for state-listed species. Coordination with DNR would be followed by targeted field surveys, if needed, for state-listed species in those areas identified by DNR. Direct take of state-listed plant species would not occur during construction of the project without coordination and permitting through DNR. Additional direct take is unlikely to occur during project operation in areas that are mowed, because areas with state-listed species potentially present would have been identified prior to construction. Direct take of state-listed plant species would be a minimal short-term impact on local populations of the affected plant species. The loss of individuals from local populations of state-listed plant species could also be a long-term, minimal impact on the population. This is because the growth and/or seed dispersal strategies of each of the four state-listed plant species potentially present in the area generally result in slow replacement of individuals lost to the local population. The potential for impacts on state-listed plant species would be similar for the three route alternatives.

There would be no physical removal, and therefore no direct take, of state-listed mussel species. This is because rivers and streams that provide suitable habitat for state-listed mussels would be crossed using HDD techniques, passing under the riverbed habitats of state-listed mussels species. Waterbodies that would be crossed by open trench have insufficient flow to support mussel populations. If an inadvertent release during HDD were to occur, there would be short-term impacts on state-listed mussel species at the point of release and further downstream until the released drilling mud was sufficiently dispersed. Released drilling mud becomes a suspended sediment that can interfere with the gills of mussels, inhibiting the mussels' ability to absorb oxygen and nutrients from the water.^{204, 205} If mussels are present, the impact of a drilling mud release would be short term and minimal to moderate, depending on the amount of drilling mud released.

Potential impacts on state-listed mussel species can also occur as a result of sediment runoff through cleared construction spaces. These could be avoided or reduced through installation and maintenance of redundant sediment control measures immediately after clearing and prior to initial ground disturbance at waterbodies located within 50 feet of the project and where stormwater flows to a waterbody.

5.7.5.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) does not contain mitigation measures specific to rare and unique resources; however, the following mitigation measures would reduce impacts on rare and unique species:

- “Care shall be used to preserve the natural landscape, minimize tree removal, and prevent any unnecessary destruction of the natural surroundings in the vicinity of all pipeline construction and restoration activities” (**Appendix H**, Section 7.11, Landscape Preservation).
- “The Permittee shall stabilize stream banks and other sensitive areas disturbed by pipeline construction in accordance with the requirements of applicable state or federal permits. [Implementation of this mitigation measure would reduce potential impacts to state-listed mussels within the ROIs of the route alternatives]” (**Appendix H**, Section 7.12, Sensitive Areas).
- “The Permittee shall employ best management practices to avoid the potential spread of invasive species on lands disturbed by project construction activities. [Implementation of this mitigation measure would reduce potential degradation of native plant communities that are critical to federal and state listed plant species, as well as habitats preferred by state-listed bird species present within the ROIs of the route alternatives]” (**Appendix H**, Section 7.16, Invasive Species).
- “The Permittee shall take all reasonable precautions against the spread of noxious weeds during all phases of construction. When utilizing seed to establish temporary and permanent vegetative cover on exposed soil the Permittee shall select site appropriate seed certified to be free of noxious weeds. To the extent possible, the Permittee shall use native seed mixes. The Permittee shall consult with landowners on the selection and use of seed for replanting” (**Appendix H**, Section 7.17, Noxious Weeds).
- “The Permittee shall restore the right-of-way, temporary workspaces, access roads, abandoned right-of-way, and other public or private lands affected by construction of the pipeline to the natural conditions that existed immediately before construction of the pipeline and as required by other federal and state agency permits. Restoration must be compatible with the safe operation, maintenance, and inspection of the pipeline. Within 60 days after completion of all restoration activities the Permittee shall advise the Commission in writing of the completion of such activities” (**Appendix H**, Section 7.24, Restoration).

Additionally, the sample routing permit also states “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant would mitigate potential impacts on rare and unique resources through the following measures:

- Pre-construction surveys would identify areas to mark or identify areas with rare and unique resources so that they are easily recognized by workers.
- Workers would abide by all signs posted by the environmental inspector that designate avoidance areas.

- The width of the construction workspace could be reduced when in the proximity of rare and unique resources. Where it is necessary to reduce the workspace, the boundaries of the feature and workspace would be identified and staked in the field.
- Wildlife-friendly erosion and sediment control BMPs that contain biodegradable netting with natural fibers would be used, and plastic mesh would not be used to minimize impacts on wildlife.
- As recommended by DNR, if the selected route alignment is near the Foxhome Prairie High Biodiversity MBS site, the applicant would evaluate resources along the route and coordinate with DNR to avoid impacts on this resource.
- As recommended by DNR, isolated dry-trench crossing methods would be used on all stream crossings instead of the proposed open-trench method. This method reduces silt and sediment suspension and transport to downstream waterbodies. This would reduce potential impacts from local and downstream transport of disturbed sediments on state-listed mussel species.
- Potential impacts on ground-nesting birds during construction would be lessened or avoided by conducting surveys for these species and their nests, at appropriate timing ahead of construction, consistent with guidance provided by USFWS and/or DNR.

Mitigation Proposed During Comment Periods

During the scoping process, actions for mitigating potential project impacts on rare and unique species were proposed, as detailed below.

CURE proposed the following mitigation actions for reducing potential impacts on federal and state-listed species:

- Prior to construction, field surveys should be conducted for state-listed species. Surveys for state-listed plants should follow DNR protocol described in the April 2022 “Guidance for Documenting and Collecting Rare Plants.”²⁰⁶
- The USFWS Recovery Plan for the Poweshiek skipperling²⁰⁷ should be consulted as part of revegetation efforts associated with the project. The species is considered to be extirpated from Minnesota, and field surveys did not locate any individuals. However, the project lies within Conservation Unit 2 in the USFWS Recovery Plan for the species. Measures within the plan for restoring native vegetation would improve the chances for return of the species to the area.
- Proper restoration of native vegetation communities would benefit rare and unique species. The proposed performance standard of 70 percent vegetation density relative to background native vegetation cover is too low and should be higher. In addition, revegetation goals should be met throughout the life of the project.

DNR made the following mitigation recommendations for reducing potential impacts on federal and state-listed species:

- Unintentional release evaluations should be conducted for water crossings proposed to be installed via HDD to ensure the soils are amenable to HDD. This would further reduce potential impacts from local and downstream transport of disturbed sediments on state-listed mussel species. (As described in Section 5.7.3.4, the applicant would develop a contingency plan to address the unintended release of drilling mud to the environment during the execution of each HDD.)

- A Vegetation Management Plan (VMP) should be prepared in consultation with the Vegetation Management Plan Working Group (VMPWG), a multi-agency group led by EERA staff in conjunction with several other state agencies, to address potential impacts related to pipeline construction, operation, and maintenance. The VMP should discuss existing vegetation, reestablishment and restoration, seed mixes, noxious weeds and invasive species, herbicide use, sensitive plant communities, and other topics identified during coordination with the VMPWG. Preparation and Implementation of such a plan would improve recovery efforts for state-listed plants and their habitats potentially affected by the project.
- Areas of grass/shrub vegetation to be cleared for construction should be cleared during non-nesting season prior to construction so suitable nesting habitat is not present prior to final clearing and construction.

To reduce potential construction impacts on state-listed species, MnDOT recommended the use of erosion control techniques that avoid entrapping or entangling small wildlife.

Mitigation Recommended by EERA Staff

None recommended.

5.7.6 Soils

The ROI for soils is the construction workspace. Soils in the project area consist mainly of well to poorly drained loams and clays. The route alternatives generally share similar soil characteristics. During construction, vegetation clearing, topsoil removal, and trenching would expose soils and increase the potential for erosion, compaction, and mixing of topsoil with subsoil. The applicant would minimize these impacts by complying with required permits and implementing the applicant's Minnesota ECP and Minnesota APP. With these measures, most impacts on soils during construction would be minimal and temporary, but some impacts could be longer term. Impacts on soils during operation would be negligible. The applicant would develop a Phase I Geohazard Assessment for the project that is designed to comply with the recommendations in PHMSA Advisory Bulletin 2022-01. The bulletin advises operators to identify areas surrounding a pipeline that may be prone to large earth movement, including but not limited to slope instability, subsidence, frost heave, soil settlement, erosion, earthquakes, and other dynamic geologic conditions that may pose a safety risk. Impacts would be similar across all three route alternatives.

5.7.6.1 Existing Conditions

Soils in the eastern portion of the project area generally consist of well drained to very poorly drained coarse-loamy till to clayey till. Soils in the western portion of the project area generally consist of somewhat poorly drained to very poorly drained loams and clays.²⁰⁸ Antler clay loam is the predominant soil type along each of the route alternatives, ranging from 21 to 27 percent of the routes. This soil is a somewhat poorly drained clay loam classified as prime farmland with 0 to 2 percent slope. The second most common soil type along RA-North is Doran clay loam, consisting of somewhat poorly drained clay loam or clay and classified as prime farmland with 0 to 2 percent slope. The second most common soil type along RA-Hybrid and RA-South is the Antler-Mustinka complex consisting of clay loam with 0 to 2 percent slope and classified as prime farmland if drained.²⁰⁹

Soil characteristics that are more susceptible to impacts from disturbance include prime farmland, hydric soils, compaction-prone soils, highly erodible soils (by water or wind), soils with poor revegetation potential, and stony-rocky soils. Prime farmland is addressed in Section 5.5.1. Sensitive soils characteristics are described as follows:

- Hydric soils are typically indicative of areas with a high mean water table and are one of three indicators (along with wetland hydrology and vegetation) for determining the presence of wetlands.
- Compaction-prone soils include clay loam or finer textures with somewhat poor, poor, and very poor drainage classes. These soils are susceptible to compaction, which can occur from heavy loads or traffic during construction.
- Highly erodible soils are prone to high rates of erosion when exposed to water or wind or after removal of vegetation. A soil's susceptibility to erosion is dependent on texture, moisture, slope, and soil management practices.
- The revegetation potential of soils is based on several characteristics, including topsoil thickness, soil texture, available water capacity, susceptibility to flooding, and slope. Some soils have characteristics that cause a high seed mortality, which requires additional management and may be difficult to revegetate. The clearing and grading of soils with poor revegetation potential can result in a lack of adequate vegetation following construction and restoration.

Frost depths vary from year to year and place to place depending on factors such as temperature, presence of snow cover, and soil conditions. **Table 5-43** shows frost depth measurements for five locations within the National Weather Service North Central River Forecast Center service area from 2004 through 2023. The National Weather Service notes that the frost depth data are pooled from a number of networks with varying collection methods and have not been quality controlled. Most locations do not have continuous data for the 20-year period.

Table 5-43 Regional Frost Depth Data

Frost Depth Location	Distance and Direction from Fergus Falls	Available Data ^a	Range of Maximum Frost Depth ^b
Crookston, MN	100 miles north	8 years	11–39 inches
Fergus Falls, MN	N/A	2 years	24–32 inches
Grand Forks, ND	120 miles north-northwest	16 years	23–49 inches
Gull Lake Dam, MN	80 miles east	9 years	5–45 inches
Orwell Dam, MN	7 miles southwest	5 years	13–30 inches

^a Number of years with data between 2004 and 2023. Years with no data or depths of 0 were not included.

^b Each value reflects the greatest frost depth for a 12-month period between October 1st of one year and the next. For example, for Crookston, the maximum frost depth was 11 inches for 2018 (the hydrologic year from October 1, 2017, to September 30, 2018) and 39 inches for 2013.

Minnesota Administrative Rules 1303.1600 Subpart 1 specifies footing depths for frost protection. The minimum allowable footing depth in feet due to freezing is 5 feet in Zone I, which includes Otter Tail and Wilkin Counties. Shallower depths may be permitted when supporting evidence is presented by an engineer competent in soil mechanics.

5.7.6.2 Potential Impacts

Soil characteristics within the construction workspace along RA-North, RA-Hybrid, and RA-South were analyzed from USDA Natural Resources Conservation Service soils data, including both SSURGO and STATSGO2²¹⁰ data.

As shown in **Table 5-44**, soil characteristics are similar but vary among the route alternatives. For example, RA-Hybrid has the least acres of hydric soils but the most acres of compaction prone soils. RA-South contains the most acres of soil within the construction workspace that are susceptible to wind and water erosion as well as revegetation concerns, followed by RA-Hybrid and RA-North, respectively.

Table 5-44 Sensitive Soil Characteristics within Each Route Alternative ROI

Route Name	Total Footprint Acreage	Hydric Soils (acres) ^a	Compaction Prone (acres) ^b	Highly Water Erodible (acres) ^c	Highly Wind Erodible (acres) ^d	Revegetation Concerns (acres) ^e
RA-North						
Construction Workspace	289.8	47.6 (16%)	206.1 (71%)	0.6 (<1%)	4.9 (2%)	42.0 (14%)
RA-Hybrid						
Construction Workspace	361.9	41.6 (11%)	285.1 (79%)	0.6 (<1%)	5.4 (1%)	46.7 (13%)
RA-South						
Construction Workspace	348.8	50.9 (15%)	255.2 (73%)	7.4 (2%)	5.7 (2%)	64.5 (18%)

^a Includes soils that are classified as hydric by SSURGO.

^b Includes soils in somewhat poor to very poor drainage classes with surface textures of clay loam and finer.

^c Includes soils with a slope >15% or soils with a K value of >0.35 and slopes >5%.

^d Includes soils in wind erodibility group designation of 1 or 2.

^e Includes soils with a non-irrigated land capability classification of 3 or greater.

Construction activities that could impact soils include the following:

- vegetation clearing
- trenching
- backfilling
- grading
- transportation of vehicles and equipment along temporary access roads

During pipeline construction, vegetation would be cleared, and topsoil would be separated from subsoil and stockpiled. Subsoils would be removed during trenching. Topsoil and subsoil would be separated and stored separately within the construction workspace. The subsoil would be replaced first, and the topsoil would be spread uniformly over the area from which it was removed. Soils within the construction workspace would be vulnerable to erosion until vegetation has been restored.

Topsoil could be lost to improper handling or erosion along the pipeline. If soil is mixed during backfilling, some biological and chemical properties of the soil could be altered. This could affect reestablishment of plant communities, resulting in long-term impacts.

Excavation in rocky soils can bring excess rocks to the surface, particularly in areas of shallow bedrock. Shallow bedrock is not present in the project area. Soil compaction and rutting would occur from movement of construction vehicles within the construction workspace. To minimize soil compaction and

rutting, the applicant would suspend certain construction activities on susceptible soils during wet conditions if the topsoil has not been stripped or use low ground weight equipment.

As described in Section 2.4.8, the applicant would dispose of drill cuttings and drilling mud from HDDs by spreading the material over the construction workspace in an approved upland location. Drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet ANSI/NSF Standard 60 would be disposed of as a solid waste at an approved facility, unless the applicant obtained a land application permit from MPCA. If spread in the construction workspace, the material would be incorporated into the soil such that no material would migrate off the workspace and soils would remain suitable for restoration and revegetation. If these conditions could not be met, the applicant would contain the materials and dispose of them at a solid waste management facility that accepts drill cuttings and drilling mud. Spreading drill cuttings from deep subsoils and drilling mud can alter the soil chemistry and biological function of underlying topsoil. Impacts on soils from drill cuttings and drilling mud disposal would be negligible to minimal, depending on the quantities.

Soil temperature may vary from heat convection and conduction of the operating pipeline. As described in Section 2.6.1, the CO₂ would enter the pipeline at a temperature between 90°F and 115°F and would then cool down to the ambient ground temperature. According to the applicant's analysis, most of the cooldown (about 90 percent) would occur within about 12 miles and the CO₂ would reach ambient temperatures at about 27 miles from the capture facility (see the response to Supplemental Information Inquiry #10 in **Appendix I**). Heat from the pipeline would warm the soil surrounding the pipeline out to a distance of about 13 inches from the pipe.

Soils characterized as frost susceptible (silt-sized particles) can contribute to frost heave, which occurs when water-saturated soils are uplifted due to expansion upon freezing.²¹¹ Frost heave is the result of the formation of ice lenses by segregation of water from the soil as the ground freezes. Ice lenses are lens-shaped masses of almost pure ice that form in frozen soil or rock. Lens formation takes place at, or a short distance behind, the freezing point at any depth where conditions are favorable and continues until those conditions change. The amount of vertical movement (heave) is roughly equal to the combined thicknesses of the underlying ice lenses. This results in greater displacement at the surface when compared to areas of greater depth. Frost heave has the potential to cause movement or deformation of pipelines. However, for frost heave to occur, soil freezing and ice lensing must occur below the pipeline, pressing upward on it from below. The applicant conducted a study on frost heave (see the response to Supplemental Information Inquiry #5 in **Appendix I**). Because the pipeline would be buried with at least 54 inches of cover, any ice lens would be expected to form above the pipeline rather than below it, thus preventing frost heave from occurring. The minimum depth of the pipeline would be below the maximum depth where soil freezes in this region, except under potentially extreme conditions (see Section 5.7.6.1).

Expansive soils, also called shrink-swell soils, are clay soils that exhibit high volume changes when environmental conditions change from dry to wet. Expansion and shrinking of soils due to moisture fluctuations can cause damage to structures. The shrink-swell potential of soils can change with depth within a given soil and is based on features such as soil type and texture, moisture content, and the amount of clay present in the soil horizon. At the depth to which the pipeline would be installed, about half the soils along each of the route alternatives have low shrink-swell potential, and about half of the soils have moderate shrink-swell potential (see the response to Supplemental Information Inquiry #9 in **Appendix I**). Expansion and retraction of soils typically occurs slowly over large areas, and linear steel pipelines generally are able to adjust to these conditions without sustaining damage. If the expansive

soils are not uniform over a large area and abut non-expansive soils, the abrupt change in how the soils react to moisture fluctuations can create a "hinge point" and add stress to the pipeline.

Some soil types in parts of the Red River Valley can be corrosive. As described in Section 2.3.2, to protect against corrosion, the applicant would apply an external fusion-bonded epoxy coating to the pipeline and install a cathodic protection system and electrical mitigation along the pipeline.

Accidental releases of fuels, lubricants, and coolants from construction equipment could also impact soils. The applicant has developed and would follow spill prevention, containment, and response measures, which include proper handling and storage of fuels and hazardous liquids, refueling procedures, equipment inspection and maintenance, and spill containment and remediation measures.

Construction practices that would minimize impacts on soils, such as erosion and mixing of topsoil and subsoil, are described in detail in the applicant's Minnesota ECP (**Appendix D**) and Minnesota APP (**Appendix E**). Based on the applicant's proposed schedule, the project would not be constructed during winter conditions. If winter construction were to occur, the applicant would implement a winter construction plan, as described further in Section 2.4.9. The plan includes measures for handling frozen soils during construction.

Negligible impacts on soils are anticipated from operation of the project. The ROI would be allowed to revert to prior use in most instances, and no soil disturbance would occur over the pipeline, except for periodic maintenance activities, which would be limited in scope and short in duration.

5.7.6.3 Mitigation

Commission Sample Routing Permit

To address potential impacts on soils, the sample routing permit (**Appendix H**) states:

- "The Permittee shall implement those erosion prevention and sediment control practices recommended by the Minnesota Pollution Control Agency (MPCA) Construction Stormwater Program. If construction of the facility disturbs more than one acre of land, or is sited in an area designated by the MPCA as having potential for impacts to water resources, the Permittee shall obtain a National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Construction Stormwater Permit from the MPCA that provides for the development of a Stormwater Pollution Prevention Plan (SWPPP) that describes methods to control erosion and runoff" (**Appendix H**, Section 7.8, Site Sediment and Erosion Control).
- "The Permittee shall implement reasonable measures to minimize erosion and sedimentation during construction and shall employ perimeter sediment controls, protect exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, stabilizing slopes, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking. Contours shall be graded as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation and prevent erosion. All areas disturbed during construction of the facilities shall be returned to pre-construction conditions" (**Appendix H**, Section 7.8, Site Sediment and Erosion Control).
- "The Permittee shall take precautions to minimize mixing of topsoil and subsoil during excavation of the trench for the pipe unless otherwise negotiated with the affected landowner" (**Appendix H**, Section 7.9, Topsoil Protection).

- “Compaction of agricultural lands by the Permittee must be kept to a minimum and mitigated in accordance with its agricultural protection plan [if applicable]” (**Appendix H**, Section 7.10, Soil Compaction).
- “Areas disturbed by construction activities shall be restored to pre-construction conditions” (**Appendix H**, Section 7.13, Wetlands and Water Resources).

Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant would need to obtain a NPDES General Construction Stormwater Coverage Permit prior to construction. Per the NPDES permit, the applicant would be required to use approved protection measures to manage soil erosion and minimize soil compaction. In addition to measures required by the NPDES permit and other permits and regulations, the applicant would implement the following:

- Stabilize all areas of exposed soils when construction activities are complete or have temporarily ceased and would not resume within 14 days, and reseed non-agricultural areas with native seed mixes approved by the Board of Water and Soil Resources (BWSR).
- Remove excess rocks from the construction workspace so that where rocks over 3 inches in diameter are present, their size and frequency are similar to adjacent soil not disturbed by construction.
- Develop a Phase I Geohazard Assessment for the project that is designed to comply with the recommendations in PHMSA Advisory Bulletin 2022-01, which advise operators to identify areas surrounding a pipeline that may be prone to large earth movement, including but not limited to slope instability, subsidence, frost heave, soil settlement, erosion, earthquakes, and other dynamic geologic conditions that may pose a safety risk. This assessment would identify and assess naturally occurring or human-triggered geologic conditions, ongoing geologic processes, or potential natural events that could adversely affect construction and/or operation of a pipeline along the project route. If the Phase I Geohazard Assessment identifies specific hazards, development of a Phase II Assessment (e.g., field reconnaissance), and possibly Phase III Assessment (site-specific investigations), would occur as recommended by a geohazard consultant. The assessments would identify best management practices during pipeline construction and operation to avoid, mitigate, and/or monitor possible geohazards.
- Run an IMU smart tool as part of the baseline assessment after construction. During operations, the applicant would have the ability to run additional IMU smart tools to track movement, strain, and stress within the pipeline.

Mitigation Proposed During Comment Periods

One commenter suggested that the applicant should have detailed plans for saving and segregating topsoil and subsoil during construction. These details are provided in the applicant’s Minnesota ECP and Minnesota APP contained in **Appendices D** and **E**, respectively.

Mitigation Recommended by EERA Staff

EERA staff believes that the results of the Phase I Geohazard Assessment and any subsequent Phase II and Phase III assessments should be provided to the Commission as a pre-construction filing.

5.7.7 Vegetation

The ROI for vegetation is the construction workspace. Vegetation in the ROI is dominated by cultivated crops. Vegetation associated with developed areas is also prevalent along all three route alternatives. Impacts on agricultural vegetation during construction and operation are lowest for RA -North, due to its length. Agricultural impacts along RA-South and RA-Hybrid are approximately equal. Otherwise, the relative percent of cover and distribution of non-agricultural vegetation types is similar among all three route alternatives. Impacts on vegetation would result almost entirely from removal and crushing during construction. Indirect impacts include possible introduction of invasive species. Removal of woody vegetation in forested areas would be long term due to longer regeneration time for woody cover. Forested areas comprise less than 1 acre total for each of the route alternatives. Overall, construction impacts on vegetation are expected to be short term and minimal for all route alternatives, and operational impacts on vegetation due to routine maintenance would be long term and minimal.

5.7.7.1 Existing Conditions

Vegetation types were analyzed using existing land cover databases,²¹² available aerial imagery, and information from DNR. Other guidance included:

- The Marschner Map, a detailed account of native vegetation compiled by Francis Marschner in 1895, based on the Public Land Surveys conducted in the late 1800s and early 1900s. The Marschner information provides important details on vegetation prior to European settlement of the area.
- The Minnesota Noxious Weed Law, administered by MDA. The law defines noxious weeds as annual, biennial, or perennial plants designated to be injurious to the environment, public health, public roads, crops, livestock, or other property. The purpose of the law is to protect residents of Minnesota from the injurious effects of these weeds. MDA lists four categories of noxious weeds with differing levels of eradication, control, reporting, transport, sales, and propagation requirements.²¹³ According to the State Prohibited Noxious Weed List, there are 16 weeds on the Eradicate list, 16 on the Control list, and 19 on the Restricted list. None of the weeds on these lists are to be transported, propagated, or sold in the state.²¹⁴

Prior to European contact, tallgrass prairie and wet prairie were the dominant vegetation in the ROI for each of the three route alternatives. Tallgrass prairies included several grasses such as bluestems, Indian grass, dropseed, and switchgrass. Wet prairies were dominated by cordgrass, cattails, rushes, and sedges. Narrow forested floodplains were common along larger streams and rivers. Fire, drought, flooding, and bison grazing historically shaped the vegetative communities; however, many of those factors have since been suppressed or eliminated from European settlement activity.²¹⁵

The current landscape is rural open space, including existing transportation corridors and agricultural use dominated by row crops and pastureland. Scattered prairie remnants are present. Forested areas, where present, are typically dominated by species other than oaks. Commercial and residential development is relatively higher on the far western and eastern ends of the project where it nears Breckenridge and Fergus Falls, respectively.

Overall, there is minor variation in land cover types among the three route alternatives. For all three route alternatives, as shown in **Figure 5-2**, the ROIs are predominantly agricultural, with smaller areas of development, forest, open land (bare rocky ground and grass), open water, and wetlands distributed along each of the route alternatives. See Section 5.4.4.2, and specifically **Table 5-4**, for definitions and a

detailed list of land cover type and subtype acreages. The percent distribution of general land cover types within the construction workspace by route alternative is shown in **Table 5-45**.

Table 5-45 Cover Types for Each Route Alternative

Land Cover Type	RA-North	RA-Hybrid	RA-South
Agricultural (cultivated and pasture/hay)	67%	82%	88%
Developed	32%	17%	11%
Upland forest (deciduous and coniferous)	<1%	<1%	<1%
Open areas	<1%	<1%	0%
Open water	<1%	0%	0%
Wetlands (emergent herbaceous and forested)	<1%	1%	1%

Vegetation communities in the local vicinity adjacent to the route alternatives have a similar composition and distribution of agricultural, developed, open land, forest land, open water, and wetland. Developed land cover areas range from impervious surfaces (roads, buildings, parking lots) to residential areas with minimal, artificially maintained vegetated surfaces. The current distribution and relative prevalence of vegetative cover types differs greatly from the pre-European contact vegetation cover types, which were dominated by prairie (open areas), with scattered small stands of upland forest and emergent wetlands. The project is outside the known area of oak wilt in Minnesota.²¹⁶

Sensitive plant communities are addressed in Section 5.7.5.

5.7.7.2 Potential Impacts

Potential impacts on native vegetation include disturbance and/or removal of plants (clearing), crushing under construction equipment, and alteration of soils in a way that deters regrowth of the pre-construction vegetation. Introduction of non-native species could also occur.

Due to the relatively uniform, high-percent cover of agricultural land, most of the direct impact on vegetation would be from clearing grain and seed crops during site preparation and construction. This would be a short-term (seasonal), moderate direct impact during construction. During operation of the project, direct impacts on agricultural vegetation would be long term and minimal. Section 5.5.1 discusses impacts on agriculture.

Table 5-46 shows the acreage of impacts on vegetation within the construction workspace and during operation of the pipeline.

Table 5-46 Acres of Impact on Vegetation by Route Alternative

Vegetation Type	Acres of Impact within Construction Workspace					
	RA-North		RA-Hybrid		RA-South	
	Construction	Operation	Construction	Operation	Construction	Operation
Agricultural (cultivated and pasture/hay)	194.6	82.7	297.5	137.9	305.8	144.4
Developed	93.6	56.1	62.6	37.3	38.7	22.7
Upland forest (deciduous and coniferous)	0.3	<0.1	0.1	0	0.1	0.1
Open areas (bare ground, rock, grassy areas)	0.1	0	0.1	0	0	0
Open Water	0.2	0.2	0	0	0	0
Wetlands (emergent herbaceous and forested)	1.3	0.8	2.1	1.6	4.7	3.3
Total	290.1	139.8	362.4	176.8	349.3	170.5

The potential impact on sensitive plant communities from construction of the project would be limited to the small area where the workspace overlaps a corner of the northern section of the Orwell 9 MBS Site.

Impacts on agricultural vegetation would be similar for the RA-South and RA-Hybrid alternates. RA-North would have fewer impacts on agricultural vegetation than the other two route alternatives. Impacts on vegetation in developed areas would be relatively higher in RA-North than in RA-South or RA-Hybrid.

Direct impacts from removal of existing vegetation would also occur in forested areas, non-agricultural open land, and wetlands. However, the maximum potential impact on forested cover communities for any of the route alternatives is 0.1 acre. Impacts on these vegetation types would be minimal, both in total and relative acreage for all three route alternatives. Construction and operational impacts on wetland vegetation would be highest for RA-South; however, these impacts are still very low in terms of acreage and total vegetation impacts.

All vegetated areas not cleared within the construction workspace would potentially be exposed to localized, short-term crushing or matting of plants under construction equipment. Although cleared areas would be restored, the impacts of soil disturbance (addressed in Section 5.7.6.2) could have a long-term effect on reestablishment of plant communities. The applicant's Minnesota APP (**Appendix E**) and its Minnesota ECP (**Appendix D**) detail specific measures to avoid and minimize impacts on vegetation.

Localized, short-term impacts on wetland vegetation would be caused by installation of wetland matting if construction occurs outside of frozen ground conditions. This would be a short-term, negligible impact, as root structures would remain. Wetland impacts are described further in Section 5.7.9.2.

Clearing vegetation followed by soil disturbance is also an opportunity for the introduction of invasive species. These species may spread and alter the composition of native and other non-agricultural vegetation communities. To reduce the potential for introduction of non-native species on exposed soils, all areas of exposed soils would be stabilized when construction activities are complete or have temporarily ceased and would not resume within 14 days. Non-agricultural areas would be reseeded with BWSR-approved, weed-free native seed. Non-native species can also be introduced through topsoil contaminated with weed seeds and by vehicles importing weed seeds from a contaminated site to an uncontaminated site. Introductions of non-native invasive species would primarily be localized and linear. Invasive species could cause potentially long-term moderate impacts. However, if invasive species were to establish and continue to spread, the impact could expand beyond the linear footprint of the pipeline. Consultation with local weed management boards and landowners would determine locations of state-identified noxious or invasive species. Where required by weed control boards, infested topsoil can be stored separately from other topsoil and subsoil.

In areas adjacent to HDDs, the disposal by spreading of drill cuttings from deep subsoils can alter the soil chemistry and biological function of underlying topsoils. Similarly, the spread of drilling mud can also alter topsoil chemistry and function (see Section 5.7.6.1 for further discussion of this topic). This would be a localized, short- to intermediate-term impact on vegetation around the areas of HDD sites, with a negligible to minimal level of impact, depending on the amount and extent of HDD cuttings spread at the drill site.

In the event of an inadvertent release of HDD drilling mud into a vegetated area, the intensity and duration of the impact would vary depending on the amount of drilling mud released and the area in which it is released. It would also vary depending on how quickly and completely the release is contained and cleaned up. A large spread of drill cuttings and/or mud that is not cleaned up in a timely manner could result in a long-term, moderate impact on vegetation re-establishment.

Forested and native plant communities take much more time to develop and mature than agricultural and non-native plant communities. As a result, clearing and other disturbances within native forested and herbaceous plant communities bring a higher risk of conversion to a different vegetation community type altogether. It may be more difficult for the species that comprise these communities to re-establish. Failure of pre-construction vegetation communities to re-establish might alter existing local ecological functions. This would be a localized impact with varying duration and intensity, depending on the extent of the altered area and the degree of alteration.

Spills of gasoline, oils, and other fluids would also have a direct, localized, permanent impact on individual plants and could have a short-term, negligible impact on adjacent individual plants and plant communities. The potential duration and context of this type of vegetation impact would be reduced through implementation of spill prevention, containment, and response measures related to handling and storage of fuels and hazardous liquids.

Potential impacts resulting from operation of the pipeline would be similar across the three route alternatives. After construction, the applicant would generally maintain the 50-foot-wide operational ROW over the pipeline by mowing and removing woody vegetation taller than 15 feet in non-cultivated areas. Exceptions include the area between HDD entry and exit points where the vegetation would not

be maintained and at riparian buffers adjacent to waterbodies where only a 10-foot-wide corridor would be maintained. This routine maintenance for the continued safety and operation of the pipeline would result in long-term, minimal impacts on vegetation.

5.7.7.3 Mitigation

Commission Sample Routing Permit

To mitigate potential impacts on vegetation, the sample routing permit (**Appendix H**) states:

- “The Permittee shall implement those erosion prevention and sediment control practices recommended by the Minnesota Pollution Control Agency (MPCA) Construction Stormwater Program. If construction of the facility disturbs more than one acre of land, or is sited in an area designated by the MPCA as having potential for impacts to water resources, the Permittee shall obtain a National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Construction Stormwater Permit from the MPCA that provides for the development of a Stormwater Pollution Prevention Plan (SWPPP) that describes methods to control erosion and runoff” (**Appendix H**, Section 7.8, Site Sediment and Erosion Control).
- “The Permittee shall implement reasonable measures to minimize erosion and sedimentation during construction and shall employ perimeter sediment controls, protect exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, stabilizing slopes, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking. Contours shall be graded as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation and prevent erosion. All areas disturbed during construction of the facilities shall be returned to pre-construction conditions” (**Appendix H**, Section 7.8, Site Sedimentation and Erosion Control).
- “The Permittee shall take precautions to minimize mixing of topsoil and subsoil during excavation of the trench for the pipe unless otherwise negotiated with the landowner” (**Appendix H**, Section 7.9, Topsoil Protection).
- “Care shall be used to preserve the natural landscape, minimize tree removal and prevent any unnecessary destruction of the natural surroundings of the vicinity of all pipeline and restoration activities” (**Appendix H**, Section 7.11, Landscape Preservation).
- “The Permittee shall clear the permanent right-of-way and temporary right-of-way preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation in areas such as trail and stream crossings where vegetative screening may minimize aesthetic impacts, to the extent that such actions do not impact the safe operation, maintenance, and inspection of the pipeline and are in compliance with all applicable laws and regulations” (**Appendix H**, Section 7.14, Vegetation Management).
- “Tree stumps will be removed at the landowner’s request or when necessitated due to trench location. The Permittee will dispose of all debris created by clearing at a licensed disposal facility” (**Appendix H**, Section 7.14, Vegetation Management).
- “The Permittee shall restrict pesticide use to those pesticides and methods of application approved by the Minnesota Department of Agriculture, DNR, and the U.S. Environmental Protection Agency. Selective foliage or basal application shall be used when practicable. All pesticides shall be applied in a safe and cautious manner so as not to damage adjacent properties including crops, orchards, tree farms, apiaries, or gardens. The Permittee shall contact the landowner or designee to obtain approval for the use of pesticide at least 14 days prior to any application on their property. The landowner may request that there be no

application of pesticides on any part of the site within the landowner's property. The Permittee shall provide notice of pesticide application to affected landowners and known beekeepers operating apiaries within three miles of the project site at least 14 days prior to such application" (**Appendix H**, Section 7.15, Application of Pesticides).

- "The Permittee shall employ best management practices to avoid the potential spread of invasive species on lands disturbed by project construction activities" (**Appendix H**, Section 7.16, Invasive Species).
- "The Permittee shall take all reasonable precautions against the spread of noxious weeds during all phases of construction. When utilizing seed to establish temporary and permanent vegetative cover on exposed soil the Permittee shall select site appropriate seed certified to be free of noxious weeds. To the extent possible, the Permittee shall use native seed mixes. The Permittee shall consult with landowners on the selection and use of seed for replanting" (**Appendix H**, Section 7.17, Noxious Weeds).

Additionally, the sample routing permit states that "the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations" (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant would mitigate potential impacts on vegetation through the following measure:

- Prior to and during construction the applicant would work with local weed management boards and landowners to determine locations of state-identified noxious or invasive species. Where required by weed control boards, infested topsoil can be stored separately from other topsoil and subsoil. The applicant may use herbicides to address invasive species during construction of operation of the project in accordance with applicable regulations.

Mitigation Proposed During Comment Periods

During scoping, CURE stated that the proposed vegetation restoration performance standard for percent vegetation density relative to background native vegetation cover is too low and should be higher, and revegetation goals should be met throughout the life of the project.

DNR recommended a VMP be prepared in consultation with the VMPWG. The VMP should discuss existing vegetation, reestablishment and restoration, seed mixes, noxious weeds and invasive species, herbicide use, sensitive plant communities, and other topics identified during coordination with the VMPWG.

Mitigation Recommended by EERA Staff

None recommended.

5.7.8 Water Resources

The ROI for surface waters and groundwater is the project area (area within 1 mile of the route width). The ROI for floodplains is the route width. None of the three route alternatives would cross lakes, or waters with federal or state designations related to high resource value. The route alternatives would cross a similar number of drainage ditches. RA-North would cross fewer rivers and streams than RA-Hybrid and RA-South. Perennial streams would be crossed using trenchless construction methods, and other waterbodies with flow at the time of construction would be crossed

using an isolated dry-trench construction method. Potential impacts on surface waters during construction would be short term and minimal for all route alternatives. Floodplain impacts would be short term and negligible during construction for all route alternatives.

While there are wells within the groundwater ROI for all three route alternatives, the majority are outside of the construction workspaces of RA-North and RA-South, and no wells are within the construction workspace of RA-Hybrid. The applicant is coordinating with DNR on a groundwater investigation in the beach ridge system area to define existing conditions and inform construction practices. EERA staff recommends the applicant develop a plan for construction in this area with measures to minimize the potential for an aquifer breach. Construction activities would have temporary, minimal, and localized impacts on groundwater.

If the existing well at the ethanol plant is used as the source of water for operating the capture facility, the water use would result in about a 7 percent increase in water withdrawal from the well. Water supply appropriations would be regulated by DNR-issued permits that would have conditions to minimize impacts on groundwater resources. The applicant would provide a contingency plan that identifies potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of water withdrawals following DNR request, when necessary. Therefore, no long-term impacts on water resources are expected during project operation.

5.7.8.1 Existing Conditions

Surface Waters

Surface water data was analyzed from the DNR Hydrography Dataset,²¹⁷ which represents surficial hydrology in Minnesota, and the Public Waters Inventory. Surface waters in the vicinity of the project consist primarily of drainage ditches, rivers, and streams.

Surface waters within the ROI (area within 1 mile of the route width) for each route alternative are shown in the detailed route maps in **Appendix B** and are summarized in **Table 5-47**.

Table 5-47 Number of Surface Waters within the ROI

Waterbody Type	RA-North	RA-Hybrid	RA-South
Drainage Ditch	80	90	76
Lake	1	2	2
Stream (Intermittent)	33	68	61
Stream (Perennial)	14	23	22
Total surface waters within the ROI^a	128	183	161
Public Waters Inventory Listed	4	5	4
MPCA Impaired Water	3	5	5
Crossed by Route	17	26	25

^a Not all waterbodies within the ROI would be crossed by the route alternative.

The project does not cross the following federal or state special designated waters along any of the route alternatives:

- Outstanding Resource Value Waters (MPCA)
- Nationwide Rivers Inventory waters (National Park Service)
- Trout streams or lakes (DNR)
- Wildlife lakes (DNR)
- Migratory waterfowl feeding/resting lakes (DNR)
- Wild rice lakes or rivers (DNR)
- Wild and scenic rivers (federal and state)

Minnesota water quality standards are written to protect lakes, rivers, streams, and wetlands by defining how much of a pollutant (for example, mercury, bacteria, turbidity, nutrients) can be in the water before it is no longer drinkable, swimmable, fishable, or useable in other, designated ways. A lake, river, or stream can be designated as an “impaired water” if it fails to meet one or more water quality standard.²¹⁸ Methods used to evaluate impairment include benthic macroinvertebrate bioassessments. These use small aquatic animals and the aquatic larval stages of insects as indicators of the biological condition of waterbodies.²¹⁹ Measurements of turbidity are also used to evaluate impairment. Turbidity is defined as a concentration of suspended particles, which include soil particles, algae, and microscopic organisms that decrease the clarity of a waterbody. Factors that increase turbidity include stream bank erosion, sediment laden water runoff, and disturbance of bottom sediments.²²⁰

Seven waterbodies within the project area for the three route alternatives are listed under the MPCA 2022 Impaired Waters list:

- Pelican River
- Judicial Ditch 2
- Ottertail River
- Unnamed Creek (H-026-082)
- Bois de Sioux River
- A drainage ditch
- Red River

None of the proposed temporary or permanent access roads would cross any waterbodies. The MLV/cathodic protection system sites, launcher, and the capture facility would not impact any waterbodies.

Surface waters crossed by the pipeline and proposed crossing methods are summarized in **Table 5-48**, **Table 5-49**, and **Table 5-50**. Detailed descriptions of crossing methods are addressed in Sections 2.4.5 and 2.4.8. The applicant would consult with DNR when designing and selecting public waterbody crossing techniques as part of the License to Cross Public Waters application.

RA-North

As shown in **Table 5-48**, the centerline of RA-North would cross 17 surface waters consisting of intermittent streams, drainage ditches, the Pelican River, and the Red River. Some streams would be crossed more than once by the centerline of RA-North. The Pelican River is impaired due to potential

E. coli/fecal matter contamination, which affects the aquatic life and recreational use of the waterbody. The Red River is impaired due to the presence of arsenic, E. coli, mercury in fish tissue, and turbidity. RA-North passes about 2,300 feet north of the City of Breckenridge Drinking Water Supply Management Area and about 38 miles south of the Moorhead-Buffalo Aquifer North Drinking Water Supply Management Area.

Table 5-48 Surface Waters Crossed by RA-North

Kittle Number	Kittle Name	Stream Type	PWI Water	Approximate Top of Bank Width (feet) ^a	Nearest Milepost	303(d) Impairment ^b	Proposed Crossing Method ^c
H-026-081-012	Pelican River	River (Perennial)	Yes	55	2.2	E. coli	HDD
MAJ-09022367	NA	Stream (Intermittent)	No	NA	4.4	NA	Open Cut
MAJ-09022590	NA	Stream (Intermittent)	No	NA	5.1	NA	Open Cut)
MAJ-09022581	NA	Stream (Intermittent)	No	NA	5.5	NA	Open Cut
H-026-081-010-002	Unnamed Creek	Stream (Intermittent)	Yes	NA	5.7	NA	Open Cut
MAJ-09022978	NA	Drainage Ditch	No	22	7.6	NA	Open Cut
MAJ-09022621	NA	Stream (Intermittent)	No	NA	9.1	NA	Open Cut
MAJ-09022945	NA	Drainage Ditch	No	20	10.7	NA	Open Cut)
MAJ-09023614	NA	Stream (Intermittent)	No	36	12.2	NA	Open Cut)
MAJ-09022447	NA	Drainage Ditch	No	NA	13.5	NA	Open Cut
MAJ-09022447	NA	Drainage Ditch	No	NA	14.5	NA	Open Cut
H-026-081-001	Unnamed Creek	Drainage Ditch	Yes	34	17.6	NA	Open Cut
MAJ-09024011	NA	Drainage Ditch	No	NA	17.6	NA	Open Cut
MAJ-09023857	NA	Drainage Ditch	No	NA	18.1	NA	Open Cut
MAJ-09024229	NA	Drainage Ditch	No	26	20.3	NA	Open Cut
MAJ-09024105	NA	Drainage Ditch	No	13	20.6	NA	Open Cut

Kittle Number	Kittle Name	Stream Type	PWI Water	Approximate Top of Bank Width (feet) ^a	Nearest Milepost	303(d) Impairment ^b	Proposed Crossing Method ^c
MAJ-09024220	NA	Drainage Ditch	No	26	20.7	NA	Open Cut
MAJ-09024220	NA	Drainage Ditch	No	33	21.4	NA	Open Cut
MAJ-09024220	NA	Drainage Ditch	No	14	22.7	NA	Open Cut
H-026	Red River	Perennial	Yes	150	23.0	As; E. coli; Hg-F; T	HDD

^a NA = Width of surface water crossing was not visible on aerial photography.

^b Impairment: E. coli – Escherichia coli, As – arsenic, Hg-F – mercury in fish, T – Turbidity; NA = not listed as impaired

^c Open cut crossings would be constructed using isolated dry-trench methods if flow is present at the time of construction. Wet (flowing) open cut crossings are not proposed.

RA-Hybrid

As shown in **Table 5-49**, the centerline of RA-Hybrid would cross 26 surface waters consisting of perennial and intermittent streams, drainage ditches, the Pelican River, the Otter Tail River, and the Bois de Sioux River. Some streams would be crossed more than once by the centerline of RA-Hybrid. The Pelican River and an unnamed perennial creek (Kittle Number H-026-082) are impaired due to potential E. coli/fecal matter contamination, which impacts the aquatic life and recreational use of the waterbody.

The Otter Tail River is impaired due to benthic macroinvertebrate bioassessments and turbidity. The Otter Tail River is also classified as a drinking-water-protected surface water (Use Class 1C) due to the potential impairment by nitrate. Nitrate is commonly found in fertilizers used on agricultural fields, grass lawns, and golf courses.

The Fergus Falls surface water intake on the Otter Tail River within the Fergus Falls Water Assessment Area is upstream from RA-Hybrid and would not be affected by the project.

The Bois de Sioux River is impaired due to dissolved oxygen, benthic macroinvertebrate bioassessments, mercury levels that limit fish consumption, E. coli/fecal matter contamination, nutrients that grow algae, and turbidity.

Table 5-49 Surface Waters Crossed by RA-Hybrid

Kittle Number	Kittle Name	Stream Type	PWI Water	Approximate Top of Bank Width (Feet) ^a	Nearest Milepost	303(d) Impairment ^b	Proposed Crossing Method ^c
H-026-081-012	Pelican River	River (Perennial)	Yes	55	2.2	E.coli	HDD
MAJ-09022367	NA	Stream (Intermittent)	No	NA	4.5	NA	Open Cut
MAJ-09022590	NA	Stream (Intermittent)	No	NA	5.1	NA	Open Cut

Kittle Number	Kittle Name	Stream Type	PWI Water	Approximate Top of Bank Width (Feet) ^a	Nearest Milepost	303(d) Impairment ^b	Proposed Crossing Method ^c
MAJ-09022581	NA	Stream (Intermittent)	No	NA	5.5	NA	Open Cut
H-026-081-010-002	Unnamed Creek	Stream (Intermittent)	Yes	NA	5.7	NA	Open Cut
MAJ-09022978	NA	Drainage Ditch	No	23	8.2	NA	Open Cut
MAJ-09022499	NA	Drainage Ditch	No	NA	11.6	NA	Open Cut
MAJ-09022836	NA	Stream (Intermittent)	No	NA	11.9	NA	Open Cut
MAJ-09023432	NA	Stream (Intermittent)	No	NA	12.3	NA	Open Cut
MAJ-09022982	NA	Drainage Ditch	No	21	13.8	NA	Open Cut
MAJ-09022827	NA	Drainage Ditch	No	NA	15.3	NA	Open Cut
MAJ-09022943	NA	Stream (Intermittent)	No	42	16.3	NA	Open Cut
MAJ-09022585	NA	Drainage Ditch	No	NA	16.9	NA	Open Cut
MAJ-09022807	NA	Drainage Ditch	No	15	18.2	NA	Open Cut
MAJ-09022834	NA	Stream (Intermittent)	No	NA	19.2	NA	Open Cut
H-026-081	Otter Tail River	River (Perennial)	Yes	128	20.5	InvertBio; T	HDD
MAJ-0902388	NA	Drainage Ditch	No	NA	23.7	NA	Open Cut
MAJ-0902439	NA	Drainage Ditch	No	10	23.9	NA	Open Cut
MAJ-090294	NA	Drainage Ditch	No	NA	24.4	NA	Open Cut
MAJ-0902316	NA	Drainage Ditch	No	NA	24.4	NA	Open Cut
MAJ-0902461	NA	Drainage Ditch	No	NA	24.9	NA	Open Cut
MAJ-0902336	NA	Drainage Ditch	No	NA	25.3	NA	Open Cut
H-026-082	Unnamed Creek	Stream (Perennial)	Yes	NA	26.1	E. coli	Bore

Kittle Number	Kittle Name	Stream Type	PWI Water	Approximate Top of Bank Width (Feet) ^a	Nearest Milepost	303(d) Impairment ^b	Proposed Crossing Method ^c
H-026	Bois de Sioux River	River (Perennial)	Yes	140	28.0	DO; E. coli; FishesBio; Hg-F; Nutrients; T	HDD

^a NA = Width of surface water crossing was not visible on aerial photography.

^b Impairment: DO – Dissolved Oxygen, E. coli – Escherichia coli, FishesBio – fish bioassessments, Hg-F: mercury in fish tissue, InvertBio – benthic macroinvertebrate bioassessments, T – Turbidity; NA = Not listed as impaired

^c Open cut crossings would be constructed using isolated dry-trench methods if flow is present at the time of construction. Wet (flowing) open cut crossings are not proposed.

RA-South

As shown in **Table 5-50**, the centerline for RA-South would cross 25 surface waters consisting of perennial and intermittent streams, drainage ditches, the Pelican River, the Otter Tail River, and the Bois de Sioux River. Some streams would be crossed more than once by the centerline of RA-South. As stated in RA-Hybrid, both Pelican River and an unnamed perennial creek (Kittle Number H-026-082) are impaired due to E. coli/fecal matter contamination.

Otter Tail River is impaired due to benthic macroinvertebrate bioassessments and turbidity and is classified as a drinking-water-protected surface water (Use Class 1C) due the potential impairment by nitrate.

The Fergus Falls surface water intake on the Otter Tail River within the Fergus Falls Water Assessment Area is upstream from RA-South and would not be affected by the project.

Bois de Sioux River is impaired due to dissolved oxygen, benthic macroinvertebrate bioassessments, mercury levels that limit fish consumption, E. coli/fecal matter contamination, nutrients that grow algae, and turbidity.

Table 5-50 Surface Waters Crossed by RA-South

Kittle Number	Kittle Name	Stream Type	PWI Water	Approximate Top of Bank Width (Feet) ^a	Nearest Milepost	303(d) Impairment ^b	Proposed Crossing Method ^c
MAJ-09023305	NA	Stream (Intermittent)	No	NA	1.6	NA	Open Cut
H-026-081-012	Pelican River	River (Perennial)	Yes	120	1.9	E. coli	HDD
MAJ-09023534	NA	Stream (Intermittent)	No	NA	3.6	NA	Open Cut
MAJ-09023534	NA	Stream (Intermittent)	No	10	4.2	NA	Open Cut
MAJ-09023534	NA	Drainage Ditch	No	NA	4.7	NA	Open Cut
MAJ-09022525	NA	Stream (Intermittent)	No	3	5.0	NA	Open Cut

Kittle Number	Kittle Name	Stream Type	PWI Water	Approximate Top of Bank Width (Feet) ^a	Nearest Milepost	303(d) Impairment ^b	Proposed Crossing Method ^c
MAJ-09022525	NA	Stream (Intermittent)	No	NA	5.3	NA	Open Cut
MAJ-09023593	NA	Stream (Intermittent)	No	56	5.6	NA	Open Cut
MAJ-09023571	NA	Stream (Intermittent)	No	12	6.6	NA	Open Cut
MAJ-09023619	NA	Stream (Intermittent)	No	NA	9.8	NA	Open Cut
MAJ-09023556	Judicial Ditch 2	Drainage Ditch	No	55	10.8	NA	Open Cut
MAJ-09022982	NA	Drainage Ditch	No	21	12.8	NA	Open Cut
MAJ-09022827	NA	Drainage Ditch	No	NA	14.3	NA	Open Cut
MAJ-09022943	NA	Stream (Intermittent)	No	NA	15.3	NA	Open Cut
MAJ-09022943	NA	Stream (Intermittent)	No	NA	15.4	NA	Open Cut
MAJ-09022585	NA	Drainage Ditch	No	NA	15.8	NA	Open Cut
MAJ-09022807	NA	Drainage Ditch	No	15	17.2	NA	Open Cut
MAJ-09022834	NA	Stream (Intermittent)	No	NA	18.1	NA	Open Cut
H-026-081	Otter Tail River	River (Perennial)	Yes	170	19.5	InvertBio; T	HDD
MAJ-0902388	NA	Drainage Ditch	No	NA	22.7	NA	Open Cut
MAJ-0902439	NA	Drainage Ditch	No	10	22.8	NA	Open Cut
MAJ-090294	NA	Drainage Ditch	No	NA	23.3	NA	Open Cut
MAJ-0902316	NA	Drainage Ditch	No	NA	23.3	NA	Open Cut
MAJ-0902461	NA	Drainage Ditch	No	NA	23.8	NA	Open Cut
MAJ-0902336	NA	Drainage Ditch	No	NA	24.3	NA	Open Cut
H-026-082	Unnamed Creek	Stream (Perennial)	Yes	40	25.0	E. coli	Bore

Kittle Number	Kittle Name	Stream Type	PWI Water	Approximate Top of Bank Width (Feet) ^a	Nearest Milepost	303(d) Impairment ^b	Proposed Crossing Method ^c
H-026	Bois de Sioux River	River (Perennial)	Yes	140	28.0	DO; E. coli; FishesBio; Hg-F; Nutrients; T	HDD

^a NA = Width of surface water crossing was not visible on aerial photography.

^b Impairment: DO – Dissolved Oxygen, E. coli – Escherichia coli, FishesBio – fish bioassessments, Hg-F: mercury in fish tissue, InvertBio – benthic macroinvertebrate bioassessments, T – Turbidity; NA = Not listed as impaired

^c Open cut crossings would be constructed using isolated dry-trench methods if flow is present at the time of construction. Wet (flowing) open cut crossings are not proposed.

The widest waterbodies that would be crossed are the Bois de Sioux River (crossed by RA-Hybrid and RA-South), Red River (crossed by RA-North), Ottertail River (crossed by RA-Hybrid and RA-South), and Pelican River (RA-North, RA-Hybrid, and RA-South), all of which are impaired waters. Each of these rivers would be crossed by HDD.

Groundwater

Unconsolidated permeable glacial deposits and recent alluvial deposits are the most important groundwater sources in the project area. These deposits consist primarily of glacial sand and/or gravel outwash, ice-contact deposits, or sand and gravel alluvium that was deposited along existing streams. Glacial aquifers are classified as surficial aquifers when the water table is in these deposits. The surficial glacial aquifers vary in thickness from a few feet to over 300 feet and can produce water up to 3,000 gallons per minute or more, depending on the thickness and extent of the saturated deposits. Buried glacial aquifers are separated from the ground surface or from overlying surficial glacial aquifers by a laterally continuous layer of lower permeability silt and/or clay that functions as an aquitard, meaning it creates a barrier to vertical flow. The buried glacial aquifers are typically confined, and some wells that are completed in them flow freely without pumping, indicating “artesian” conditions. Shallow confined aquifer conditions are particularly prevalent in a beach ridge system area that occurs east of where the flat plain of the Red River Valley transitions to more hilly topography.

Most lakes, rivers, and many wetlands near the project are hydraulically connected with the water table and are typically observed as a surface expression of the water table. The project area in Otter Tail County has a depth to water table typically less than 20 feet below ground surface, and the depth to water table in Wilkin County is typically less than 10 feet below ground surface.²²¹

Groundwater sources within the ROI are pumped from wells for commercial, industrial, public, and private uses.

According to DNR, RA-South crosses the surficial beach ridge aquifer between MPs 4.6 and 7.7 in Otter Tail County. RA-North and RA-Hybrid also cross this aquifer in Otter Tail County at about MP 5 and MP 6. Shallow geology and groundwater can be highly variable and complex in beach ridge areas. DNR’s review of aerial photos shows a groundwater upwelling signature down slope from the beach ridge. DNR stated that the area is prone to significant groundwater discharge and an initial groundwater investigation by the applicant confirmed that artesian groundwater conditions are present along RA-South in the beach ridge system. Groundwater investigations have not been conducted along RA-North and RA-Hybrid. However, MDH reports that, based on well records in its County Well Index, artesian conditions are present in shallow confined aquifers within 1 mile of each route alternative (see **Appendix J**).

Based on a review of the Minnesota Spring Inventory,²²² the nearest groundwater spring (Kennedy Park Spring) is located about 3.7 miles southeast of MP 1.5 along the three route alternatives.

Based on the MDH's County Well Index²²³ database:

- 56 wells are located within 1 mile of RA-North
- 42 wells are located within 1 mile of RA-Hybrid
- 73 wells are located within 1 mile of RA-South

The County Well Index does not include all existing wells in Minnesota. A pre-construction survey would be required to identify all wells within the construction workspaces. The tables below summarize wells listed in County Well Index that are located within the respective construction workspace for each alternative.

Four out of the 56 wells within 1 mile of RA-North are within the RA-North construction workspace, as shown in **Table 5-51**.

Table 5-51 Wells within the RA-North Construction Workspace

MWI Well ID	Well Type	Distance from Centerline (feet)	Nearest MP	Direction from Centerline	Static Water Level (feet) ^b
589079	MW	17.5	18.6	Southeast	11.8
589080	MW	16.9	18.6	Southeast	15.5
589078	MW	15.2	18.6	Southeast	11.8
589083	MW	115.4	20.7	Northeast	16.3

^a MW – Monitoring Wells are used to measure or monitor the level, quality, quantity, or movement of subsurface water.

^b The distance from the land surface (or the measuring point) to the water in the well under non-pumping (static) conditions.

None of the 42 wells within 1 mile of the RA-Hybrid route centerline would be within the construction workspace. A total of 73 wells are within 1 mile of the RA-South route centerline, one of which is located within the construction workspace near MP 6.8, as shown in **Table 5-52**.

Table 5-52 Wells within the RA-South Construction Workspace

MWI Well ID	Well Type ^a	Nearest MP	Distance from Centerline (feet)	Direction from Centerline	Static Water Level (feet) ^b
847292	OB	6.8	28.4	Northwest	10

^a OB – Observation Wells are a permanent well structure which is used to obtain data on a periodic or ongoing basis for aquifer characteristics or water quality.

^b The distance from the land surface (or the measuring point) to the water in the well under non-pumping (static) conditions.

Minnesota Rules 4725.2150 provides minimum required separation distances between a well and a pipeline carrying flammable or volatile gas. This distance is 10 feet or 5 feet with the shorter distance applying if the person constructing the well, or the person installing the pipeline, marks the well with a permanent sign warning of the location of the pipeline. Any well that is determined to be located less

than the minimum required distance from the pipeline provided in Minnesota Rules 4725.2150, must be sealed by a Minnesota licensed well contractor, who must provide a report of any well sealed to MDH.

Floodplains

Floodplain crossings for each route were determined based on a review of Federal Emergency Management Agency (FEMA) floodplain Zone A/AE data along the ROI. While there are no FEMA-mapped floodplains that would be crossed in Otter Tail County, there are a few FEMA-mapped floodplain crossings in Wilkin County. RA-North crosses one floodplain near MP 23. RA-Hybrid has floodplain crossings at MPs 20.3, 20.8, 21.3, 28.4, and 29. RA-South crosses floodplains near MPs 19.2, 19.8, 20, 20.3, 27.3, 27.4, 28.

5.7.8.2 Potential Impacts

Surface Waters

Impacts on surface water may occur during construction activities. These include clearing and grading of stream banks, topsoil disturbance, in-stream trenching, trench dewatering, backfilling, and expansion of access roads. These activities can increase sedimentation and erosion, modify hydrological flow, release chemical and nutrient pollutants from sediments, and introduce chemical contaminants such as fuel and lubricants. These impacts would be minimal and short term, occurring only during construction.

RA-North would cross 17 intermittent waterbodies, RA-Hybrid would cross 26 intermittent waterbodies, and RA-South would cross 25 intermittent waterbodies.

The capture facility and associated MLV/cathodic protection system are about 1.5 miles from the nearest waterbody. The four remaining MLVs are at least 0.5 mile from the nearest waterbody. None of the temporary or permanent access roads cross any waterbodies and are far enough away from any waterbodies that they are not anticipated to have any impact.

After the initial clearing and grading is completed, the pipeline would be installed at waterbodies crossed by the project using nonflowing open cut, isolated dry-trench, or trenchless construction methods including HDD and conventional bores. The pipeline would be installed deep enough to prevent pipe exposure over time.

As shown in **Table 5-48**, **Table 5-49**, and **Table 5-50**, perennial waterbodies would be crossed using trenchless construction methods, either conventional bore or HDD, to avoid impacts associated with surface disturbance (vegetation clearing and trenching).

The applicant would use an isolated dry-trench crossing method (flume or dam and pump) on delineated waterbodies with perceivable water flow during construction. With the flume crossing method, flumes would be installed before trenching activity. Sandbags and a plastic sheeting diversion structure, or an equivalent structure, would be used to create a seal and to divert stream flow through the flume. The dam and pump method would use sheet piling to create a dam to provide a dry workspace, and the stream flow would be pumped through a hose around the excavation area. The pump intake would be equipped with a fish screen.

The nonflowing open cut method would be used at waterbody features that have no flow or when flow is unlikely between initial disturbance and final stabilization. Section 4.5.1 of the Minnesota ECP describes this crossing method in more detail. The non-flowing open cut method places straw bales or silt screening across the width of the waterbody during trenching. The flowing open cut method would not be used for the project.

As part of the License to Cross Public Waters permitting process, DNR would determine construction and restoration plans for each public water crossing, including those that would be crossed via a trenchless (HDD) method.

Prior to installation of a waterbody crossing, the applicant would review the crossing to confirm conditions and review upcoming weather patterns. Work would be completed per the timing windows outlined in Section 4.4 of the Minnesota ECP. In-stream construction activities (specifically trenching, pipeline installation, backfill, and restoration of the streambed contours) at waterbodies 0 to 10 feet in width would generally be completed in under 24 hours. The crossing of intermediate waterbodies 10 to 100 feet in width would generally be completed in under 48 hours.

Perennial rivers would be crossed by the HDD method as described in Chapter 2. Throughout the process of drilling and enlarging the small diameter pilot hole along a pre-determined path under a waterbody, a bentonite clay slurry, known as “drilling mud,” would be circulated through the drilling tools to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. The water used to create the drilling mud may be appropriated from surface or groundwater sources under water appropriation permits issued by DNR.

Some substrates, such as unconsolidated gravel or coarse sand, could present conditions that increase the potential for an unintended release of drilling mud to the environment (also referred to as an “inadvertent return”), whereby drilling mud may move laterally or vertically from the drill hole. If a wetland or waterbody overlies or is near the release location, the drilling mud might flow into that resource. In most circumstances, releases of drilling mud can be contained. However, when drilling mud releases to a waterbody, it disperses quickly into the water, causing turbidity and sedimentation downstream.

The effectiveness of an inadvertent return cleanup would depend on the size of the release, the duration of the release, when the release is detected, and the location of the release. If the release is in a waterbody, then the flow or size of the waterbody can impact the cleanup.

Prior to conducting HDDs, the applicant would develop a contingency plan to address the unintended release of drilling mud to the environment. This plan would include: (1) a contingency for the waterbody crossing in the event the drill is unsuccessful or proves infeasible, (2) measures to reduce the risk for an inadvertent return to occur, and (3) procedures to monitor for inadvertent returns during drilling. The applicant states that containment, response, and clean-up equipment would be available at both sides of an HDD crossing location prior to beginning the HDD to assure a timely response in the event of an inadvertent release. In comments on the draft EIS, DNR stated that the contingency plan should be in coordination with the DNR utility license application.

Under certain conditions, an additive might need to be mixed with the drilling mud for viscosity or lubricating reasons. These additives would be approved by MDH or meet NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects. If additives are not used in the drilling mud, there is an increased chance of inadvertent releases and a higher potential for failed crossings. The applicant would not clear trees within riparian zones, which would help to minimize the potential of construction-related sediment from reaching each feature. In accordance with the MPCA Construction Stormwater General Permit, the applicant would also use erosion and sediment control BMPs during construction and restoration activities to minimize sediment and other contaminants from entering the waterbody.

Once in operation, the project would have limited impacts on waterbodies. Impacts associated with maintenance and repair would be rare and infrequent. Operational impacts on surface waters may occur during the first few years of operation as vegetation and restoration methods establish.

The project would not be close enough to affect the City of Breckenridge, the Drinking Water Supply Management Area, or the Moorhead-Buffalo Aquifer North Drinking Water Supply Management Area. The Fergus Falls surface water intake on the Otter Tail River within the Fergus Falls Water Assessment Area is upstream from RA-Hybrid and RA-South and would not be affected by the project.

Groundwater

Ground disturbance or excavation associated with installation of a 4-inch-diameter pipeline is not expected to significantly affect groundwater resources. Ground disturbance associated with construction would be primarily limited to depths between 5 and 6 feet, although sheet piling, if used, would extend to depths of 10 to 15 feet. Sheet piling consists of steel sheets that can be interlocked and driven into the ground in sequence to provide lateral support along the trench wall. Sheet piling can provide stability in unstable or highly saturated soils, create a dry workspace at waterbody or road crossings, or strengthen an excavation that might need to remain open for some time.

Backfilled pipeline trenches have the potential to create a conduit for groundwater, which can lead to soil erosion and affect hydrology, which can affect wetlands. Trench breakers are installed during pipeline construction to minimize the potential for such impacts. The applicant proposes to install trench breakers at the entry and exit from every public water crossing, except at HDD crossings. In addition, as outlined in Section 5.5 of the Minnesota ECP, trench breakers would be installed at wetland boundaries where the pipeline trench may cause a wetland to drain, or the trench bottom would be sealed to maintain wetland hydrology. Trench breaker/plug placement would be tailored to site-specific conditions and would be at least as protective as the Pennsylvania standards.²²⁴ Additional details regarding trench breakers are provided in the response to Supplemental Information Inquiry #12 in

Appendix I.

Groundwater recharge could be impacted by vegetation clearing and soil compaction. Where the water table is shallower than the depth of excavation, dewatering of the trench or bore pit might be required. Dewatering is regulated by DNR and would be conducted according to permit requirements. The impacts of these construction activities on groundwater would be temporary, minimal, and localized.

Use of sheet piling in locations with a shallow confined aquifer carries the potential that the sheet piling could intersect the aquitard that confines the aquifer, thereby breaching the aquifer. If artesian conditions are present, when the sheet piling is removed the void created can act as a flow path and uncontrolled flow of water can occur. The breaching of a shallow confined aquifer could have significant long-term impacts on groundwater resources. The applicant would conduct geotechnical investigations prior to construction anywhere sheet pile would be used. The applicant has committed to not using sheet piling in beach ridge areas. Should trench wall stability be a concern in beach ridge areas, the applicant would use trench boxes to stabilize the trench walls, which would not result in any additional excavation.

Commenters have expressed concerns that the pipeline trench itself could intersect a shallow confined aquifer. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge area crossed by the pipeline to further define existing conditions and advise on

construction methodology. Furthermore, as described in Section 5.7.8.2, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during construction and contingency measures to mitigate the impacts if a breach should occur.

Depending on the quantity, spills and leaks of fuels or hazardous materials during construction could impact groundwater, especially in areas with a shallow water table. The applicant has developed and would follow spill prevention, containment, and response measures, which include proper handling and storage of fuels and hazardous liquids, refueling procedures, equipment inspection and maintenance, and spill containment and remediation measures. With these measures, impacts on groundwater in the event of a leak or spill, if any, would likely be minimal.

As described in Section 5.7.8.1, wells are documented within the construction workspace for two of the route alternatives. Additional wells could be present that are not documented. Wells within the construction workspace have the potential to be damaged. Additionally, Minnesota Rules Chapter 4725 defines an isolation distance of 50 feet or variance process for a hazardous buried pipeline from water supply wells.²²⁵ The applicant states it would consult with affected landowners regarding known cased wells that may be crossed by the project and take appropriate action to avoid or minimize impacts. If necessary, the applicant states it would work with landowners to develop site-specific plans for wells within 50 feet of the pipeline, which could include capping the well and constructing a new well or, if preferred by the landowner, the applicant could request a variance from MDH.

Based on current knowledge of groundwater conditions in the ROI, impacts on groundwater would be similar for each of the route alternatives.

Water Use

During pipeline construction, installation of HDDs, hydrostatic testing, and dust control could involve appropriations from surface water or groundwater sources, if permitted by DNR. The use of water for HDDs and hydrostatic testing would be single-event appropriations, whereas dust control appropriations would be variable, as needed, based on conditions. The applicant estimates about 125,000 gallons of water would be needed for construction of the pipeline. Most of the water, 110,000 gallons, would be used for hydrostatic testing. Trench dewatering is regulated by DNR and would be conducted according to permit requirements.

The applicant is evaluating the need to appropriate water for dewatering, dust control, and hydrostatic testing during construction of the capture facility. A specific water source has not been determined at this time; however, the applicant plans to obtain water for hydrostatic testing and dust control during construction of the capture facility from either a local surface water source or groundwater well directly or indirectly from the ethanol plant or the city of Fergus Falls. The amount of water needed for capture facility construction has not yet been determined.

Once the applicant has finalized water appropriation sources and volumes needed for construction, the applicant would apply for coverage under individual or general DNR water appropriation permits for any surface or groundwater appropriated for these activities. These permits would contain BMPs for water withdrawals, which the applicant would be required to follow. Water appropriation permits from DNR would also inform the locations used, any seasonal restrictions to account for low-flow conditions, and volume and measurement requirements.

The applicant committed to include a contingency plan as part of its water appropriation permit application, because it is challenging to predict how changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons would impact proposed water resources. The contingency plan would include identification of potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of water withdrawals following DNR request, when necessary.

Water would not be needed for operation of the pipeline. At the capture facility, cooling water would circulate through heat exchangers to cool CO₂, lubricating oil from the compressors, and glycol from the dehydration unit regeneration system. Water would not come into contact with these substances. The water would then circulate through a cooling tower, where a small amount would evaporate, and a small amount would be discharged to manage the mineral content. Fresh water would be added to make up for this water loss, and the water would then be recirculated to the heat exchangers.

Water for operation of the capture facility is expected to be obtained from an existing, on-site commercial well at the ethanol plant. However, the applicant has indicated that it has not yet finalized plans with the ethanol plant for use of this well. Based on information from the Minnesota Department of Health's county water well index, the well is screened within the Quaternary buried artesian aquifer between depths of 188 and 210 feet.²²⁶ The applicant has not yet held conversations with DNR regarding the need to amend an existing DNR Water Appropriation Permit, or the need to obtain a new permit, for the capture facility's operational water needs.

The applicant estimates that the capture facility would require 8.2 gallons per minute for half the year (winter months) and 40.9 gallons per minute for half the year (summer months), for an average water usage of about 13 million gallons per year. The ethanol plant withdrew 174 million gallons from its well in 2022, so the capture facility use would represent about a 7 percent increase in water withdrawal. U.S. Geological Survey data from 2015 indicates that approximately 49 million gallons of groundwater were used per day, on an annual basis, for irrigation in Otter Tail County.²²⁷ This equates to about 17,900 million gallons per year. In 2022, 140,000 million gallons of water were used for irrigation in Minnesota, and about 22,500 million gallons of permitted groundwater use in Otter Tail and Wilkin Counties was reported to DNR.²²⁸

During operations, the capture facility would produce a continuous stream of industrial wastewater at about 8 to 10 gallons per minute. The wastewater would contain some volatile organic compounds that would be removed from the incoming CO₂ stream, trace amounts of oil, and dissolved solids. Options for managing this wastewater include treatment and reuse, combining it with the ethanol plant's wastewater stream, routing it to the ethanol plant for use in its process, sending the wastewater to a local wastewater treatment plant for treatment, or discharging directly to waters of the state as an independent, separate stream. If the discharge water is routed to a local wastewater treatment plant, the volume would not necessitate expansion of existing facilities. If the applicant pursues an independent discharge to a water of the state, it would seek coverage under a new MPCA Individual NPDES Industrial Wastewater permit.

Water supply appropriations would be regulated by DNR-issued permits that would have conditions to minimize impacts on groundwater resources. DNR would review permit applications and would not issue a permit if the amount of water to be withdrawn would adversely affect the aquifer or other users. In case of drought, DNR would follow its Minnesota Statewide Drought Plan,²²⁹ which provides a framework and staged approach for implementing drought response actions. Minnesota Statutes,

Section 103G.293, which mandates DNR to prepare a drought plan, states that permits must provide conditions on water appropriation consistent with the drought response plan.

If withdrawing water from surface water appropriations, the applicant would use a 3/16-inch mesh intake screen to reduce impingement and entrainment of aquatic life and manage flow rates. The applicant would conduct reporting as required by permit conditions.

Floodplains

The pipeline and temporary access road construction impacts within floodplains would be temporary. Following construction, the pipeline would be underground and would not be impacted by flooding or affect floodplain dynamics.

MLV 321-04 and a portion of its associated permanent access road along RA-Hybrid (MP 28.8) and RA-South (MP 27.7) would be within a FEMA-mapped 500-year floodplain located near MP 27. MLV 321-03 and a portion of its associated permanent access road along RA-Hybrid (MP 21.4) and RA-South (MP 20.3) would be within a FEMA-mapped 500-year floodplain located near MP 21. None of the MLVs are within FEMA-mapped 100-year floodplains. No other aboveground facilities would be in floodplains.

The applicant would coordinate with Wilkin County to secure a floodplain permit for the portions of the project that would be constructed within designated floodplains, as needed. A Floodplain Ordinance serves to minimize flood losses and protect public health and the safety of the county.²³⁰

5.7.8.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) includes the following measures to mitigate impacts on water resources:

- “Wetlands and riparian areas shall be accessed using the shortest route possible in order to minimize travel through wetland areas and prevent unnecessary impacts. No temporary workspace areas shall be placed within or adjacent to wetlands or water resources, as practicable” (**Appendix H**, Section 7.13, Wetlands and Water Resources).
- “Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area” (**Appendix H**, Section 7.13, Wetlands and Water Resources). EERA staff recommends this language be revised for clarity to say “Soil excavated from the wetlands and riparian areas shall be contained in uplands and not placed back into the wetland or riparian area until necessary to restore the excavated trench in the wetland or riparian area.”
- “Dewatering during periods of excessive precipitation or in areas where the natural groundwater table intersects the pipeline trench will not be directed into wetlands or water bodies. Dewatering discharges will be directed toward well vegetated upland areas. Should discharge activities need to be directed off the right-of-way landowner consent will be obtained and locations will be chosen to minimize impacts. All discharge activities will comply with applicable agency permits or approvals” (**Appendix H**, Section 7.13, Wetlands and Water Resources).
- “Areas disturbed by construction activities shall be restored to pre-construction conditions” (**Appendix H**, Section 7.13, Wetlands and Water Resources).
- “Water resource areas disturbed by construction activities shall be restored to pre-construction conditions in accordance with the requirements of applicable state and federal permits or laws

and landowner agreements. All requirements of the U.S. Army Corps of Engineers (USACE), Minnesota Department of Natural Resources (DNR), and local units of government shall be met” (**Appendix H**, Section 7.13, Wetlands and Water Resources).

Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant would mitigate impacts on the large perennial rivers (the Pelican River, the Otter Tail River, and the Bois de Sioux River [or Red River for RA-North]) and adjacent riparian areas by installing the pipeline using HDD methods.

The applicant would avoid the use of sheet piling in beach ridge areas and would use ground penetrating radar to study the depth of the confining layer through the entire beach ridge area crossed by the pipeline to further define existing conditions and advise on construction methodology.

In response to comments from DNR, the applicant states that it would:

- Add the following statement to Section 4.8 of the Minnesota ECP: “Where trenched crossings were used, the Contractor will restore the stream by first replacing underlying streambed materials in the trench before replacing streambed surface/substrate materials to support the consistency of the disturbed stream bottom relative to undisturbed areas;
- Not use the flowing open cut method for any stream crossing;
- Continue to consult with DNR on groundwater investigations for the potential routes and on construction methods in relation to groundwater;
- Conduct exploratory borings to characterize the shallow subsurface anywhere sheet piling would be used, and submit the results to DNR groundwater staff for evaluation. Exploratory borings would be conducted to at least the maximum depth of any construction impacts.

Mitigation Proposed During Comment Periods

DNR made the following recommendations for mitigations to reduce potential impacts on water resources:

- At a minimum, Pennsylvania standards for trench breaker placement should be used, and knowledge gained from additional subsurface site characterization may provide further guidance on where to place trench breakers most effectively. Trench breakers should be used at the entrance and exit of every waterbody regardless of slope (except for HDD crossings). The applicant’s use of trench breakers is described in Section 5.7.8.2.
- The pipeline should be installed deep enough to prevent pipe exposure over time. DNR’s Area Hydrologists may have specific data on depth of cover for river and stream crossings and should be consulted.
- Unintentional release evaluations should be conducted for water crossings proposed to be installed via HDD to ensure the soils are amenable to HDD. (As indicated in Section 5.7.3.3, the applicant has completed geotechnical evaluations for two of the three HDD crossings at waterbodies and plans to conduct an investigation at the third once access is obtained. An

assessment of the potential for an inadvertent release of drilling mud is part of the feasibility analysis and design for HDDs.)

- Where trench crossings are used for streams, DNR recommends segregating the streambed surface material that is usually coarser than underlying material for restoring the streambed surface (similar to how topsoil is segregated in uplands).
- The contingency plan to address inadvertent release response should include equipment, such as a functioning vac-truck and other equipment/materials on site. This contingency plan should be coordinated with the DNR utility license application.

MDH states that any previously unknown well discovered during pipeline construction should be reported to MDH and protected from damage. If the well is no longer in use, it should be additionally protected from becoming lost, so a licensed well contractor can evaluate it for sealing. Any well that is uncovered, where the wellhead had been buried, cannot be reburied unless sealed by a licensed well contractor.

One commenter stated that the applicant should be required to document and report the amount of drilling fluid lost to the environment in each release. Further, the commenter noted that, ideally, the applicant should be required to disclose all chemicals used for HDD and the amounts used in its drilling fluid so that there is more clarity on potential toxicity to aquatic life. EERA staff notes that Minnesota Rule 115.061 requires that, should a spill or untreated discharge to a surface water occur, MPCA must be notified immediately.

Mitigation Recommended by EERA Staff

EERA staff believes that a special permit condition requiring the applicant to prepare a plan for pipeline construction in areas crossing the beach ridge area is reasonable. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during construction and contingency measures to mitigate the impacts of a breach should one occur. This plan should be developed in coordination with DNR.

5.7.9 Wetlands

The ROI for wetlands is the route width. Based on the National Wetlands Inventory, most wetlands in the ROI for each route alternative are emergent, with lesser amounts of forested and riverine wetlands. The number of wetland acres within the ROI is much higher for RA-South because the route width for this alternative is increased in one area to allow for additional study and the potential need to make modifications to the alignment, while a similar increase was not included for RA-Hybrid and RA-North. The acreage of wetlands that would be within the construction ROW is relatively small for all three route alternatives, ranging from 0.7 acre for RA-North to 2.7 acres for RA-South. Direct wetland impacts would occur within the construction ROW during pipeline construction. Impacts on forested wetlands would be slightly higher for RA-Hybrid relative to RA-North and RA-South. Impacts would be minimal and short term in emergent wetlands, and minimal to moderate and long term in forested wetlands. Indirect impacts on wetlands would be comparable among all three route alternatives and would be negligible to minimal and long term during operation of the project. Wetland impacts would be minimized through implementation of standard best management practices and conditions required under the state and federal permits for work in wetlands. Overall, wetland impacts would be similar among the three route alternatives.

5.7.9.1 Existing Conditions

Wetlands listed in the National Wetlands Inventory (NWI) were compared for the three route alternatives. Although the applicant delineated wetlands along RA-South, similar studies have not been performed for portions of RA-Hybrid or for RA-North. Use of NWI data allows the three route alternatives to be compared on the same basis. The NWI wetlands geospatial dataset provides information on the nation's wetland habitat types, locations, and trends to support research, land management planning and analyses, policy development, and modeling activities.²³¹

Wetlands provide a variety of environmental benefits, including flood storage, wildlife habitat, water quality, flow, nutrient sequestration, and recreation. The following section describes the wetlands crossed by the route alternatives and measures to minimize impacts. Many of these wetlands are limited based on topography and highly interspersed in the landscape. Emergent wetlands crossed by the project are generally located in agricultural roadside areas, which are generally maintained ditches and free of woody vegetation.

Emergent wetlands, also known as palustrine emergent (PEM) wetlands, consist of sedge- and rush-dominated wetlands adjacent to waterbodies, fresh (wet) meadows in roadside and agricultural drainage ditches, seasonally flooded basins in agricultural areas, and shallow marsh communities dominated by cattails (*Typha* spp.) and reed canary grass (*Phalaris arundinacea*). Widely scattered small, ephemeral pools support a variety of emergent hydrophytes, which are plants that only grow in or on water. Common plant species in emergent wetlands include cattail, reed canary grass, prairie cordgrass (*Spartina pectinata*), giant goldenrod (*Solidago gigantea*), and nodding smartweed (*Persicaria lapathifolia*).

Forested wetlands, also known as palustrine forested (PFO) wetlands, are dominated by forested plant communities and by tree, shrub, and understory herbaceous species that are adapted to and tolerant of periodic inundated or saturated soils. Canopy tree species in forested wetlands in the area are typically cottonwood, black ash, and/or aspen. Understory species may include young ash and a variety of wet-tolerant shrubs. Sedges, bluejoint grass, and a variety of wet-tolerant herbaceous species comprise the forest floor community.

NWI wetlands within the route width (the ROI) of each alternative are summarized in **Table 5-53** below.

Table 5-53 Wetlands within the Route Alternatives²³²

Route	County	Cowardin Type ^a	Wetland Type	Acres within the ROI ^b
RA-North	Otter Tail	PEM	Freshwater Emergent Wetland	9.4
RA-North	Otter Tail	PFO	Freshwater Forested Wetland	3.1
RA-North	Otter Tail	PUB	Freshwater Pond	0.0
RA-North	Otter Tail	PSS	Freshwater Shrub Wetland	1.1
RA-North	Otter Tail	R	Riverine	1.4
RA-North	Wilkin	PEM	Freshwater Emergent Wetland	4.7
RA-North	Wilkin	PFO	Freshwater Forested Wetland	0.4
RA-North	Wilkin	PUB	Freshwater Pond	0.2
RA-North	Wilkin	R	Riverine	0.6

Route	County	Cowardin Type ^a	Wetland Type	Acres within the ROI ^b
			TOTAL	20.9
RA-Hybrid	Otter Tail	PEM	Freshwater Emergent Wetland	9.4
RA-Hybrid	Otter Tail	PFO	Freshwater Forested Wetland	3.1
RA-Hybrid	Otter Tail	PUB	Freshwater Pond	0.0
RA-Hybrid	Otter Tail	PSS	Freshwater Shrub Wetland	1.0
RA-Hybrid	Otter Tail	R	Riverine	1.4
RA-Hybrid	Wilkin	PEM	Freshwater Emergent Wetland	5.7
RA-Hybrid	Wilkin	PFO	Freshwater Forested Wetland	1.8
RA-Hybrid	Wilkin	R	Riverine	2.4
			TOTAL	24.7
RA-South	Otter Tail	PEM	Freshwater Emergent Wetland	29.0
RA-South	Otter Tail	PFO	Freshwater Forested Wetland	2.3
RA-South	Otter Tail	PAB	Freshwater Pond	0.7
RA-South	Otter Tail	PSS	Freshwater Shrub Wetland	1.1
RA-South	Otter Tail	R	Riverine	1.2
RA-South	Wilkin	PEM	Freshwater Emergent Wetland	5.7
RA-South	Wilkin	PFO	Freshwater Forested Wetland	1.8
RA-South	Wilkin	R	Riverine	2.7
			TOTAL	44.6

^a PEM = Palustrine Emergent; PSS = Palustrine Scrub-Shrub; PFO = Palustrine Forested, R= Riverine.

^b The requested route width for RA-South has been increased to 1,808 feet from MP 6.4 to MP 7.1, allowing for additional route study and the potential need to make modifications to the pipeline alignment. A similar increase has not been incorporated into the route widths for RA-North and RA-Hybrid.

5.7.9.2 Potential Impacts

Table 5-54 summarizes wetland types crossed by the route alternatives. Wetlands along the project routes, including type and ID number, are shown in the maps in **Appendix B**.

Table 5-54 Wetlands Crossed by the Route Alternatives²³³

Route	County	Cowardin Type ^a	Wetland Type	Milepost	Acres in Construction Workspace	Crossing Length by Centerline (feet)
RA-North	Otter Tail	PFO	Freshwater Forested Wetland	2.2	<0.1 ^b	207
RA-North	Otter Tail	PFO	Freshwater Forested Wetland	2.2	<0.1 ^b	370
RA-North	Otter Tail	R	Riverine	2.2	<0.1 ^b	72

Route	County	Cowardin Type ^a	Wetland Type	Milepost	Acres in Construction Workspace	Crossing Length by Centerline (feet)
RA-North	Wilkin	PEM	Freshwater Emergent Wetland	14.6	0.7	245
RA-North	Wilkin	PFO	Freshwater Forested Wetland	23.0	<0.1 ^b	55
RA-North	Wilkin	R	Riverine	23.0	<0.1 ^b	207
				TOTAL	0.7	998
RA-Hybrid	Otter Tail	PFO	Freshwater Forested Wetland	2.2	0.4 ^b	207
RA-Hybrid	Otter Tail	PFO	Freshwater Forested Wetland	2.2	0.8 ^b	370
RA-Hybrid	Otter Tail	R	Riverine	2.2	0.1 ^b	72
RA-Hybrid	Wilkin	PEM	Freshwater Emergent Wetland	20.3	0.1 ^b	43
RA-Hybrid	Wilkin	R	Riverine	20.5	0.2 ^b	127
RA-Hybrid	Wilkin	PEM	Freshwater Emergent Wetland	20.6	0.1 ^b	51
RA-Hybrid	Wilkin	PEM	Freshwater Emergent Wetland	26.1	0.4 ^b	325
RA-Hybrid	Wilkin	PEM	Freshwater Emergent Wetland	26.1	0.1 ^b	53
RA-Hybrid	Wilkin	R	Riverine	29.1	0.1 ^b	98
				TOTAL	2.3	1,347
RA-South	Otter Tail	PEM	Freshwater Emergent Wetland	0.6	0.1	45
RA-South	Otter Tail	PEM	Freshwater Emergent Wetland	1.6	0.1	42
RA-South	Otter Tail	PEM	Freshwater Emergent Wetland	1.9	0.4 ^b	372
RA-South	Otter Tail	PSS	Freshwater Shrub Wetland	1.9	0.1 ^b	42
RA-South	Otter Tail	R	Riverine	1.9	0.1 ^b	76
RA-South	Otter Tail	PEM	Freshwater Emergent Wetland	5.3	0.1	81
RA-South	Otter Tail	PEM	Freshwater Emergent Wetland	5.7	0.6	447
RA-South	Otter Tail	PFO	Freshwater Forested Wetland	6.9	0.2	168
RA-South	Otter Tail	R	Riverine	10.8	<0.1	18
RA-South	Wilkin	PEM	Freshwater Emergent Wetland	19.2	0.1 ^b	43

Route	County	Cowardin Type ^a	Wetland Type	Milepost	Acres in Construction Workspace	Crossing Length by Centerline (feet)
RA-South	Wilkin	R	Riverine	19.5	0.2 ^b	127
RA-South	Wilkin	PEM	Freshwater Emergent Wetland	19.6	0.1 ^b	51
RA-South	Wilkin	PEM	Freshwater Emergent Wetland	25	0.1 ^b	53
RA-South	Wilkin	PEM	Freshwater Emergent Wetland	25.1	0.4 ^b	325
RA-South	Wilkin	R	Riverine	28.0	0.1 ^b	98
				TOTAL	2.7	1,989

^a PEM = Palustrine Emergent; PFO = Palustrine Forested; PSS = Palustrine Scrub-Shrub; R= Riverine.²³⁴

^b Although this wetland would be crossed by the route alternative, impacts would be avoided by use of bore or HDD technique.

Note: The sum of addends may not total correctly due to rounding.

As shown in **Table 5-54**, the acreage of NWI wetlands in the construction workspace would be highest along RA-South, followed by RA-Hybrid and RA-North. However, the total acreages for each route alternative and the differences between them are small. The MLVs/cathodic protection system, launcher, and capture facility would not impact wetlands. Final wetland impacts would be determined pending completion of wetland field surveys and evaluation of workspace in wetland areas.

Typical construction in most wetlands would be similar to construction in uplands and would consist of clearing, trenching, dewatering, installation, backfilling, clean-up, and revegetation. Construction across wetlands would result in temporary impacts and, in a few situations, minor changes in plant species composition for emergent wetlands. Construction activities that affect forested wetlands would have a long-term, moderate impact because it would take longer for the tree species and associated understory shrub species that dominate forested wetlands to regenerate. Forested wetlands within the operational ROW would be maintained as emergent wetlands resulting in a permanent, significant impact to forested wetlands. Temporary impacts may include loss of wetland vegetation because of clearing and other construction activities; soil disturbance associated with clearing, trenching, and equipment traffic; and increases in turbidity and alterations of hydrology as the result of trenching, dewatering, and soil stockpiling activities.

The pipeline trench would be excavated in wetlands using a backhoe excavator. In unsaturated wetlands, up to 12 inches of topsoil would be stripped from the trench line and stockpiled separately from trench spoil. Grading of wetlands would be dictated by soil saturation (see Sections 5.2 and 5.3 of the Minnesota ECP in **Appendix D**). Wetlands that have saturated soils, but do not have standing water, would use a standard wetland crossing method, which consists of pre-assembled and positioned pipe that is lined up adjacent to a trench and lowered into the pre-cut trench. The dry crossing method would be used to cross wetlands that have no standing water and no water present below the surface so that topsoil can be segregated easily. Pipe-stringing would occur within the wetland or adjacent to the wetland, depending on site conditions and designated workspace.

Wetlands designated as public waters are subject to DNR's Public Waters Work Permit process. The project would not impact public water basins along any of the proposed route options.

Near MP 0.3, all three route alternatives cross one parcel that has USFWS wetland interests administered by the Fergus Falls Wetland Management District. USFWS staff confirmed the wetlands on the parcel are the only features subject to the conservation easement. The project avoids wetland impacts on the parcel.

In Minnesota, wetland crossings are regulated by USACE, MPCA, DNR, and BWSR Local Government Units (LGU) through the Clean Water Act and Minnesota's Wetland Conservation Act. Prior to construction, the applicant must acquire all wetland permits for the project from local, state, and federal agencies.

The applicant submitted an application to request Clean Water Act, Section 404/10 coverage under the Utility Regional General Permit from USACE (certified by MPCA under Section 401 of the Clean Water Act) for the RA-South route in October 2022 and submitted updated materials in March 2023. The applicant would request Section 404/10 coverage for any route approved after submittal of this EIS.

The project falls under the Wetland Conservation Act Federal Approvals Exemption for Utilities, which is overseen by BWSR. This exemption applies to utilities, as defined by USACE, as "any pipe or pipeline for the transportation of any gaseous, liquid, liquefiable, or slurry substance, for any purpose, and any cable, line, or wire for the transmission of electrical energy, telephone, electronic data, and radio or television communication." In accordance with Minnesota Statute 103G.2241, subdivision 3, and Minnesota Rule 8420.0420, subpart 4, a replacement plan is not required for wetland impacts resulting from the construction, maintenance, or repair of utility lines, including pipelines and associated facilities when such a project is authorized by USACE under Section 404 of the Clean Water Act. The applicant submitted a Notice of Intent to use this exemption to the Otter Tail County and Wilkin County LGUs concurrent with the USACE application and states it would keep BWSR and the LGUs apprised of the USACE permitting process.

5.7.9.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) includes the following measures to mitigate impacts on wetlands:

- "Wetlands and riparian areas shall be accessed using the shortest route possible in order to minimize travel through wetland areas and prevent unnecessary impacts" (**Appendix H**, Section 7.13, Wetlands and Water Resources).
- "No temporary workspace areas shall be placed within or adjacent to wetlands or water resources, as practicable" (**Appendix H**, Section 7.13, Wetlands and Water Resources).
- "To minimize impacts, construction in wetland areas shall occur during frozen ground conditions where practicable and shall be according to permit requirements by the applicable permitting authority. When construction during winter is not possible, wooden or composite mats shall be used to protect wetland vegetation" (**Appendix H**, Section 7.13, Wetlands and Water Resources).
- "Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area" (**Appendix H**, Section 7.13, Wetlands and Water Resources). EERA staff recommends this language be revised for clarity to say, "Soil excavated from the wetlands and riparian areas shall be contained in uplands and not placed back into the wetland or riparian area until necessary to restore the excavated trench in the wetland or riparian area."

- “Dewatering during periods of excessive precipitation or in areas where the natural groundwater table intersects the pipeline trench will not be directed into wetlands or water bodies. Dewatering discharges will be directed toward well vegetated upland areas. Should discharge activities need to be directed off the right-of-way landowner consent will be obtained and locations will be chosen to minimize impacts. All discharge activities will comply with applicable agency permits or approvals” (**Appendix H**, Section 7.13, Wetlands and Water Resources).
- “Areas disturbed by construction activities shall be restored to pre-construction conditions. Restoration of the wetlands will be performed by Permittee in accordance with the requirements of applicable state and federal permits or laws and landowner agreements” (**Appendix H**, Section 7.13, Wetlands and Water Resources).
- “Wetland and water resource areas disturbed by construction activities shall be restored to pre-construction conditions in accordance with the requirements of applicable state and federal permits or laws and landowner agreements. All requirements of the U.S. Army Corps of Engineers (USACE), Minnesota Department of Natural Resources (DNR), and local units of government shall be met” (**Appendix H**, Section 7.13, Wetlands and Water Resources).

Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant would mitigate impacts on wetlands by following measures in its Minnesota ECP. In addition, the applicant would mitigate potential impacts on wetlands through the following measures:

- At wetlands, the pipeline construction workspace width would be reduced from 100 feet to 75 feet. Where a wetland cannot support construction equipment (for example, in wetlands with saturated soils), construction activities would be accomplished from construction mats or using low ground pressure equipment. If used, construction mats would be removed upon project completion. To help mitigate the flow and deposition of sediments into wetlands, redundant sediment control measures would be installed and maintained immediately after clearing and prior to initial ground disturbance at wetlands located within 50 feet of the project and where stormwater flows to a wetland.
- The applicant would limit post-construction vegetation maintenance to promote the growth of the riparian filter strip (buffer) and maintain a 10-foot-wide corridor centered over the pipeline for ongoing maintenance, visual inspections, and to allow for corrosion and leak surveys. Between HDD entry and exit points at waterbody crossings, the applicant would not clear riparian wetland vegetation during construction or operations. Vegetation management would be limited to hand trimming necessary to set the HDD guidewires or a pump for water withdrawal.
- As recommended by MPCA, the applicant committed to revising its Minnesota ECP to address trench crowning/subsidence (see response to Supplemental Information Inquiry #12 in **Appendix I**) if issued a route permit for the project. The revised ECP would include details for preventing excessive crowning or subsidence above the restored centerline. The applicant would restore the construction workspace to as close to the original pre-construction contours as practicable. If uneven settling occurs or surface drainage problems develop as a result of

pipeline construction, the applicant would provide additional land leveling services after receiving a landowner's written notice, weather and soil conditions permitting.

Mitigation Proposed During Comment Periods

In its comments on the draft EIS, DNR recommended that the applicant's Minnesota ECP include monitoring of groundwater expressions along the project route.

Mitigation Recommended by EERA Staff

EERA staff recommends that the applicant provide the revised Minnesota ECP to the Commission 30 days prior to the Plan and Profile submittal.

5.7.10 Wildlife and their Habitats

The ROI for wildlife and their habitats is the route width. For all three route alternatives, the majority of wildlife species present are common generalist species well-adapted to disturbed habitats and human activities. Wildlife species range from larger mammals to smaller reptiles, amphibians, and invertebrates. Fish, aquatic amphibians, and aquatic invertebrates could be present in intermittent and perennial streams crossed by the route alternatives. Larger, more mobile wildlife species would likely avoid portions of the ROI during construction. Smaller, less mobile wildlife species and/or species in burrows could be inadvertently injured or killed by construction equipment. Habitat loss or degradation would be minimal, as most of the route width for all three route alternatives is agricultural land. Potential impacts on wildlife would be comparable across all three route alternatives. Impacts on wildlife populations would be localized, short term, and negligible. Impacts on freshwater species are expected to be minimized by the use of HDD techniques and sediment controls. Operation of the project would have minimal, long-term impact on wildlife and their habitats.

5.7.10.1 Existing Conditions

Wildlife that could occur in the ROI are common generalist species associated with disturbed habitats and are accustomed to human activities occurring in the area (for example, agriculture, roads, and rural homesteads). Wildlife species in the area include white-tailed deer, coyote, beaver, muskrat, river otter, rabbits, squirrels, red and gray fox, raccoon, bald eagles, woodcock, ruffed grouse, wild turkeys, migratory waterfowl (for example, geese, ducks, trumpeter swans, herons), and various birds (for example, meadowlarks, sparrows, thrushes, songbirds, various woodpeckers, shore birds). Less mobile wildlife that could occur within the route width include reptiles and amphibians, such as turtles, snakes, frogs, toads, and small mammals like mice and voles. Invertebrate wildlife species, which include insects and pollinator insect species, also occur within the ROI. Rare and unique wildlife species are discussed in Section 5.4.5.

Fish species might be present in perennial or intermittent rivers and streams crossed by the route. Fish species records for the MPCA Biological Monitoring Station where the ROIs for RA-South and RA-Hybrid cross the Otter Tail River (Station ID 116RD008) identify 29 species of fish recorded at that station. Fish species records for the MPCA Biological Monitoring Station where the ROI for RA-South crosses the Pelican River (Station ID 16RD013) identify 23 species of fish recorded at that station. Records at the Biological Monitoring Station where the ROIs for RA-North and RA-Hybrid cross the Pelican River (Station ID 05RD111) identify 29 species of fish at that station. Fish presence records for these MPCA Biological Monitoring Stations are summarized in **Table 5-55**.

Table 5-55 Fish Species Found at MPCA Biological Monitoring Stations on the Otter Tail and Pelican Rivers

Species Common Name	Species Scientific Name	RA-South	RA-Hybrid	RA-North
Bigmouth Shiner	<i>Notropis dorsalis</i>	A	A,B	B
Blacknose Dace	<i>Rhinichthys atratulus</i>	C	B	B
Blackside Darter	<i>Percina maculata</i>	A,C	A,B	B
Bluegill	<i>Lepomis macrochirus</i>	A	A,B	B
Bluntnose Minnow	<i>Pimephales notatuts</i>	A	A,B	B
Bowfin	<i>Amia calva</i>		B	B
Brook Stickleback	<i>Culea inconstans</i>		B	B
Central Stoneroller	<i>Campostoma anomalum</i>	C	B	B
Channel Catfish	<i>Ictalurus punctatus</i>	A,C	A	
Common Carp	<i>Cyprinus carpio</i>	A,C	A,B	B
Common Shiner	<i>Luxulus cornutus</i>	A,C	A,B	B
Creek Chub	<i>Semotilus atromaculatus</i>	A,C	A,B	B
Emerald Shiner	<i>Notropis atherinoides</i>	A	A	
Fathead Minnow	<i>Pimephales promelas</i>	C	B	B
Genus Redhorses	<i>Moxostoma sp.</i>		B	B
Golden Redhorse	<i>Moxostoma erythrurum</i>	A,C	A,B	B
Goldeye	<i>Hiodon alosoides</i>	A	A	
Green Sunfish	<i>Lepomis cyanellus</i>	A,C	A,B	B
Hornyhead Chub	<i>Nocomis biguttatus</i>	A,C	A,B	B
Johnny Darter	<i>Etheostoma nigrum</i>	A,C	A,B	B
Largemouth Bass	<i>Micropterus salmoides</i>	A,C	A,B	B
Logperch	<i>Percina caprodes</i>	A,C	A	
Longnose Dace	<i>Rhinichthys cataractae</i>	C	B	B
Northern Hogsucker	<i>Hypentelium nigricans</i>	A,C	A,B	B
Northern Pike	<i>Esox Lucius</i>		B	B
Orangespotted Sunfish	<i>Lepomis humilis</i>	A	A	
Quillback	<i>Carpionides cyprinus</i>	A	A	
Rock Bass	<i>Ambloplites rupestris</i>	A,C	A,B	B
Sand Shiner	<i>Notropis stramineus</i>	A	A	
Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>	A,C	A,B	B
Silver Redhorse	<i>Moxostoma anisurum</i>	A,C	A,B	B
Smallmouth Bass	<i>Micropterus dolomieu</i>	A,C	A,B	B
Southern Brook Lamprey	<i>Ichthyomyzon gagei</i>	A	A	
Spotfin Shiner	<i>Cyprinella spiloptera</i>	A,C	A,B	B
Spottail Shiner	<i>Notropis hudsonius</i>	A	A	

Species Common Name	Species Scientific Name	RA-South	RA-Hybrid	RA-North
Stonecat	<i>Noturus flavus</i>	A	A	
Tadpole Madtom	<i>Noturus gyrinus</i>		B	B
Walleye	<i>Sander vireus</i>	A	A	
White Sucker	<i>Catostomus commersonii</i>	C	B	B
Yellow Bullhead	<i>Ameiurus natalis</i>		B	B
Total species present		33	39	29

MPCA Biological Monitoring Stations Cited (Station ID, years monitored):

A – Otter Tail River Station ID 116RD008 (2017) – Crossed by RA-South and RA-Hybrid

B – Pelican River Station ID 05RD111 (2005) – Crossed by RA-North and RA-Hybrid

C – Pelican River Station ID 16RD013 (2016, 2020) – Crossed by RA-South

These records indicate fish species found at the Biological Monitoring Stations on a given day and likely do not include other common fish species known to occur in Pelican and Otter Tail Rivers. Other common fish species in the Otter Tail River, in addition to those identified at the MPCA Biological Monitoring Stations, include black crappie, sauger, yellow perch, and black and brown bullheads. Lake sturgeon are also known to occur in the Otter Tail River; however, most are found in the upper reaches of the river near the outlet from Otter Tail Lake. DNR has released lake sturgeon into the upper Otter Tail River dating back to 2001. As a result, there are documented occurrences of lake sturgeon in the Otter Tail River well upstream of all three route alternatives. In addition, DNR has recently tagged and released lake sturgeon into the lower Otter Tail River.

Fish species found commonly in the Pelican River, in addition to those identified in the MPCA Biological Monitoring Station records, include smallmouth bass, perch, and black and brown bullheads. The variation in waterbody characteristics at the route crossings affects the potential habitat for fish. Habitat suitability depends on species-specific needs combined with factors such as the waterbody's size, flow regime, water quality, aquatic and riparian vegetation, and the setting and geographic location of the watershed.

The Otter Tail River also supports healthy and diverse freshwater mussel populations. A Habitat Suitability Criteria study conducted on the Otter Tail River found over 4,800 mussels representing 13 species. The study found variable stream gradient, water velocity, and depth conditions that provided diverse mussel habitats suitable for a range of species.²³⁵

The DNR Watershed Health Assessment Framework (WHAF) ranks the health of a watershed along five biological, geological, and water quality components and generates a score from low health to high health. The Watershed Health Assessment Framework rates the ROIs of all three route alternatives as “low.”²³⁶

Minnesota defines Species in Greatest Conservation Need (SGCN) as “native animals, nongame and game, whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long-term health and stability. Also included are species for which Minnesota has a stewardship responsibility.”²³⁷ The Wildlife Action Network is “mapped terrestrial and aquatic habitats, buffers, and connectors that represent a diversity of quality habitat...representing viable or persistent populations and ‘richness hotspots’ of SGCN.”²³⁸ The Otter Tail River is a mapped feature in the Wildlife Action Network. This feature received a rank of low to medium-high around the eastern portion of RA-South and RA-Hybrid. RA-North does not cross the Otter Tail River. **Table 5-56** identifies stressors that contribute to population declines in species of greatest conservation need. “Habitat-related

stressors were considered a predominant stressor for 70 percent of SGCN (241 of 346 species), indicating that loss, degradation (including from contaminants), and fragmentation of habitats are the most serious challenges facing SGCN populations.”²³⁹

Table 5-56 Habitat Stressors for Species of Greatest Conservation Need²⁴⁰

Stressors	% Predominant Factor^a
Habitat Stressors	70
Habitat degradation	38
Habitat is rare, vulnerable, or declining	35
Habitat loss	31
Habitat fragmentation	23
Depends on natural processes that are no longer within natural range of variation	10
Contaminants	9
Requires large home range or multiple habitats as part of their life cycle	4
Depends on large habitat patch	4
Other Stressors: Specific Threats	13
Invasive animal species	9
Disease	3
Overexploitation, collecting, bounty killing	2
Deliberate killing	1

^a The inverse of the percentages for each problem does not necessarily represent the percentage of SGCN for which the factor is not a problem, but instead might indicate that there is not sufficient information available to determine the level of influence the problem has on SGCN.

Habitats in the local vicinity consist of open land, wood land, and wetland habitats. Open land habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Woodland habitat consists of areas of deciduous plants, coniferous plants, or both and associated grasses, legumes, and wild herbaceous plants. Wetland habitat wildlife consists of open, marshy, or swampy shallow water areas.²⁴¹

Linear corridor projects have the potential for fragmenting wildlife habitats. Habitat fragmentation can be a moderate to significant long-term impact when it occurs in more natural, less prevalent vegetation communities. The ROIs for all three route alternatives are dominated by agricultural land, with small, isolated areas of deciduous forest, wetlands, and other non-agricultural habitats.

5.7.10.2 Potential Impacts

Construction of the pipeline along any of the three route alternatives would not significantly diminish wildlife habitat quality or availability. This is because habitat quality is already relatively low overall, and those areas of higher habitat quality comprise less than 5 percent of the construction workspace and less than 4 percent of the operational ROW for any of the route alternatives.

Impacts from construction activities would likely result in the loss of individuals of certain wildlife species. The species most likely to be directly impacted by construction are those that are small, with limited mobility and/or visibility, such as small mammals, amphibians, and invertebrates. Burrows, dens, and other types of low or subsurface habitats might be removed, crushed, or damaged by construction. Although impacts on individual wildlife would be permanent and significant, the impact on the viability of any given wildlife species would be short term and negligible to minimal.

Larger and/or more mobile wildlife using existing habitats within the ROI are expected to be displaced temporarily during construction due to increased human activity (for example, noise, odors, human presence). Most mobile wildlife would return to the area after construction. Impacts on displaced wildlife would be localized, short term, and negligible.

Construction and operation of the project facilities would occur in developed areas or in agricultural areas, where wildlife habitat is generally limited. The capture facility and MLV sites would be graveled and fenced, significantly limiting use by wildlife.

Impacts on ground-nesting birds could occur as part of clearing and trenching activities. Following construction, impacts on avian species are not anticipated as the pipeline would be underground during operation. Information regarding known raptor nests within the route widths is not known at this time. In the event that a raptor nest would need to be moved, the relocation would follow species-dependent DNR requirements, which could include placing the nest back on the new structure or constructing a separate nesting platform. The relocation of a raptor nest would be a short-term, negligible impact, if properly timed. Impacts on the overall viability of local avian species populations would be short term and negligible.

Sediment entering streams from exposed soils during construction could have an impact on fish and mussel species. Erosion and sediment control BMPs, as described in the Minnesota ECP, would be used to minimize such impacts. Streams would be crossed using HDD or isolated dry-trench crossing methods, as described in Section 5.7.8.2. Dry-trench crossing methods reduce turbidity during construction of a waterbody crossing compared to flowing open cut methods. HDD crossings would impact habitat for freshwater species only in the event of an inadvertent release of drilling mud. A release of drilling mud would have localized, short-term, minimal impacts on fish populations near the point of the release. Impacts on mussels from an inadvertent release of drilling mud are described in Section 5.7.5.2. With implementation of erosion and sediment control BMPs and use of HDD and dry-trench crossing methods, the project should have localized, short-term, negligible impacts on fish and mussel populations.

Reptiles, such as snakes, move underground below the frost line and become inactive or hibernate over winter months and then emerge in early spring.²⁴² Turtles and amphibians generally hibernate under pond bottoms, but would also hibernate on land underneath the frost line, and also emerge in early spring. Impacts on overwintering reptiles and amphibians could occur during early spring construction; that is, individuals might be inadvertently killed, should disturbance occur at their place of overwintering prior to emergence. Impacts on individuals of reptile and amphibian species would be permanent and significant. Habitat disturbance resulting from the project is not expected to result in a decline in local reptile and amphibian populations. The majority of the habitat types available to reptiles and amphibians is agricultural, with relatively little wetland, forested, aquatic, or open upland habitat available. While some reptile and amphibian species use agricultural habitat, the project's impact on more preferred habitat types would be minimal. Therefore, the project's impact on reptile or amphibian species would be short term and minimal.

Due to the relatively small size of insects in each developmental stage, it is difficult to estimate the size and extent of potential impacts on insect populations. “Insects may winter above or below ground as eggs, larvae, pupae, or adults, depending on the species” in areas like grass thatch, leaf litter, bunch grasses, tunnels in wood, etc.²⁴³ Early spring construction could have an impact on insects, on the ground or in the litter layer, that have not yet hatched or become active. Given the broad distribution of most insect species in the ROI, the impacts on insect populations overall would be short term and negligible.

Potential long-term impacts on terrestrial and aquatic species are anticipated to be minimal along all route alternatives. Operational impacts are expected from continued maintenance of the ROW. Impacts on wildlife habitat would be associated primarily with clearing activities associated with project construction and conversion of existing habitat to maintained ROW. Regardless of the route alternative selected, wildlife habitat would be converted to maintained route corridors. These direct impacts would be long term and minimal because most of the ROI is cultivated cropland.

5.7.10.3 Mitigation

Commission Sample Routing Permit

The sample routing permit (**Appendix H**) includes the following mitigation measures that apply to protection of vegetation, and thus to support wildlife habitats:

- “Care shall be used to preserve the natural landscape, minimize tree removal, and prevent any unnecessary destruction of the natural surroundings in the vicinity of all pipeline construction and restoration activities” (**Appendix H**, Section 7.11, Landscape Preservation).
- “Areas disturbed by construction activities shall be restored to pre-construction conditions” (**Appendix H**, Section 7.13, Wetlands and Water Resources).
- “The Permittee shall clear the permanent right-of-way and temporary right-of-way preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation in areas such as trail and stream crossings where vegetative screening may minimize aesthetic impacts, to the extent that such actions do not impact the safe operation, maintenance, and inspection of the pipeline and are in compliance with all applicable laws and regulations” (**Appendix H**, Section 7.14, Vegetation Management).
- “The Permittee shall restrict pesticide use to those pesticides and methods of application approved by the Minnesota Department of Agriculture, DNR, and the U.S. Environmental Protection Agency. Selective foliage or basal application shall be used when practicable. All pesticides shall be applied in a safe and cautious manner. The Permittee shall provide notice of pesticide application to affected landowners and known beekeepers operating apiaries within three miles of the project site at least 14 days prior to such application” (**Appendix H**, Section 7.15, Application of Pesticides).

Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations” (**Appendix H**, Section 8, Other Permits and Regulations).

Applicant-Proposed Mitigation

The applicant would mitigate impacts on wildlife by implementing measures in its Minnesota ECP, including the following:

- To allow the passage of wildlife and livestock, and to facilitate the natural drainage pattern, spoil piles would have gaps that align with the breaks of the strung pipe. Plugs of subsoil in the ditch would be left as moderate grade ramps, or bridges may also be constructed to allow the passage of wildlife and livestock.
- Trenching procedures would be followed closely to ensure the length of time the trench is left open is minimized to the extent practicable. Trenches would be inspected immediately prior to backfilling in order to locate and remove any trapped animals present, as recommended by DNR.
- USFWS would be contacted regarding proper avoidance measures for ground-nesting birds ahead of construction.

In addition, the applicant would use HDD for crossing certain waterbodies and implement the following BMPs recommended by DNR for native plant communities and MBS sites:

- Do not park equipment, stockpile supplies, or place spoil within the MBS sites.
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species.
- Use effective erosion prevention and sediment control measures.
- Revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible.
- Use only weed-free mulches and seed mixes.

The applicant would use wildlife-friendly erosion and sediment control BMPs that contain biodegradable netting with natural fibers and would avoid the use of plastic mesh to minimize impacts on wildlife.

The impacts on fisheries from pipeline construction would be reduced with the implementation of waterbody crossing BMPs. The applicant would avoid or minimize impacts on fisheries by implementing specific BMPs during construction, including but not limited to:

- Selecting a crossing technique that is most appropriate for each waterbody, after consultation with DNR.
- Completing in-stream work activities within the timeframes outlined in Section 4.4 of the Minnesota ECP, including DNR in-water work restrictions to protect critical fish life phases.
- Installing and maintaining redundant sediment control measures immediately after clearing and prior to initial ground disturbance at waterbodies located within 50 feet of the project and where stormwater flows to a waterbody. On portions of the project where work would be occurring during applicable “work in water restrictions” for public waters, all exposed soil areas within 200 feet of the water’s edge, and that drain to that water, would be stabilized within 24 hours during the restriction period. Stabilization of all exposed soils within 200 feet of the public water’s edge, and that drain to that water, would be initiated immediately and completed within 7 calendar days whenever construction activity is complete or has temporarily ceased on any portion of the site outside of the restriction period. Stream banks would be protected from erosion using temporary and long-term soil stabilization techniques. Examples of erosion control

techniques include placement of erosion control blankets, mulch, straw bales, bio-logs, silt fence, and prompt seeding following construction activities.

- Establishing perennial vegetative buffers of up to 50 feet adjacent to lakes, rivers, and streams and buffers of 16.5 feet adjacent to ditches. The applicant would minimize the long-term impacts from riparian clearing by limiting post-construction vegetation maintenance to promote the growth of the riparian filter strip (buffer), and only maintaining a 10-foot-wide corridor centered over the pipeline for ongoing maintenance and visual inspections of the pipeline and to allow corrosion and leak surveys to occur. Vegetation between HDD entry and exit points would not have routine clearing or mowing. Clearing would be limited to hand trimming necessary to set the HDD guidewires or a pump for water withdrawal.

Mitigation Proposed During Comment Periods

DNR recommended the following mitigation for reducing potential impacts on wildlife and their habitats:

- Limit the length of time the trench is open.
- One additional mitigation for nesting birds in areas of grass/shrub vegetation to be cleared for construction would be to mow/cut these areas during non-nesting season prior to actual construction so suitable nesting habitat is not present prior to final clearing and construction.
- Follow MnDOT's 2020 *Standard Specifications for Construction* for rolled erosion control materials that specify only natural fibers with no plastic mesh be used.

Mitigation Recommended by EERA Staff

None recommended.

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Chapter 6 Potential Impacts and Mitigation for Alternative Technologies

Chapter 6 studies two alternative technologies: a suite of agricultural practices and a suite of energy use and efficiency changes. These alternative technologies would not reduce emissions from fermentation at the ethanol plant because they do not use carbon capture and sequestration. The technologies could, however, reduce the carbon intensity score (CI score) of the ethanol produced at the ethanol plant through lowered GHG emissions in the ethanol life cycle and by increased sequestration of CO₂ in soil. These technologies could enhance the marketability of the ethanol produced at the ethanol plant in LCFS markets if implemented. The technologies discussed in this chapter are complementary, not only to each other, but to carbon capture and storage as well. The lowest CI score comes from doing both.

This chapter is organized as follows:

- Section 6.1 describes what a CI score is and how it is determined.
- Section 6.2 discusses agricultural practices that could avoid emissions to lower the CI score of corn cultivation, such as no-till or reduced tillage, reduced fertilizer application, retaining corn stover/residues, and cover cropping.
- Section 6.3 discusses energy use and efficiency strategies that could be undertaken by the ethanol plant, including upgrading process equipment, implementing combined heat and power systems, and using renewable energy.
- Section 6.4 discusses energy use and efficiency strategies that could be undertaken by feedstock producers, such as biodiesel powered machinery and electrifying the grain drying process.
- Section 6.5 analyzes the impacts of the technology alternatives on human and environmental resources and how those impacts compare to the applicant's proposed project. It also identifies applicable mitigation measures that could reasonably be implemented to avoid or minimize the impacts.
- Section 6.6 discusses conclusions of this analysis.

This chapter analyzes the two alternative technologies ordered by the Commission and was prepared with data collected and analyzed "commensurate with the importance of the impact and the relevance of the information to a reasoned choice among alternatives."¹ The Commission cannot select any of these alternative technologies as an alternative; however, the information provided will inform the Commission's decision to issue a pipeline routing permit.²

This analysis assumes the project would not impact ethanol production and that captured CO₂ would not be used for EOR but would be sequestered as proposed by the applicant. Costs are not included as part of this analysis. Information related to operation of the ethanol plant and its current energy use was provided by the applicant in response to EERA staff's Supplemental Information Inquiries, which are included in **Appendix I**.

6.1 Carbon Intensity Score

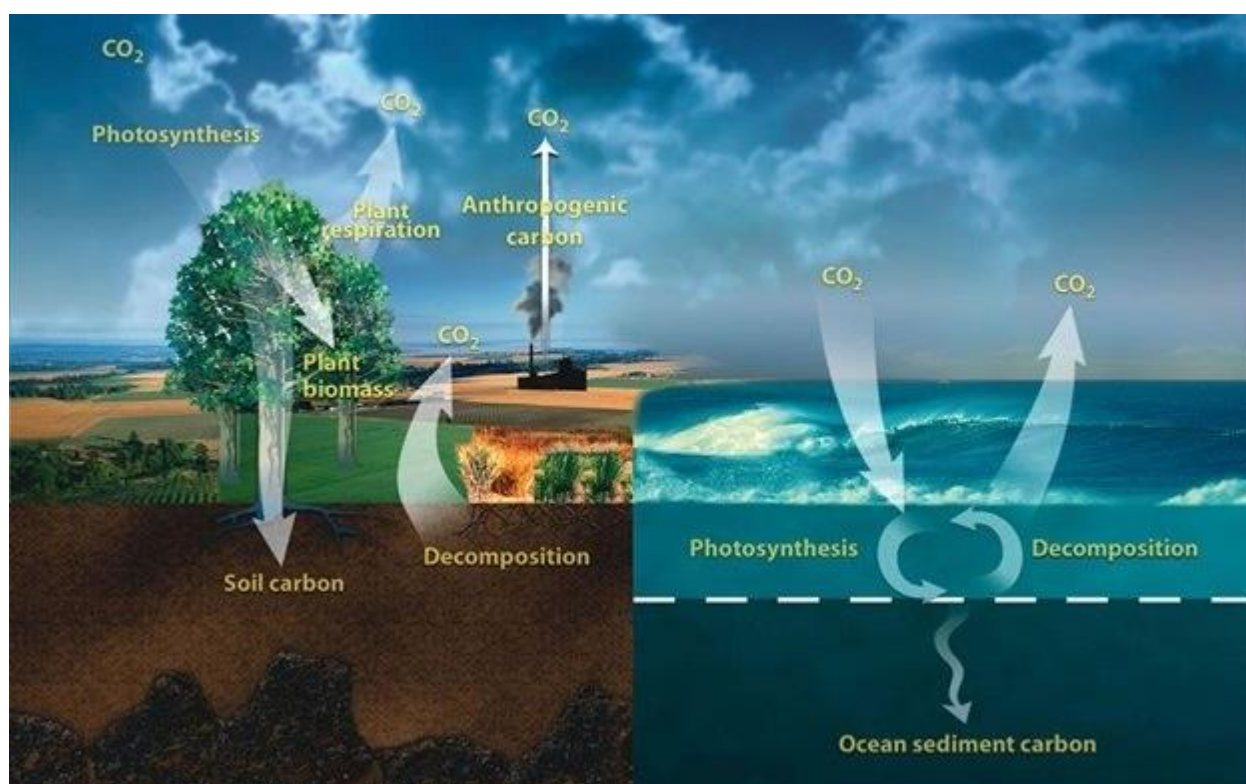
The CI score is a metric used by LCFS markets to determine the credits or deficits a fuel can generate based on its environmental impact through its life cycle.

This section describes the carbon cycle and CI score, how the CI score is derived, and why it is important in the context of the proposed project. This section also provides background information to summarize the current state of the science, estimation, and regulation of GHG emissions from fuel production and the relative ranking of different fuel types in LCFS markets.

6.1.1 The Earth's Carbon Cycle

The Earth's carbon cycle is a natural process that involves the dynamic transport of carbon atoms among the atmosphere, oceans, soils, and living organisms, as illustrated in **Figure 6-1**. This cycle plays a role in maintaining a balance of CO₂ in the atmosphere.

Figure 6-1 Earth's Carbon Cycle³



Key components of the carbon cycle include biological respiration, photosynthesis, and decomposition. The largest sinks of CO₂ are soils and oceans. Soils absorb CO₂ from the atmosphere, which is primarily mediated by plants through photosynthesis. During photosynthesis, CO₂ is converted into sugars and other carbon-based compounds that are released through the roots into the soil. These carbon-based compounds are either stored in the soil as organic matter or used as a nutrient source for microorganisms. Not all CO₂ released from microbial respiration and decomposition escapes into the atmosphere; some of it is converted into more stable forms of organic carbon and deposited long term. That process is called soil carbon sequestration.

Combustion of fossil fuels acts as a large source of GHGs such as CO₂ and other GHGs that also have global warming potential—mainly CH₄, N₂O, sulfur hexafluoride (SF₆), carbon tetrafluoride (CF₄/PFC-14), and a host of hydrofluorocarbons and chlorofluorocarbons.⁴

Human activities have accelerated an increase in atmospheric CO₂e. As a result of these emissions, increased temperatures and shifting climates have triggered feedback loops releasing even more CO₂e that was previously stored in glaciers, permafrost, forests, and all terrestrial ecosystems including agricultural lands.⁵ The United States Department of Energy (DOE) defines CO₂e as representing the total climate impact of all GHGs, not just CO₂. CO₂ is the primary GHG emitted through human activities such as the combustion of fossil fuels, deforestation, and land use change.

6.1.2 Definition of CI Score and How it is Derived

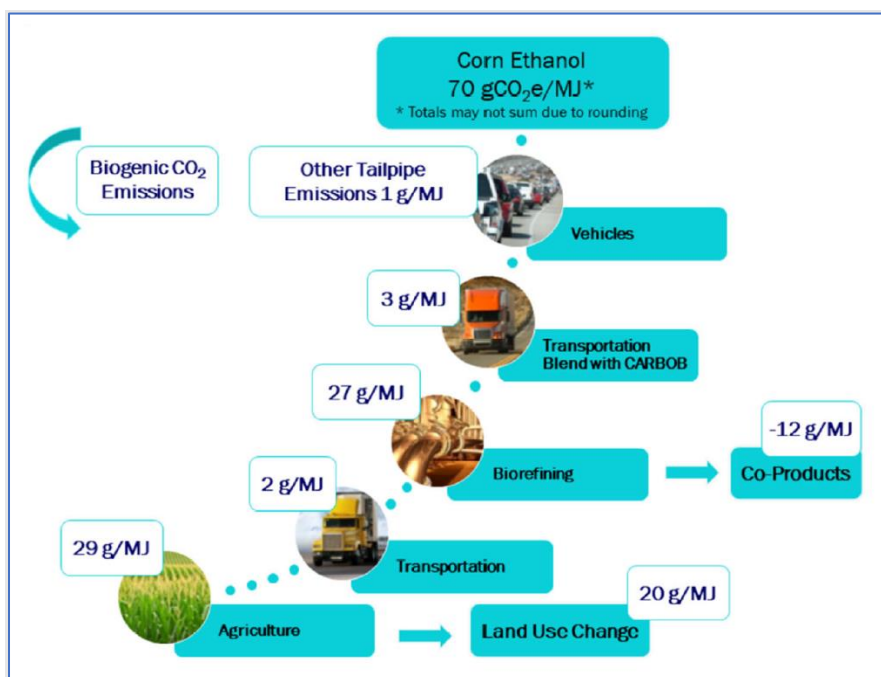
The CI score is a key indicator for energy-related CO₂e emissions projections and tracking. The CI score is defined as the amount of CO₂e emissions per unit of energy produced. It is one of the four components of the Kaya identity—a mathematical framework that estimates the amount of CO₂e emissions from human activities.⁶ Depending on the pathway of the fuel production life cycle, the CI score can be extremely low or even negative, implying that the entire fuel production process takes more CO₂e out of the atmosphere than it emits. Conversely, when little or no CO₂e is removed from the atmosphere and fuel production processes rely heavily on the combustion of fossil fuels, the CI score can be extremely high.

To accurately derive the CI score for a fuel, a rigorous life cycle assessment approach is employed. A life cycle analysis (LCA) for fuel involves using various models to assess the environmental impacts attributable to the fuel at each life cycle stage, from raw material sourcing to end use. The CI score for the fuel is then derived by aggregating the carbon intensity at each stage to represent the net amount of CO₂e emission per unit of energy contained within the finished fuel.

The CI score serves as a quantitative indicator of the net carbon intensity of a fuel and is expressed in grams of CO₂e emitted per unit of energy produced by the fuel in grams of CO₂e per megajoule of energy (gCO₂e/MJ).

$$\text{CI score} = \frac{\text{Total mass of CO}_2 \text{ emissions from LCA of fuel}}{\text{Total power generated from biofuel}} = \frac{\text{gCO}_2\text{e}}{\text{MJ}}$$

Based on the models and methods used by the State of California, the general life cycle associated with the average CI score for corn ethanol is shown in **Figure 6-2** and is used as an illustrative example of CI scores associated with each stage.

Figure 6-2 Fuel Life Cycle for Corn Ethanol⁷

Land use change refers to the indirect emissions associated with the conversion of land to meet demand for a product when land previously producing that product switches to corn production for ethanol feedstock. This often occurs in response to market driven pressures and affects all crop-based feedstocks.⁸

Each producer of corn ethanol will have a different CI score yet fall within a range associated with a fuel pathway. A fuel pathway is a detailed description of the life cycle stages of fuel production and use for a specific transportation fuel. The three main components of a fuel pathway include:

- **Feedstock.** A type of renewable biomass that is converted into a renewable fuel.
- **Production process.** The type of technology used to convert biomass into renewable fuel.
- **Fuel type.** Renewable fuels include liquid and gaseous fuels derived from biomass sources.

The range of CI scores associated with a given fuel pathway stems from CI score variability at each stage of the life cycle, whether it's the distance feedstock must travel from farm to biorefining, or the electricity source mix used by the ethanol plant's electric utility provider.

6.1.3 Why CI Score is Important

The CI score is a necessary metric used in the evaluation of the environmental impact of fuel production. Its importance lies in providing a quantifiable measure of GHG emissions associated with the entire life cycle of a fuel, from harvest/extraction to consumption. The CI score guides stakeholders, policymakers, and industries in their efforts to reduce carbon emissions and advance alternative energy sources.

LCFS are regulatory frameworks designed to reduce the carbon intensity of fuels and promote the use of more sustainable fuel alternatives. These standards play a role in addressing climate change by incentivizing the production and consumption of low-carbon and renewable fuels. The CI score is a

central component of the LCFS market. It serves as the primary metric to quantify and compare the environmental impact of different fuels.

LCFS regulation requires fuel reporting entities to submit a discrete set of inputs used to calculate the CI score along with summary data and documentation from the applicants' monitoring systems. For example, the California Air Resources Board (CARB) requires determination of a fuel pathway as either Tier 1 (first generation fuels like starch and sugar-based ethanol) or Tier 2 (next generation fuels like ethanol from crop residues, algae biodiesel, hydrogen). Tier 1 and Tier 2 pathway applications require independent verification of data reports by a CARB-accredited verifier. Certification approval processes are managed through an interactive, secure web-based system to track the fuel pathway certification process, fuel transactions and recordkeeping, and credit generation and transfers. Current submission requirements include a CARB-issued CI score summary in Microsoft Excel with operating conditions, supporting documents as required by operating conditions for the selected pathway, and previously certified calculation of the CI score from 24 months of operational data from the preceding 2 calendar years.⁹

With the passage of the Inflation Reduction Act, and the creation of the Clean Fuel Production Credit under section 45Z in particular, biofuel producers are eligible for a tax credit of \$0.02 per gallon for every CI point below 50 kilograms of CO₂e per Metric Million British thermal units (kgCO₂e/MMBtu), with a maximum of \$1.00 per gallon. The basis for the CI calculation under this program is the most recent Argonne National Laboratory's Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model as measured in kgCO₂e/MMBtu. The EPA renewable fuel standard program requires that a renewable fuel (or conventional biofuel; typically ethanol derived from corn starch) must meet a 20 percent life cycle GHG reduction compared to a 2005 gasoline baseline.¹⁰ The 2005 EPA average gasoline baseline for CI is 93.08 gCO₂e/MJ. The current estimated (2023) Argonne GREET CI score, as provided by Green Plains, of the Otter Tail ethanol facility is 59 kgCO₂e/MMBtu (equivalent to 56 gCO₂e/MJ), which meets this requirement at an estimated 40 percent reduction.¹¹

Table 6-1 compares the CI scores of some common commodity crop feedstock ethanol to the CI score of gasoline.

Table 6-1 Carbon Intensity Scores of Common Fuels

	CI Score Range (gCO ₂ e/MJ)	Source	Location
Gasoline	93–101	Scully et al. 2021 ¹²	United States
Corn Ethanol	52.1–78.3	Scully et al. 2021 ¹³	United States
Wheat Ethanol	40–110	Yan and Boies 2013 ¹⁴	United Kingdom
Sorghum Ethanol	55.83–70.7 ^a	Lewandowski and Pape 2019 ¹⁵	United States

^a Weighted average ranges from *The California Low Carbon Fuel Standard: Incentivizing Greenhouse Gas Mitigation in the Ethanol Industry*, USDA, Office of the Chief Economist, November 2020.

The estimates in **Table 6-1** include emissions for land use change. Research funded by the National Wildlife Federation and DOE found that ethanol is likely at least 24 percent more carbon-intensive than gasoline due to emissions from land use change associated with corn cultivation practices.¹⁶ The ongoing scientific debate among GREET model authors and other industry experts accounts for the large range of estimates concerning the impact of land use change on the CI score of ethanol.^{17, 18, 19, 20, 21, 22}

Each LCFS market functions by setting an annual CI score target based on the average life cycle CI score of all transportation fuels for that year. Over time, that target decreases to reach emissions reduction goals by a given target year. All fuel sellers within that market must report how many million gallons are sold. Conventional fuels such as gasoline and diesel, which have the highest CI scores, would be compared to the target CI score to determine how many additional GHGs were emitted past the target. Companies report deficits against the annual CI score target.

To meet the LCFS markets' annual CI score target, companies must make up the difference of their reported deficit by purchasing credits. Companies can earn credits by selling low CI score fuels within the LCFS market that come in under the annual target. Credits are then sold to high CI score fuel producers to reach the annual target for each compliance period. Non-compliance may result in penalties.

Each LCFS market sets its own CI score targets based on transportation emissions reduction goals. The first LCFS was established by the State of California in 2009 and developed and implemented by CARB in 2010. CARB approved amendments to regulations to reach more aggressive targets in recent years. All current fuel pathways certified by CARB are available on the CARB website for reference.²³

These standards have paved the way for defining LCFS regulations in other jurisdictions across the United States such as Oregon's Clean Fuels Program²⁴ and Washington's Clean Fuel Standard.²⁵ Other states including Illinois,²⁶ New Mexico,²⁷ New York,²⁸ Michigan,²⁹ Minnesota,³⁰ and Massachusetts³¹ have passed or are considering bills to develop similar LCFS programs. A bill recently introduced in the United States House of Representatives would establish the first federal LCFS for aviation fuels.³²

In 2013, British Columbia became the first Canadian Province to introduce its own LCFS program with a similar structure to California's LCFS.³³ At the national level, Canada began implementing the Clean Fuel Regulations in 2023.³⁴

Demand for credits under these regulations create market signals for investment in low CI score fuels. The LCFS markets in the United States have increased investment in producing fuels with lower CI scores because of the increased incentive to produce fuels with CI scores that create credits. These credits can then be sold. As such, biofuel producers seek to lower their CI score to compete in these markets, which creates opportunities for farmers as feedstock providers.

6.1.4 Project CI Score

The ethanol plant produces corn ethanol. In accordance with its 2019 *Air Individual Permit Part 70 Reissuance 11100077-101*, MPCA permits the ethanol plant to produce up to 65 million gallons of undenatured ethanol per year. The ethanol plant conducts annual CI score calculations based on current operations. CARB has most recently certified the ethanol plant's fuel pathway with a CI score of 72.83 gCO₂e/MJ. The CI score for the ethanol fuel pathway at the ethanol plant has since been recalculated and updated by the Green Plains ethanol plant with a CI score of 56 gCO₂e/MJ.³⁵ The project proposes to capture and store CO₂ from ethanol fermentation at the ethanol plant, thus reducing the CI score of the ethanol produced.

Commenters questioned whether the project would be able to capture 100 percent of the ethanol plant's emissions. Therefore, four capture efficiency rates were evaluated for comparison: 10, 40, 70, and 100 percent. This range covers the lowest capture rate regularly recorded by a CO₂ capture facility and a perfect capture efficiency.³⁶

The CO₂ capture and transport process itself will consume energy, which will subsequently add to the CI score. To determine the net CI score for the different capture scenarios, it is assumed 0.19 MMTPA of CO₂ is generated by the ethanol plant and that the project will consume 38,501,733 kWh per year. The following equation shows how the net CI score of the ethanol plant is estimated:

$$\text{Net CI Score} = (\text{Initial CI Score} + \text{Electrical Energy Use} + \text{Capture Facility Loss}) - \text{CO}_2 \text{ Captured}$$

Table 6-2 presents potential net CI scores with emissions assumptions and a range of capture efficiency rates. The initial CI score presented reflects the plant's most recent Certified Carbon Intensity Pathway through the CARB LCFS program. Recent reporting from the Green Plains ethanol plant presents an updated CI score estimate of 56 gCO₂e/MJ, indicating the ethanol plant is capable of reducing its CI score independent of the project.³⁷

Table 6-2 Project CI Score Range

Capture Efficiency	Initial CI Score (gCO ₂ e/MJ) ^a	Electricity Use (gCO ₂ e/MJ) ^b	Capture Facility (gCO ₂ e/MJ) ^c	CO ₂ Captured (gCO ₂ e/MJ) ^d	Net CI Score (gCO ₂ e/MJ) ^e
100%	72.83	0.9724	2.99	(35.43)	41.4
70%	72.83	0.9724	2.99	(24.80)	52.0
40%	72.83	0.9724	2.99	(14.17)	62.6
10%	72.83	0.9724	2.99	(3.54)	73.2

Note: Values in parentheses are negative.

^a CARB published LCFS Pathway Certified Carbon Intensities as of July 2024; Applicant & Pathway: Fuel Producer: Green Plains Otter Tail LLC (4180); Facility Name: GREEN PLAINS OTTER TAIL, LLC (70110); Midwest Corn, Dry Mill; Dry DGS and Wet DGS, Corn Oil and Syrup; Natural Gas, Grid Electricity; Starch Ethanol produced in Fergus Falls, MN; Finished fuel transported by rail to California; Composite CI. (3.0); Current CI Score = 72.83 gCO₂e/MJ; Certification Date = 2/1/2024.³⁸

^b Calculated using a Lake Region Electric Cooperative emission factor of 291.4 lb CO₂e/MWh, which is equal to 132.2 gCO₂e/kWh. Annual estimated project electricity use is 38,501,733 kWh. [CO₂e (MT/yr) = 38,501,733 kWh x 132.2 gCO₂e/kWh x 0.0022046 lbCO₂/2000 lb/ton x 0.907185 metric ton/short ton = 5089.7]. [CO₂e (g/MJ) = 5089.7 MT CO₂e/yr x (10⁶ g/ 1 MT) x (1 yr/65M gal) x (1 gal/80.53 MJ) = 0.9724 gCO₂e/MJ].

^c CO₂ emissions generated from operation of the capture facility or from the fermentation process not captured due to system maintenance, repairs, or upset condition. Values provided as an estimated maximum loss for a worst-case scenario.

^d CO₂ captured shown in units of CO₂e; Global warming potential for CO₂ is 1.

^e Net CI score rounded to three significant figures.

The life cycle phases being studied in this chapter focus on opportunities at the agriculture stage, as well as at the production stage, to lower the total CI score of the ethanol produced at the ethanol plant. The embodied carbon associated with the construction of the capture facility is not included in the estimated net CI score, which can be found in Chapter 5, Table 5-39. The score could be reduced at various life cycle stages, including the following:

- Agricultural production
- Transportation of feedstock to plant
- Feedstock processing
- Fermentation and distillation
- Creation of co-products and by-products
- Energy source for plant operations

- Distribution and transportation
- End-use combustion

6.2 Agricultural Practices

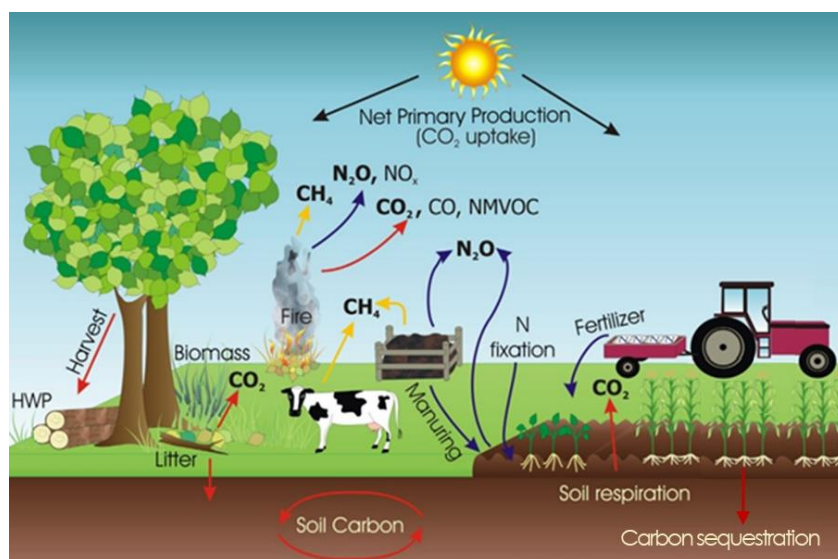
6.2.1 How CI Score Applies to Agricultural Practices

This section describes the role of agriculture as an avenue for mitigating the carbon intensity associated with corn ethanol production at the ethanol plant. This analysis describes alternative agricultural technologies that can reduce the CI score of the ethanol produced to enhance its marketability in LCFS markets. The impacts of alternative agricultural technologies on resources are addressed in Section 6.5.

The emissions stemming from agricultural practices account for nearly 25 percent of the total CI score.³⁹ The CI score of corn ethanol across the United States has varied over time and within each stage of the LCA. The DOE attributes reduced CI scores to several factors, including improvements in corn yields, implementation of conservation practices, and increased efficiency in ethanol production technologies.⁴⁰

Soils can act as carbon sinks, sequestering CO₂ from the atmosphere, while natural processes such as plant and animal respiration and decomposition act as a source of GHG emissions. Management activities such as energy use and fertilizer and pest management applications are also sources of GHG emissions. These dynamic fluxes of GHGs from farming operations are shown in **Figure 6-3**. Changes in land management practices can sequester CO₂ from the atmosphere.⁴¹

Figure 6-3 Agricultural GHG Sources and Sinks⁴²



HWP = harvested wood products; NMVOC = non-methane volatile organic compounds

The carbon intensity of corn grain cultivation for biofuel can be quantified using industry standard models with input data reflecting the biological, environmental, and market-driven changes in corn production. A transparent and easy-to-use tool for calculating the CI score of biofuel feedstocks, the Feedstock Carbon Intensity Calculator, uses farming inputs and on-farm energy consumption to estimate GHG emissions associated with upstream fuel manufacturing and on-farm use. The Feedstock Carbon Intensity Calculator is integrated into a dynamic version of the GREET model, which evaluates the LCA of over 100 different fuel pathways.⁴³

The GREET default farming input data are provided in the model as references and are derived from publicly available data and reports from USDA, including the National Agricultural Statistics Service, Economic Research Service, and Office of the Chief Economist. USDA and the Economic Research Service periodically compile on-farm energy consumption data at the United States state level from the Agricultural Resource Management Survey for corn, soybean, and rice. These integrated tools were developed by the Argonne National Laboratory (funded by DOE's Office of Energy Efficiency and Renewable Energy) for quantifying the LCA of fuel feedstocks. These tools have determined an average CI score for corn farming to be approximately 29 gCO₂e/MJ.⁴⁴

6.2.2 *Agricultural Practices for Ethanol Plant Farmers*

The ethanol plant sources its biofuel feedstock from local farmers, grain elevators, and farmer co-ops within trucking distance (that is, within approximately 40 miles from the ethanol plant's location in Fergus Falls), primarily within Otter Tail and Wilkin Counties (see **Appendix I**).

The ethanol plant calculated its CI score using industry-approved standards and tools based on the research methodology adopted by the Argonne National Laboratory research supported by DOE, EPA, and states' regulations. The ethanol plant used the following models to compare to the CI score of corn:

- Argonne National Laboratory GREET model
- CARB GREET model
- Washington State GREET model
- Canada's recently introduced Clean Fuel Regulations

The ethanol plant calculated its CI score for its ethanol on a per bushel basis of its primary feedstock source of USDA #2 Yellow corn grain. The CARB Tier 1 calculator⁴⁵ estimates that each bushel of corn grain has a CI score of approximately 6,442.02 gCO₂e/bushel. This is equivalent to a CI score of 21.44 gCO₂e/MJ for agricultural practices associated with corn feedstock production for the ethanol plant (see responses to Supplemental Information Inquiries #4 and #8 in **Appendix I**).

6.2.3 *Alternative Agricultural Strategies*

Alternative agricultural practices could be implemented in place of conventional agricultural practices to reduce the CI score of the corn cultivation portion of the corn ethanol LCA.

For the purposes of this EIS, conventional farming practices means practices such as tillage, irrigation, synthetic inputs (fertilizer, herbicide, pesticide), and cultivation of a concentrated monocrop. Many of these practices are carbon intensive and contribute to reductions in soil carbon sequestration.

Alternative agricultural practices can lower the CI score of cultivated corn by reducing GHG emissions from various land management practices. Minnesota has set a goal to reduce GHG emissions by 50 percent by 2030 and by 100 percent by 2050 from a 2005 baseline.⁴⁶ Agriculture accounts for approximately 25 percent of Minnesota's GHG emissions, so strategies to reduce emissions from this sector are necessary to reach statewide goals.⁴⁷ In addition to reducing CO₂e emissions and lowering CI scores of corn cultivation for ethanol, some alternative strategies could help maintain soil health and reduce erosion, which would help farms adapt to warmer and wetter conditions as the climate changes.⁴⁸

Farmers already implement various alternative agricultural practices like planting shelterbelt trees and reducing intensive tillage practices.⁴⁹ Minnesota's Buffer Law requires perennial vegetative buffers of up

to 50 feet along lakes, rivers, and streams and buffers of 16.5 feet along ditches.⁵⁰ These buffers help filter out phosphorus, nitrogen, and sediment. Many of the ethanol plant's farmer feedstock producers also already use alternative agricultural practices such as cover cropping, conservation tillage, no till, and precision fertilizer application; however, no quantitative data has been collected to estimate how extensively these practices are currently used.

Adopting additional alternative agricultural practices to further lower the CI score of corn cultivation is a strategy that can be quantitatively evaluated by estimating alternative future emissions scenarios. When considering alternative agricultural practices to study in this EIS, the following considerations guided our decisions for choosing alternative agricultural practices that are feasible and accessible to the ethanol plant's farmer producers:

- Alternative agricultural practices should be well-suited to the local climate conditions in Otter Tail and Wilkin Counties. That includes considerations for temperature, precipitation, and soil type.
- Alternative agricultural practices that align with the specific agroecological conditions of the region are more likely to be successful and sustainable.
- Alternative agricultural practices chosen for this evaluation must be feasible in terms of cost, equipment requirements, and ease of integration into existing farming systems. Accessibility is crucial for practical implementation by local farmers.

Selected alternative agricultural practices must not result in a decrease in the yield per acre of biofuel feedstock. Ideally, practices should aim to maintain or even increase yield, ensuring economic viability and sustainability of the biofuel production process. The practices chosen for evaluation are backed by industry-proven technologies or established regenerative agricultural knowledge/practices. This criterion ensures that the selected methods have been tested, validated, and demonstrated to be effective in real-world conditions, minimizing the risk associated with adopting new and untested technologies.

The most beneficial alternative agricultural practices, in terms of CI score, for farmers supplying corn grain to the ethanol plant are as follows:

- **No-till/Reduced Tillage.** Reducing soil disturbance helps promote soil carbon sequestration. Tillage can disrupt the soil structure, reduce water infiltration, accelerate decomposition of organic matter, and release GHGs into the atmosphere. Conventional practices that use intensive tillage often require fuel usage to power tractors and other heavy equipment. By reducing or eliminating tillage practices, farmers can save energy, which in turn can reduce the overall carbon intensity of the farming operation.
- **Cover Cropping.** Cover crops can be interseeded with corn during the growing season. They can also be planted in the fall after harvest. These crops can be terminated by winter temperatures or by mechanical or chemical practices in spring. Cover cropping practices have shown up to 3 percent increases in corn yields after 5 consecutive years⁵¹ and can reduce GHG emissions by 0.27 ton/acre.⁵² Planting legume species can increase soil nitrogen and reduce the need for added fertilizer in the spring.⁵³ Cover cropping can contribute to reducing the need for synthetic fertilizer through nitrogen fixation and phosphorus bioavailability.
- **Fertilizer Reduction.** Synthetic nitrogen-based fertilizers are carbon intensive. This is associated with the manufacturing processes and transportation. The machinery and equipment used to apply fertilizers also contribute to the overall carbon intensity associated with corn cultivation.

Improving fertilizer use efficiency (for example, application timing, injection into soil) reduces overall fertilizer application. Additionally, precision application that enhances nitrogen uptake by plants reduces nitrogen-based compounds that would otherwise be lost to the environment as emissions or runoff.

- **Retaining Corn Stover/Residues.** Leftover plant materials—like leaves, stems, and stalks—after harvest are agricultural residues and contain organic matter. The organic matter gradually decomposes and contributes to the organic content of the soil, which promotes carbon sequestration. Portions of the residues are sometimes used to graze livestock, sold as fodder, or burned in the field. Retaining crop residues like corn stover would help retain carbon in the soils and reduce emissions associated with grazing, burning, or processing for further transportation to the end user.

While these methods are proposed as potential alternative agricultural practices, there is active scientific discussion about the effectiveness of no-till/reduced tillage,^{54, 55, 56, 57} cover cropping,^{58, 59, 60} fertilizer reduction,⁶¹ and retaining crop residues on soil carbon sequestration rates and crop yields. Implementing alternative agricultural methods presents unique challenges and opportunities for feedstock producers.^{62, 63}

By combining these practices, farmers can optimize carbon sequestration in the soil while reducing emissions. Industry-standard GHG tools are used to model future changes in farm management practices to estimate the changes in CO₂e emissions. These tools help stakeholders make informed decisions about agricultural practices by estimating and comparing the carbon footprint associated with different management strategies.

6.2.3.1 Carbon/GHG Modeling

Several accessible tools and models are available for comparing different management strategies to estimate changes in GHG emissions. These tools, such as the following, cater to a diverse audience, including farmers, researchers, and policy makers:

- **COMET-Farm Tool.** This online tool developed by USDA allows users to estimate GHG emissions and carbon sequestration in agricultural systems. It covers a range of management practices, including tillage, cover cropping, and nutrient management.
- **Agriculture and Land Use National Greenhouse Gas Inventory Software.** This software was developed by EPA and Colorado State University and is based on methods in the *[Intergovernmental Panel on Climate Change] IPCC Guidelines for National Greenhouse Gas Inventories*. It is designed to support an evaluation of mitigation potential using the inventory data as a baseline for projecting emission trends associated with management alternatives.⁶⁴
- **DeNitrification-DeComposition (DNDC) Model.** This computer simulation models carbon and nitrogen biogeochemistry in agro-ecosystems. The model can be used for predicting crop growth, soil temperature and moisture regimes, soil carbon dynamics, nitrogen leaching, and emissions of trace gases, including N₂O, nitric oxide (NO), dinitrogen (N₂), ammonia (NH₃), CH₄ and CO₂. It is often used by researchers and requires some technical expertise.
- **Cool Farm Tool.** This is another widely used online platform tool that helps farmers, supply chain managers, and researchers estimate the carbon footprint of agricultural activities. The Cool Farm Alliance owns and manages the tool, requiring membership for use.

For the purposes of this EIS, an accessible and reproducible evaluation of alternative agricultural practices applicable to west central Minnesota was necessary to identify an applicable suite of strategies

to avoid emissions from corn cultivation. The COMET-Farm tool noted above was chosen to run a matrix of farming management test cases to estimate the impact of adopting alternative agricultural practices on the CI score.

6.2.3.2 COMET-Farm Analysis Methods

USDA's COMET-Farm tool involves several key components. Users input specific data related to the agricultural operations, including planting and harvesting dates, crop species, livestock, tillage practices, cover cropping, irrigation, nutrient management, and energy use. COMET-Farm is a process-based model that simulates carbon and GHG dynamics in response to user data input. The modeling approach considers how different practices influence carbon sequestration and GHG emissions over time. The tool estimates GHG emissions, including CO₂, CH₄, and N₂O. It considers emissions from various sources, such as soil, livestock, and energy use.

The analysis was conducted using proxy farm locations assumed to be within a 40-mile radius of the ethanol plant in Fergus Falls. The results of this assessment were then proportionally scaled to account for the estimated total acreage of corn contributing to the feedstock of the ethanol plant. The ethanol plant's air permit (2019 Air Permit 11100077-101) was used to estimate the total maximum acreage required to supply an adequate feedstock. The air permit allows the ethanol plant to produce up to 65 million gallons of ethanol annually.

Approximately 2.9 gallons of ethanol are produced from each bushel of corn grain, which means a maximum of 22.4 million bushels of corn could be supplied to the ethanol plant per year. While the USDA's 2023 Minnesota state average for corn production was reported at 180 bushels per acre, the USDA's 2017 Census of Agriculture for Otter Tail and Wilkin Counties indicated a lower average yield of around 150 bushels per acre. Consequently, to meet the maximum allowable ethanol production, an estimated 125,000 to 150,000 acres would be required.

To assist with interpreting results, assumptions of historical, current, and future practices were established based on data derived from academic research findings, USDA reporting records, and suggested default values from industry standard models (specifically the GREET and COMET-Farm models). **Table 6-3** summarizes model assumptions and selected inputs. The next paragraphs describe these assumptions. See **Appendix M** for more details.

Looking ahead to future land management scenarios spanning the next 10 reporting years (2023–2032), potential alternative strategies include the adoption of no-till practices, the introduction of a nitrogen-fixing winter cover crop (such as clover), and a 50 percent reduction in synthetic nitrogen fertilizer application. Other assumptions include removing major sources of GHG emissions due to little evidence supporting their use in Otter Tail County or Wilkin County corn farming. This includes removing irrigation, liming, crop residue burning, and livestock grazing. Variations in crop residue emissions were held constant to simplify the model (assuming 50 percent corn stover removal). Therefore, all test cases were run with no liming application, no burning of crop residues, no livestock grazing, and 50 percent corn stover removal. See model assumptions in **Table 6-3** with correlating sources for each input value in **Appendix M**.

Table 6-3 COMET-Farm Model Assumptions

Section Name	Section Timeline	Description
Historical	Pre-2000	<ul style="list-style-type: none"> • Pre-1980: Upland, non-irrigated • 1980–2000: Non-irrigated, annual crops in rotation • 1980–2000: Intensive tillage
Baseline	2000–2022	<ul style="list-style-type: none"> • Continuous annual corn crop (no cover crop) • Intensive tillage • 170 pounds per acre total nitrogen (fertilizer + manure)
Future	2023–2032	<ul style="list-style-type: none"> • Corn crop with winter cover crop (clover [<i>Trifolium spp.</i>]) • No tillage • 50% reduction of fertilizer inputs
All	--	<ul style="list-style-type: none"> • 50% residue (stover) removal • Non-irrigated • Single harvest in fall (late September) • No burning • No lime application • 150 bushels per acre yield • No livestock grazing

To estimate the impacts of alternative agricultural practice adoptions, four future test cases were modeled. Each test case kept consistent historical and baseline scenario inputs, while future scenario inputs varied by 25 percent incremental increases in acreage that adopted a suite of accessible alternative agricultural practices. The chosen suite of alternative agricultural practice inputs was kept consistent across all four test cases to prevent variations from interfering with interpretation of the results because each practice impacts the CI score differently.

Each test case report provides results from the COMET-Farm model from all three scenarios: historical, baseline, and future. The historical and baseline scenario inputs were kept consistent across all test cases and represent conventional farming practices as described above. Future scenarios assumed implementation of a suite of accessible alternative agricultural practices listed in **Table 6-3**.

The emissions reported from the baseline scenarios assume the previous 10 years of management. The emissions reported from the future scenario are determined from the average annual metric tons of CO₂e per 1,000 acres of total simulated parcels (conventional and alternative) over a 10-year period; conventional parcels assume no management changes are made in the future scenario while the alternative agricultural practice parcels assume the change in input values are made in the future scenario. Test case 1 models only one 1,000-acre proxy parcel while the remaining scenarios have varying acreage between conventional and alternative parcels that sum to 1,000 acres. The COMET-Farm test scenarios are described in **Table 6-4**.

Table 6-4 COMET-Farm Alternative Scenario Test Matrix

Test #	Description	Proxy Farm Acres (Conventional)	Proxy Farm Acres (Alternative)	Historical	Baseline	Future
1	Current practices continue without change	1,000	0	Conventional	Conventional	Conventional
2	25% increase in acreage implementation of alternative practices	750	250	Conventional	Conventional	No till, cover crop, 50% reduced fertilizer
3	50% increase in acreage implementation of alternative practices	500	500	Conventional	Conventional	No till, cover crop, 50% reduced fertilizer
4	75% increase in acreage implementation of alternative practices	250	750	Conventional	Conventional	No till, cover crop, 50% reduced fertilizer

6.2.3.3 COMET-Farm Analysis Results

The COMET-Farm model was run for the four test cases described in **Table 6-5**. Results are presented in **Table 6-6** through **Table 6-9**. The information provided regarding estimated GHG emissions for each test case is intended for informational purposes only. It is important to recognize that various GHG accounting models may produce different outcomes due to differences in methodologies, assumptions, data sources, and other factors. Interpretations should consider the limitations, uncertainties, and potential biases associated with each model's results. The COMET-Farm model results are not linked to the CI score determined by the ethanol plant. The intent of the COMET-Farm modeling exercise is to estimate the potential reduction of CI score when alternative agricultural practices increase across cropland used to source feedstock. This approach allows for a quantifiable estimate of the impacts on GHG mitigation using alternative approaches to agricultural production of feedstock.

Table 6-5 COMET-Farm Model Results Summary of Test Cases (all proxy locations – total of 1,000 acres)

Test #	Description	Baseline Emissions ^a (metric tons CO ₂ e/year)	Future Emissions (metric tons CO ₂ e/year)	Change in Emissions (metric tons CO ₂ e/year)	Scaled Acreage Baseline Emissions (metric tons CO ₂ e/year)	Scaled Acreage Future Emissions (metric tons CO ₂ e/year)
1	Current practices continue without change	1677.4	1677.4	0	209,680–251,616	209,680–251,616
2	25% increase in acreage implementation of alternative practices	1876.0	1529.2	(346.8) ^b	234,501–281,401	191,154–229,385
3	50% increase in acreage implementation of alternative practices	1835.3	1178.2	(657.1)	229,412–275,296	147,274–176,729
4	75% increase in acreage implementation of alternative practices	1794.2	844.2	(950.0)	224,276–269,132	105,525–126,630

Note: Values in parentheses are negative.

^a The same location was chosen for all proxy parcels. Proxy parcel locations were chosen using a “point” method, which estimated soil information based on the point location. The selected soil data will impact all emissions estimations from biogeochemical processes on soil data derived from the USDA Web Soil Survey and the DayCent simulation model. Parameter sensitivity varies by input. Proxy parcel soil data is available in **Appendix M**. Differences in scenario emissions are a result of COMET-Farm modeling estimations based on varying parcel size.

Table 6-6 COMET-Farm Model Results – Test Case 1: CI Score

Scenario Section	Proxy Total Emissions (metric tons CO ₂ e/year)	Project Scale Emissions (metric tons CO ₂ e/year)	CI Score (gCO ₂ e/MJ)
Baseline (all parcels)	1677.4	209,680–251,616	40.06–48.07
Future (all parcels)	1677.4	209,680–251,616	40.06–48.07
Change [+/-] (all parcels)	0	0	-

Table 6-7 COMET-Farm Model Results – Test Case 2: CI Score

Scenario Section	Proxy Total Emissions (metric tons CO ₂ e/year)	Project Scale Emissions (metric tons CO ₂ e/year)	CI Score (gCO ₂ e/MJ)
Baseline (all parcels)	1876.0	234,501–281,401	44.80–53.76
Conventional	1369.5	171,193–205,431	-
Alternative	506.5	63,308–75,970	-
Future (all parcels)	1529.2	191,154–229,385	36.52–43.82
Conventional	1369.5	171,193–205,431	-
Alternative	159.7	19,961–23,954	-
Change [+/-] (all parcels)	(346.8)	(43,347)–(52,016)	(8.28)–(9.94)
Conventional	0	0	-
Alternative	(346.8)	(43,347)–(52,016)	-

Table 6-8 COMET-Farm Model Results – Test Case 3: CI Score

Scenario Section	Proxy Total Emissions (metric tons CO ₂ e/year)	Project Scale Emissions (metric tons CO ₂ e/year)	CI Score (gCO ₂ e/MJ)
Baseline (all parcels)	1835.3	101,637.5–121,965	43.83–52.59
Conventional	917.7	114,710–137,652	-
Alternative	917.6	114,703–137,644	-
Future (all parcels)	1178.2	46,875–56,250	28.14–33.76
Conventional	917.7	114,710–137,652	-
Alternative	260.5	32,565–39,077	-
Change [+/-] (all parcels)	(657.1)	(82,138)–(176,729)	(15.69)–(18.83)
Conventional	0	0	-
Alternative	(657.1)	(82,139)–(98,566)	-

Note: Values in parentheses are negative.

Table 6-9 COMET-Farm Model Results – Test Case 4: CI Score

Scenario Section	Proxy Total Emissions (metric tons CO ₂ e/year)	Project Scale Emissions (metric tons CO ₂ e/year)	CI Score (gCO ₂ e/MJ)
Baseline (all parcels)	1794.2	224,277–269,132	42.85–51.42
Conventional	496.0	61,995–74,394	-
Alternative	1298.3	162,281–194,738	-
Future (all parcels)	844.2	105,525–126,630	20.16–24.19
Conventional	496.0	61,995–74,394	-
Alternative	348.2	43,530–52,235	-
Change [+/-] (all parcels)	(950.0)	(118,752)–(142,502)	(22.69)–(27.22)
Conventional	0	0	-
Alternative	(950.0)	(118,752)–(142,502)	-

Note: Values in parentheses are negative.

6.2.3.4 Discussion and Conclusion – Impact on CI Score

The results from the COMET-Farm model show that continuing conventional practices would be the most carbon intensive path, while the change in CO₂e emissions from test cases 2 through 4 show a negative change in CO₂e emissions, which indicates either a reduction in emissions or an increase in the carbon sequestered.

The 21.44 CI score is a measure of how much CO₂e emissions are associated with the current corn cultivation portion of the total CI score for the LCA of corn ethanol, as mentioned in Section 6.2.2. To convert metric tons of CO₂e per year to CI score, each modeled emissions scenario output was quantified in units of metric tons CO₂e per year and multiplied by the annual maximum allowable gallons of ethanol produced by the plant, the energy content of undenatured ethanol, and a conversion factor for metric tons to grams CO₂e. The conversion equation per 1 metric ton of CO₂e/year to carbon intensity of gCO₂e/MJ is shown in the equation below:

$$\frac{1 \text{ metric ton CO}_2\text{e}}{1 \text{ year}} \times \frac{1 \text{ year}}{65\text{M gal ethanol}} \times \frac{1 \text{ gal}}{80.53 \text{ MJ}} \times \frac{1\text{M gCO}_2\text{e}}{1 \text{ metric ton CO}_2\text{e}}$$

COMET-Farm results show the greatest impact to the CI score in test case 4 where a suite of alternative agricultural practices is adopted over 75 percent of the total acreage used to cultivate corn for feedstock production as shown in **Table 6-9**. Implementing these practices on 75 percent of the total acreage currently used to cultivate corn for feedstock production could lower the CI score for feedstock production into the range of approximately 20 to 24 gCO₂e/MJ, an estimated reduction of approximately 23 to 27 gCO₂e/MJ units from the baseline CI score (approximately 43 to 51 gCO₂e/MJ) associated with conventional farming. Assuming there can be a 75 percent increase in acreage change from conventional practices to implementation of alternative agricultural practices, the current corn cultivation CI score for the ethanol plant could be reduced from its current estimate of 21.44 gCO₂e/MJ. These results are further discussed within the conclusion in Section 6.6.

The carbon sequestration potential of croplands varies based on soil quality and composition. High-quality soils, characterized by enhanced nutrient and water retention, large populations of beneficial microorganisms, and a deep soil profile, generally exhibit greater carbon sequestration potential than poorer-quality soils lacking these attributes.

Implementing additional alternative agricultural practices such as nutrient reduction practices and avoided conversion of unmanaged lands (peatlands, mineral wetlands, native grasslands) to cropland would further reduce the carbon intensity of corn feedstock production. Transitioning from conventional practices such as intensive tillage and heavy synthetic fertilizer use to alternative agriculture practices involves a multifaceted shift. If farmers opt to implement practices like no-till, adding cover crops, or reducing synthetic nitrogen application by 50 percent, they might encounter several challenges, summarized in the following paragraph.

The initial investment cost of adopting new practices requires farmers to invest in specialized equipment, seeds, and technologies. Gaining the knowledge and skills to implement these practices can be the first hurdle. Initially, a farmer might experience fluctuations in crop yields as the soil ecosystem adjusts to reduced tillage and nitrogen inputs. Farmers might need to develop alternative weed control strategies, such as cover cropping, crop rotation, or mechanical methods, to manage increased weed pressures effectively. The soil health must be managed and monitored to track progress, so farmers will need to assess soil organic matter levels, nutrient availability, microbial activity, and other soil health indicators regularly. Reducing synthetic nitrogen application by 50 percent necessitates careful nutrient management and balancing.

The economic implications of transitioning to alternative agricultural practices include changes in input costs, crop prices, and profitability. Farmers may need to evaluate the economic viability of transitioning their croplands. Engaging with local networks, agricultural extension services, and community organizations can support farmers' transition to alternative agricultural practices. Addressing these challenges requires a combination of education, technical assistance, financial support, and community engagement to facilitate successful adoption and implementation.

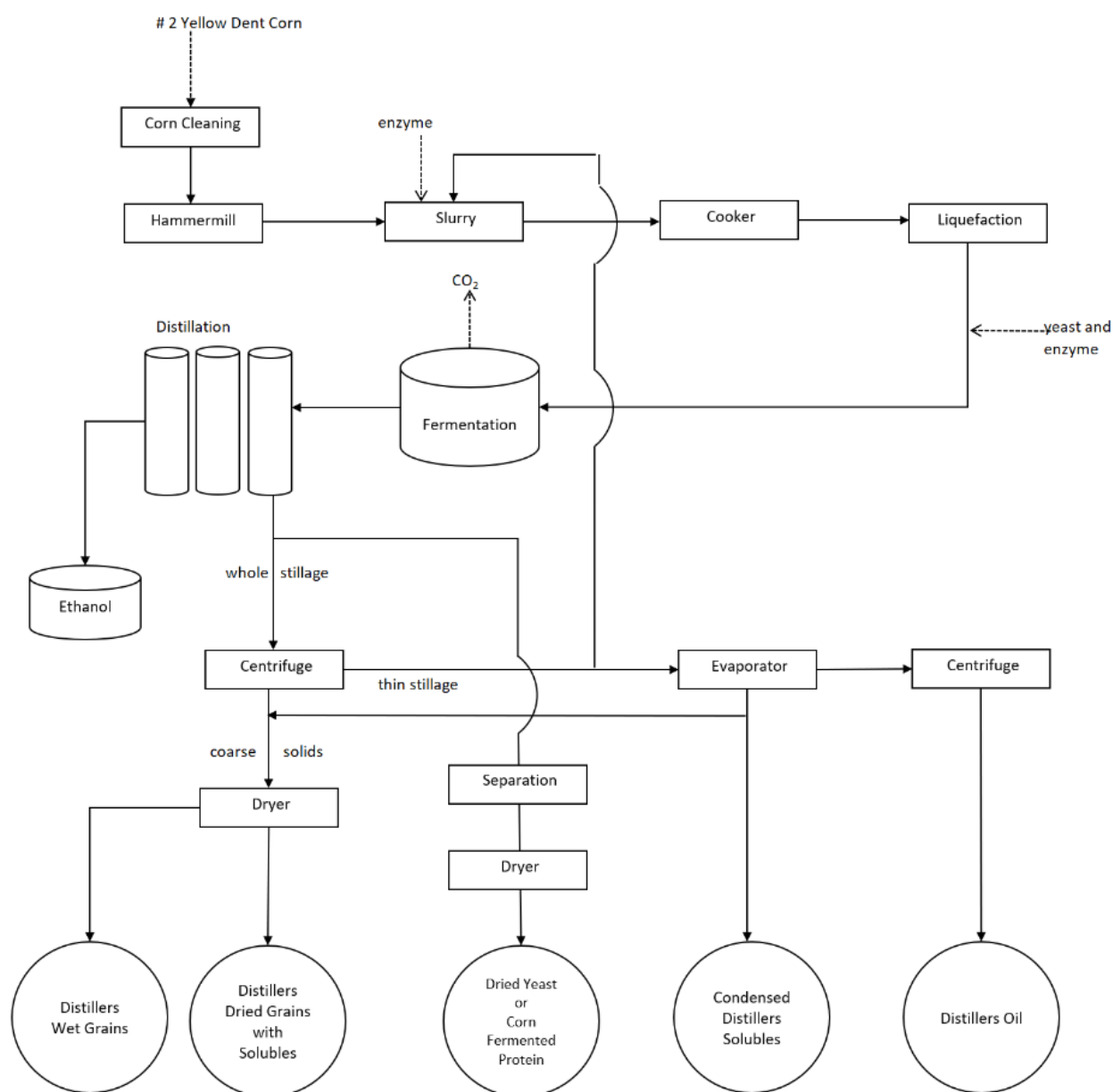
6.3 Energy Use and Efficiency Changes – Ethanol Plant

6.3.1 *Summary of United States Ethanol Plant Energy Use and CI Score*

The third life cycle stage of ethanol production is biorefining feedstock at an ethanol plant—essentially converting the feedstock (corn, sorghum, stover, etc.) into the final product for use as ethanol biofuel. Two different processes are conventionally used, namely wet milling and dry milling. About 91 percent of ethanol biorefineries are dry milling plants, including the Green Plains Ethanol Plant. Dry milling plants tend to produce a slightly lower yield per bushel of grain but consume up to 75 percent less energy.⁶⁵

A typical dry milling process involves milling, cooking, liquefaction, fermenting, and distilling, as shown in **Figure 6-4** (see **Appendix I**). Energy in the form of electricity and process fuels, typically natural gas, is used throughout the refining process. On average, process fuels account for 90 percent of energy consumption at an ethanol plant, while the remaining 10 percent of energy needs comes from grid connected electricity.⁶⁶ Ethanol plants can also produce co-products such as distiller's grain solubles, corn oil, and CO₂ by using what would otherwise be waste from the feedstock. Co-products require additional energy intensive refining processes such as drying. Therefore, energy consumed at an ethanol plant isn't entirely attributable to the production of ethanol.

Figure 6-4 Corn Dry Milling Process Overview



CI scores related to energy use at ethanol plants take into consideration energy consumption and the source of energy generation. Factoring in those two parameters, a typical CI score for energy use ranges from 26.5 to 32.7 gCO₂e/MJ.⁶⁷

6.3.2 Ethanol Plant Operational Energy CI Score

The CI score for the ethanol plant accounts for emissions associated with on-site combustion and GHG emissions, as well as emissions associated with the sources of electricity that are consumed on site. For the purposes of this EIS, biogenic emissions associated with the fermentation of corn grain and powering mobile heavy machinery have been excluded because they are considered carbon neutral. These biogenic emissions are considered carbon neutral because GHG emissions released from the

biological resource—plants, trees, soil—would be sequestered by subsequent activities like replanting trees or cultivating the next season of corn.⁶⁸ In regard to mobile heavy machinery, these data are not available for the ethanol plant. Instead, the focus is on the stationary emissions associated with the ethanol plant's operational energy use.

To most accurately account for the CI score associated with ethanol production, a credit for co-products is introduced. This credit considers what product in the marketplace a given co-product displaces and whether the CI score of the co-product is indeed less than that of the product it displaces. Currently, the ethanol plant produces dry, wet, and hybrid distiller's grains; corn oil; and CO₂. Distillers grain solubles and corn oil are sold to customers, but produced CO₂ is currently not captured, processed, and sold. The information available is insufficient to reasonably assign co-product credits. As such, the alternatives assessment considers all operational energy use at the ethanol plant. **Table 6-10** summarizes the ethanol plant's operational energy CI score. By assigning co-product credits, this baseline operational energy score could be lower.

Table 6-10 Ethanol Plant Operational Energy Carbon Intensity Score

Source	Energy Use ^a (MWh/year)	Emissions Rate (pounds CO ₂ e/MWh)	GHG Emissions ^b (MMT CO ₂ e/year)	CI Score (gCO ₂ e/MJ) ^c	Comments
Process Fuel	473,808	398 ^d	0.086	19.3	Natural Gas=100%
Electricity	38,064	291.4 ^e	0.005	1.1	Electrical Grid=100%
Total	511,872	—	0.091	20.4	

MWh = megawatt hour; MMT = million metric tons.

^a Energy usage data provided by the applicant. Data was gathered over a 2-year period and averaged.

^b GHG emissions based on a conversion factor of 2.2e+9 lbs/MMT.
GHG Emissions = (lb CO₂e/ MWh)*(1 MMT/2.2e+9 lb)*(MWh/year)

^c CI Score based on a conversion factor of 80.53 MJ/gallon of undenatured ethanol (source: [CARB](#)) and current ethanol production rate of 55 million gallons of ethanol per year.⁶⁹
CI Score = MMT CO₂e/year * (1e+12 g/MMT)*1 year/55,000,000 gallons) * (1 gallon/80.53 MJ)

^d From United States Energy Information Administration Frequently Asked Questions.⁷⁰

^e Emissions rate based on Lake Region Electric Cooperative's grid mix.

6.3.2.1 Process Fuel

Process fuel use accounts for approximately 88 percent of the ethanol plant's energy consumption, which closely aligns with the national average of 90 percent. The ethanol plant uses process fuel for various purposes. While the percentage of process fuel going to each end use is unknown, it is reasonable to assume the largest use is to create steam via industrial boilers. The steam is then used as heat during the mashing and cooking, distillation, and evaporation steps in the ethanol production process. Often, the distillation process consumes the most process fuel, followed by evaporation, and then cooking. Other minor end uses for process fuel include space heating and hot water for facility occupants. Regarding co-products, process fuel is assumed to be used for drying distiller's grains.

Natural gas is the sole source of process fuel for the ethanol plant and is provided by Great Plains Natural Gas Company. Utility bills from Great Plains Natural Gas Company indicate an average monthly natural gas consumption of 134,620 million British thermal units over the past 24 months. This unit has been converted to megawatt hours (MWh) per year in **Table 6-10** for consistency with electrical use.

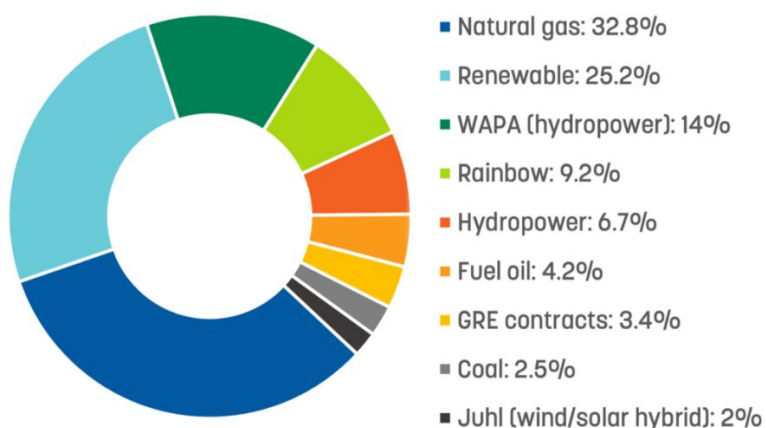
An accurate emissions rate for the natural gas burned at the ethanol plant is unavailable; therefore, the United States Energy Information Administration emissions factor representing the average emission rate for natural gas was used. Natural gas is a fossil fuel, and while “cleaner” than other fossil fuels like coal, it produces significantly more GHG emissions than alternative renewable energy sources. Combining the GHG emissions factor with the substantial volume of natural gas yields a CI score of 19.3 gCO₂e/MJ for the ethanol plant’s natural gas consumption.

6.3.2.2 Electricity

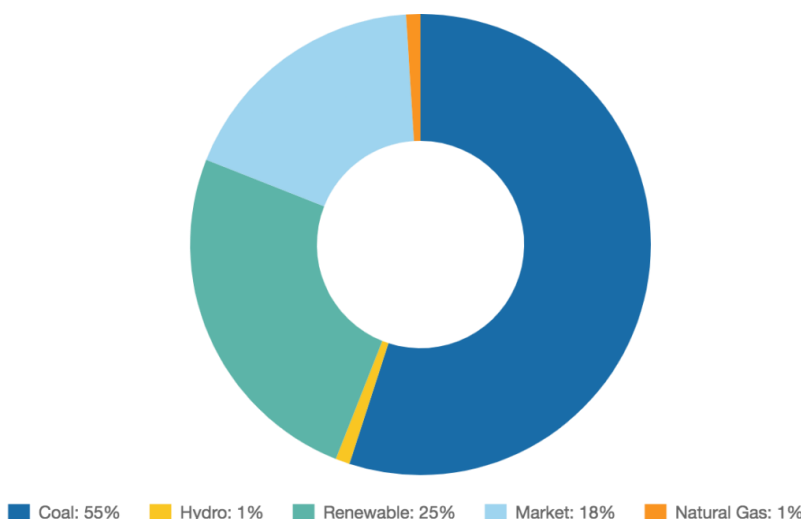
Based on the energy use quantities shown in **Table 6-10**, approximately 12 percent of energy use at the ethanol plant is derived from electricity generation. As with the process fuel, the end use breakdown for electricity at the ethanol plant is unknown and would require subsystem metering. Within the ethanol production process, electricity is used to power various pumps, fans, milling equipment, and agitators. Other minor end uses include lighting; heating, ventilation, and air conditioning; and products powered by standard outlets for building occupants. For co-products, electricity is assumed to be used predominantly to power a centrifuge for separating distiller’s grains. Also included is the electricity consumed for pumping and treating water used throughout the ethanol production process.

The ethanol plant’s electricity is provided by Lake Region Electric Cooperative. This utility provider has the grid mix shown in **Figure 6-5**.

Figure 6-5 Lake Region Electric Cooperative Grid Mix⁷¹



Rainbow Energy Center, LLC is the owner of the Coal Creek Power Plant in North Dakota, which transmits electric generation to Minnesota. The Coal Creek Power Plant uses coal and currently does not have carbon capture infrastructure in place. Great River Energy’s (GRE) current grid mix is shown in **Figure 6-6**. As noted in **Figure 6-5**, 3.4 percent of Lake Region Electric Cooperative’s grid mix comes from GRE.

Figure 6-6 Great River Energy Grid Mix⁷²

Combining the weighted GHG emissions factors from each source with the electricity demand yields a CI score of 1.1 gCO₂e/MJ for the ethanol plant's electricity consumption.

6.3.2.3 Operations, Maintenance, and Improvements

The ethanol plant is in continuous operation. The flow of material and energy does not stop unless there are outages. Outages occur unintentionally or due to scheduled facility maintenance. Typically, ethanol plants schedule downtime for maintenance once each year. During the downtime, energy consumption is reduced while maintenance is performed on equipment. No information could be obtained regarding frequency and scope of inspections, energy auditing, and systems-scale energy performance assessments for the ethanol plant; however, it is assumed these activities occur.

In terms of energy performance upgrades, the ethanol plant has undergone improvements in the ethanol production process. Vacuum distillation was implemented in 2021. According to the applicant, this resulted in a process fuel reduction of approximately 10 percent. This corresponds to a 10 percent decrease in natural gas consumed and its associated emissions.

6.3.3 Ethanol Plant Energy Use and Efficiency Measures

Energy use and efficiency strategies can be defined and implemented individually. It is often most effective to define a sequence of strategies and implement them in a way that builds on the previous strategy or strategies to optimize energy use and efficiency. That sequence is as follows:

1. Repair equipment and prevent leaks (eliminate energy losses)
2. Adjust equipment parameters and maintenance (optimize equipment energy)
3. Implement energy conservation measures and upgrade equipment (improve energy efficiency)
4. Capture energy from one process for use in another (re-use energy)
5. Use low-carbon energy sources for remaining demand (use clean energy)

Several energy efficiency strategies can be implemented that would significantly reduce the ethanol plant's operational CI score. Using alternative clean energy sources for the remaining energy demand could then reasonably bring the ethanol plant's operational CI score to zero.⁷³

6.3.3.2 Energy Efficiency Strategies

Table 6-11 lists strategies for energy reductions based on best available information and industry technologies and practices. Ranges are provided as appropriate to represent a distribution of possible energy reduction by each energy source. **Table 6-12** shows the current and revised CI scores after implementation of these strategies, assuming they are not already implemented.

Table 6-11 Energy Efficiency and Reduction Strategies

Strategy Type	Strategy	Energy Reduction (%)	Energy Source
Eliminate Energy Losses	Insulate steam pipes ⁷⁴	5–10	Natural gas
Optimize Equipment	Clean-in-place heat exchangers ⁷⁵	0–5	Natural gas
Optimize Equipment	Boiler tune-ups ⁷⁶	5–10	Natural gas
Improve Efficiency	Variable frequency drives ⁷⁷	30–40	Electricity
Improve Efficiency	All LED lighting	0–5	Electricity
Reuse Energy	Mechanical vapor recompression ⁷⁸	40–50	Natural gas
Reuse Energy	Let-down steam turbine ⁷⁹	20–30	Electricity

Table 6-12 Revised Carbon Intensity Score after Energy Efficiency Measures

Source	Reduction (%)	Energy Use (MWh/year)	Current CI Score	Revised CI Score ^a	Difference
Natural Gas	62.5 ^b	177,678	19.3	7.2	12.1
Grid Electricity	62.5 ^c	14,274	1.1	0.4	0.7
Total		191,952	20.4	7.6	(12.8)

Note: Values in parentheses are negative.

^a Revised CI Score = Current CI Score x (100 - % central energy reduction)/100%

^b Reduction ranged from 50 to 75%. Central value equals 62.5%.

^c Reduction ranged from 50 to 75%. Central value equals 62.5%.

More significant energy reduction strategies are discussed in detail below:

- **Variable frequency drives for motors.** Variable frequency drives are motor controllers that can adjust the frequency and voltage to meet the load required to operate the motor at the minimum necessary speed. This saves energy because the motors no longer run exclusively at full speed and instead dynamically adjust speed as appropriate. Ethanol plants use motors throughout the ethanol production process, so compounding energy savings are possible as more variable frequency drives are installed.
- **Alcohol mechanical vapor recompression.** Heat from distillation and evaporation processes can be captured and the thermal vapors recompressed via mechanical means such as a heat pump. This process enables the energy to be returned as heat to the distillation and evaporation stage. In so doing, less natural gas is needed to produce steam via boilers. Additional electricity is required to operate the mechanical compression equipment.
- **Low-pressure let-down steam turbine.** Boilers produce high pressure steam that must be stepped down to low pressure to be used by the evaporators. The pressure is conventionally lowered via a pressure-reducing valve and desuperheater. However, if routed through a let-

down turbine, the high pressure can be lowered while simultaneously turning a turbine that generates electricity. A minor increase in process fuel energy is required to run the let-down turbine.

6.3.3.3 Alternative Energy Sources

If the ethanol plant implements energy efficiency strategies, the ethanol plant would have new annual energy consumption values for each energy type. The remaining energy demand could then be more reasonably met with alternative energy sources. To further reduce the CI score, the ethanol plant could implement alternative energy sources outlined in **Table 6-13** individually or in complementary ways.

Table 6-13 Potential Alternative Energy Sources

Current Energy Source	Alternative Energy Source	% Substitutable
Natural Gas	Anaerobic digester (animal waste, food waste, stover biomass, stillage) ⁸⁰	100
	Synthetic methane ⁸¹	100
	Solar thermal ⁸²	5–10
	Electricity	Unknown
Grid Electricity	On-site combined heat and power ⁸³	100
	On-site solar photovoltaics ⁸⁴	100
	On-site wind turbine	50–100
	Renewable power purchase agreement	100
Natural Gas and Electricity	Geothermal ⁸⁵	100

Electricity generated from alternative energy sources is assumed to go into the utility grid while the ethanol plant continues to pull electricity from the grid. Electricity produced by the ethanol plant is subtracted from the electricity consumed by the ethanol. Therefore, even though some energy sources are intermittent, they overproduce electricity at other times, allowing the plant to fully offset its annual electricity consumption via alternative sources.⁸⁶

Choosing the most appropriate alternative energy sources and associated energy generation depends on several factors, including financial, technical, logistical, and regulatory conditions. A more detailed analysis would be required to verify the feasibility and energy generating capacity of alternative energy sources. This cursory assessment concludes that a combination of energy efficiency strategies coupled with viable alternative energy sources can theoretically achieve the results shown in **Table 6-14**. Each alternative energy source is discussed in further detail in the following sections.

Table 6-14 Revised Carbon Intensity Score after Alternative Energy Source Implementation

Source	Replaced (%)	Current CI Score	CI Score: Energy Efficiency + Alternative Energy Source	Difference
Natural Gas	100	19.3	0	(19.3)
Grid Electricity	100	1.1	0	(1.1)
Total		20.4	0	(20.4)

Note: Values in parentheses are negative.

Natural Gas Alternatives

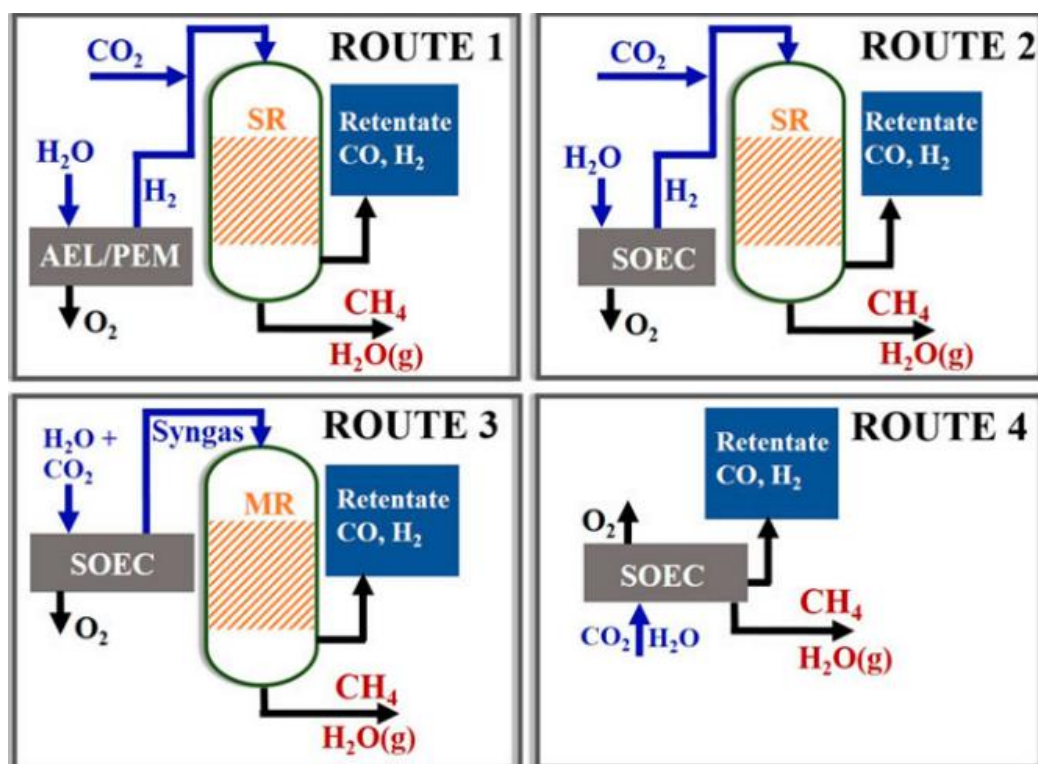
Anaerobic Digester

Anaerobic digestion is the use of microbial communities to facilitate breakdown of organic matter. The digestion process yields biogas, which can be captured and used as a process fuel in the same applications as natural gas. Several feedstocks can be used, including food waste; animal manure; wastewater sludge; biomass like wood, stover, or stillage; and comingled like stillage with manure. Anaerobic digestion reactors can be up to 100 feet in diameter, but there is ample space on site for necessary infrastructure at the ethanol plant.

Synthetic Methane

Synthetic methane is a manufactured form of methane that can be used in the same applications as natural gas. There are several ways to produce synthetic methane, as shown in **Figure 6-7**. Two pathways are more appropriate as it relates to an ethanol plant, namely Routes 3 and 4. Solid oxide electrolysis (that is, the use of electricity to produce a chemical reaction) of steam and CO_2 can be used to create synthetic gas (syngas) that is then transformed into synthetic methane through thermochemical means (that is, a chemical reaction combined with high heat).

Figure 6-7 Synthetic Methane Production Methods⁸⁷



Note: AEL/PEM = Alkaline Electrolysis/Proton Exchange Membrane; SOEC = Solid Oxide Electrolyzer Cell

Alternatively, technologies are being piloted for in-situ methane synthesis through the electrolysis of steam and CO_2 . In both pathways, process steam and CO_2 from ethanol fermentation can be captured and used. The synthetic methane can fully replace natural gas as process fuel. Because the CO_2 used in producing the synthetic methane comes from biofuel and would otherwise have been emitted, it is considered a carbon neutral resource.⁸⁸ Additional electricity is required to operate the equipment. This electrical demand can come from renewable electricity discussed below. Additionally, waste heat

created from the synthetic methane production process can be captured and used to reduce electric energy input to perform the electrolysis.

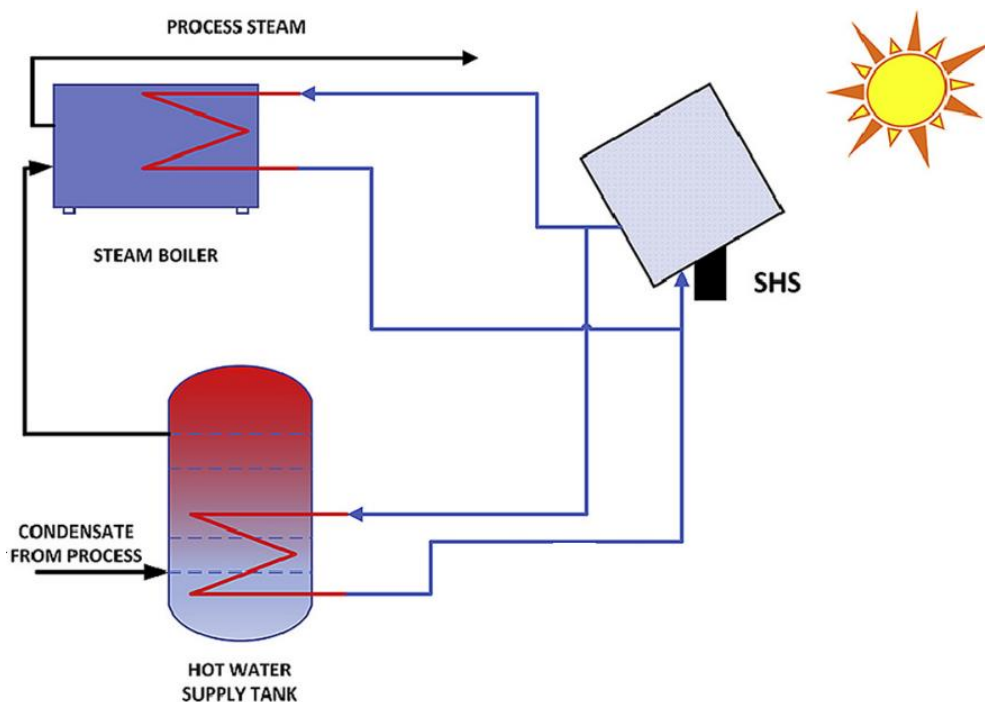
Lastly, the National Aeronautics and Space Administration (NASA) has developed a method of using solar photovoltaics, water, CO₂, and metal compounds to produce methane. This technology is still in development for commercializing.⁸⁹

Solar Thermal

Non-concentrating solar collectors can be used to heat a fluid for use in the ethanol production process. One of the more efficient applications of this technology is to use solar thermal energy to pre-heat boiler make-up water (see **Figure 6-8**). This requires lower thermal energy from the collectors, allowing for heat loss in the system, and is particularly effective for the northern climate where the ethanol plant is located.

Solar thermal systems will not perform during the night or on especially cold and overcast days. Therefore, it is assumed energy would be produced one-third of the year, or approximately 2,900 hours/year. A 6-MWh system with 70 percent efficiency would therefore produce approximately 12,200 MWh/year, thereby displacing between 5 and 10 percent of the natural gas demand after implementing energy efficiency strategies. Assuming 65 watts/square foot, a system would need to be approximately 64,600 square feet. Based on review of satellite imagery, there appears to be sufficient area at the ethanol plant to mount a solar thermal system close to this size. Systems should be installed on rooftops first, and then the remaining capacity can be ground mounted. This conserves as much useable area as possible for other alternative energy sources.

Figure 6-8 Solar Thermal Heating Diagram⁹⁰



Note: SHS = Solar Heating System

Electrification

There are likely to be several process-fuel end uses that could reasonably be converted to electricity, such as space heating for occupants and domestic hot water. Retrofitting systems to use electricity provides efficiency gains as well as the opportunity to use other energy source alternatives.

Grid Electricity Alternatives

On-site Combined Heat and Power

Combined heat and power is a way of converting process fuel into electricity, thus avoiding the need to draw electricity from the electric grid. Because the electricity is generated closer to the end use, there are efficiency gains. Additionally, the fuel used can be from a renewable resource as opposed to relying on the grid mix of the utility provider. One application is to burn biomass to create steam that turns a steam turbine (see **Figure 6-9**). The waste steam can be used for heating, while the turbine generates electricity. The second most common application is to use gas turbines (see **Figure 6-10**). Synthetic gas must then be combusted within a combustor, turning a gas turbine that generates electricity. Exhausted gas from the turbine passes through a heat recovery steam generator, enabling it to be used for heat loads as normal.

Figure 6-9 Combined Heat and Power with Steam Turbine⁹¹

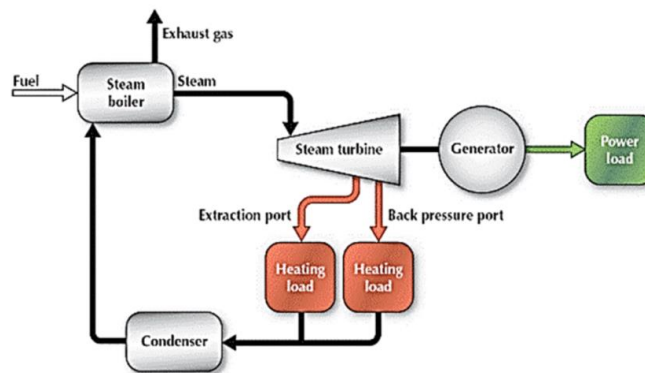
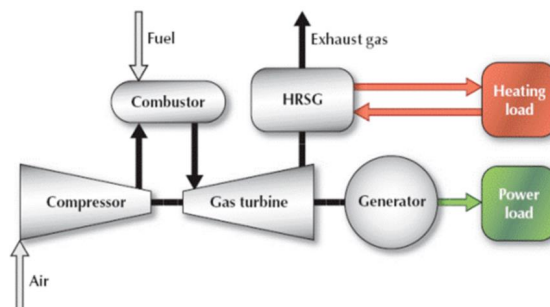


Figure 6-10 Combined Heat and Power with Gas Turbine⁹²

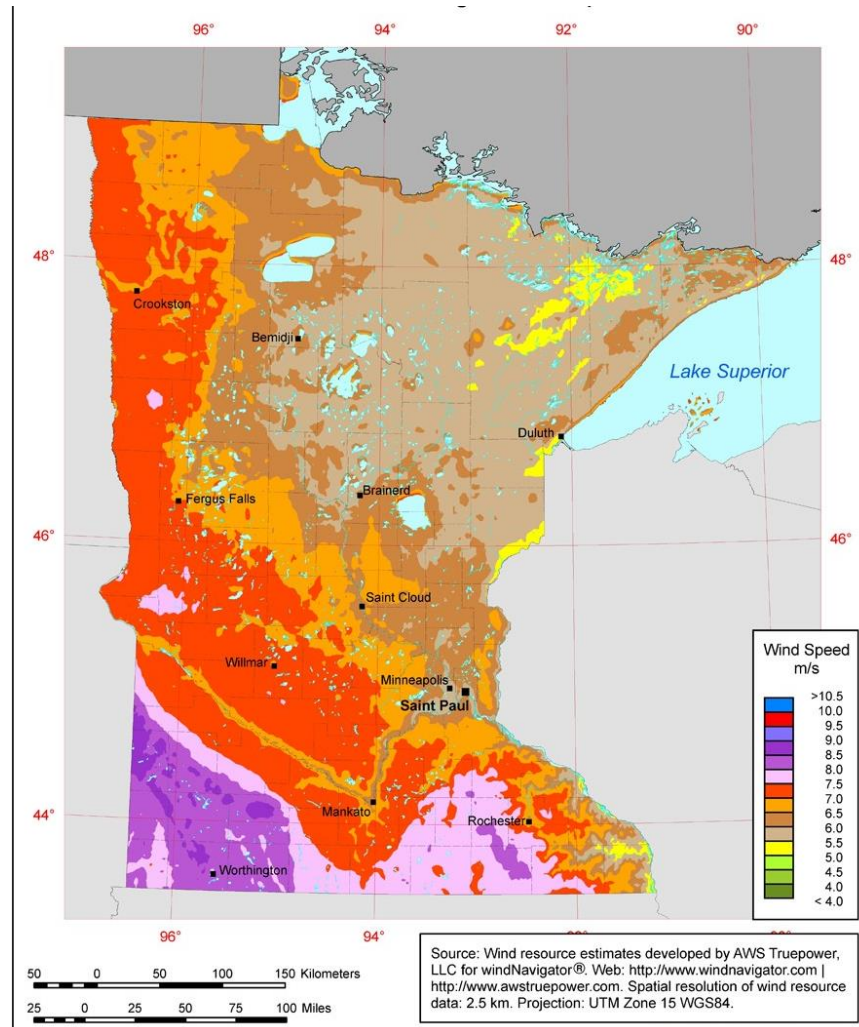


Wind Turbine

Wind turbines have long blades extending outward from a central drive shaft. Kinetic energy from the wind contacts the blades and propels them in a circular motion, subsequently rotating the drive shaft. The drive shaft then turns an electric generator to produce electricity. The average annual wind speed dictates the effectiveness of a wind turbine. According to the National Renewable Energy Laboratory, in Otter Tail County, the annual average wind speed at 80 meters is 7 to 7.5 meters per second, as shown

in **Figure 6-11**. While the wind speed and available acreage should be sufficient, this technology is likely not viable because the ethanol plant is prohibitively close to the Fergus Falls Municipal Airport-Einar Mickelson Field.

Figure 6-11 Annual Average Wind Speed at 80 meters for Minnesota



Solar Photovoltaics

Solar photovoltaic panels absorb the sun's energy to generate electrical charges. These charges follow an internal electrical field creating a flow of electricity. Assuming an energy reduction of 62.5 percent from employing the energy efficiency strategies described above, the ethanol plant would use approximately 14,300 MWh/year. PVWatts Calculator was used to determine that an 11-megawatt solar photovoltaic system would be required to produce this electricity annually. See **Appendix M** for more details. A system with this capacity would occupy between 15 and 25 acres. Based on review of satellite imagery, there appears to be sufficient area at the ethanol plant to install a photovoltaic array of this size with limited or no shading (see **Figure 6-12**).

Figure 6-12 Solar Radiation Exposure⁹³

Renewable Power Purchase Agreements

A power purchase agreement is a type of contract made between a buyer and a utility provider wherein the provider agrees to build, maintain, and operate a renewable energy system and deliver the electricity to the buyer either directly on-site or via the electric grid. Conditions of the contract include an agreed upon fixed price per unit of energy generated, duration of supply, and whether the buyer has rights to the renewable energy credits associated with the electricity generated. Renewable energy credits are documents issued for every 1 megawatt of electricity generated via renewable sources. The owner of a renewable energy credit can claim the environmental and social benefits thereof, or sell it on the market for another entity to claim the benefits. In order for this source to be applicable, the ethanol plant would need to have possession of each renewable energy credit associated with the power purchase agreement.

Natural Gas and Grid Electricity Alternative

Geothermal energy is the only viable alternative energy source that could replace both process fuel and electricity consumption at the ethanol plant. Geothermal energy involves capturing thermal resources from deep below the Earth's surface. This is conventionally achieved in three ways:

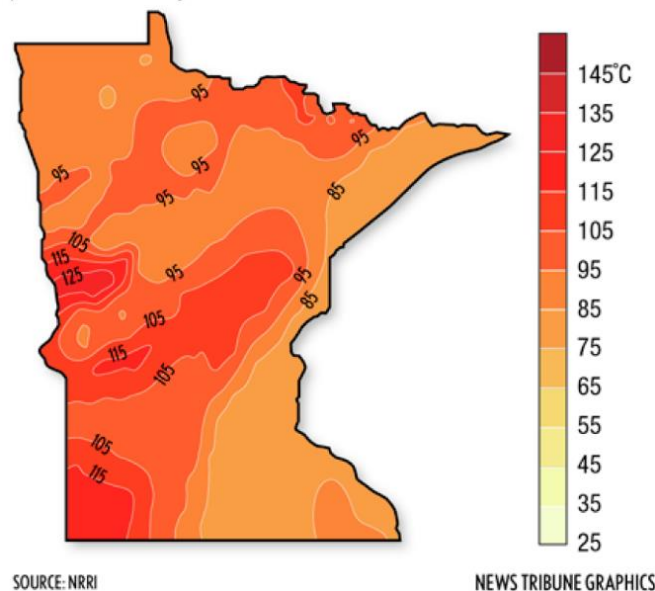
- directly recovering steam from underground reservoirs to turn a generator
- directly recovering hot water from underground reservoirs and converting to steam via flash steaming or binary cycling
- injecting water down to hot dry rock and recovering the created steam

The method used depends on several factors. Hot dry rock resources are present under Otter Tail County, making the third option—referred to as an enhanced geothermal system—technically viable. According to the Natural Resources Research Institute, temperatures of the rock 7 kilometers underground reach approximately 125 degrees Celsius, as shown in **Figure 6-13**. This may be sufficient to recover steam for direct substitution of process fuel as well as to generate electricity via a steam turbine.

Figure 6-13 Distribution of Hot Rock Resources beneath Minnesota

Where's the heat?

This map shows (in Celsius) how hot the rocks are about 7 kilometers underground across Minnesota. The darker red, the more heat, and the easier access for geothermal heat to produce electricity.



Geothermal power production has the smallest land surface footprint of any power plant, requiring only 404 square feet per 1,000 MWh.⁹⁴ A reasonable size for generating 5 MWh from hot dry rock geothermal energy would be between 200 and 400 square feet. Geothermal energy reserves are constant, reliable, renewable, and abundant; however, with current technologies and subsidies, initial capital costs tend to exceed that of the other options.

6.3.3.4 Operational Energy CI Score Scenarios

To accurately understand the CI score of the ethanol plant, it is necessary to evaluate emissions reduction over a defined period. The reason for this is twofold. First, utility grids are expected to decarbonize over time, meaning the CI score for the facility would decrease without making changes. Second, implementation of energy efficiency and alternative energy strategies would be expected to occur incrementally over time.

The assessment period starts in 2026 because that is when the CO₂ pipeline is anticipated to be operational. Because the CO₂ pipeline has a service life of 25 years, the assessment period ends in 2050. CI scores will be compared among the following three scenarios: (1) baseline; (2) energy efficiency; and (3) energy efficiency + alternative energy.

Baseline Scenario

Description: The ethanol plant will maintain the same energy usage and providers for electricity and natural gas across the assessment period.

Assumptions:

- There will be no additional energy demand over the 25-year assessment period.
- No co-product credits will be applied, thus deducting from the CI score.
- The electric utility provider will be decarbonized by 2040.
- The electricity emissions rate will decrease linearly from 291.4 in 2023 to 0 in 2040.
- The natural gas utility provider will be decarbonized by 2050.⁹⁵
- The natural gas emissions factor will decrease linearly from 398 in 2023 to 0 in 2050.

Energy Efficiency Scenario

Description: The ethanol plant will gradually implement energy efficiency measures over the assessment period. Grid-connected utilities will continue to decarbonize.

Assumptions:

- All baseline scenario assumptions apply.
- Electricity consumption will be 62.5 percent more efficient by 2050 than present consumption. Energy efficiency strategies could reduce electricity consumption between 50 and 75 percent, where 62.5 percent is the median value.
- Efficiency of electrical end uses will increase by 2.5 percent annually. This will result in a 62.5 percent energy reduction in 25 years.
- Natural gas consumption will be 62.5 percent more efficient by 2050 than present consumption. Energy efficiency strategies are likely to reduce electricity consumption between 50 and 75 percent, where 62.5 percent is the median value.
- Efficiency of natural gas end uses will increase by 2.5 percent annually. This will result in a 62.5 percent energy reduction in 25 years.

Energy Efficiency plus Alternative Energy Scenario

Description: The ethanol plant will gradually implement energy efficiency measures as well as replace utility-provided energy sources with on-site renewable energy alternatives over the assessment period. Grid-connected utilities will continue to decarbonize.

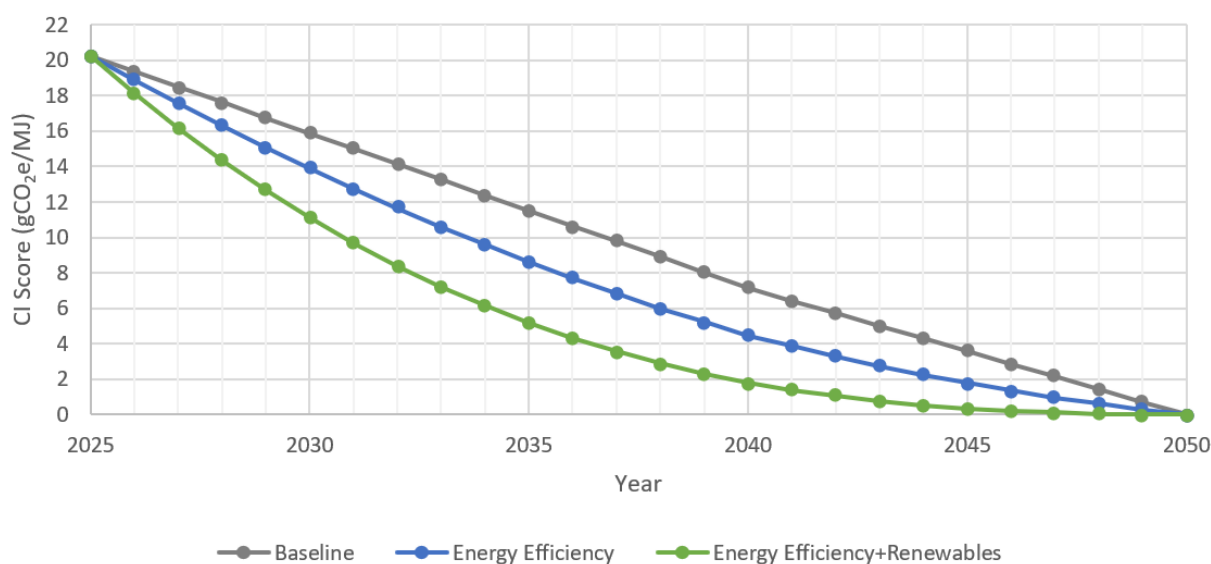
Assumptions:

- All energy efficiency scenario assumptions apply.
- By 2050, all electric and process fuel demand will be met from on-site clean energy sources.
- Each year, an additional 4 percent of energy demand will be met from on-site clean energy sources. The cumulative result will be 100 percent over 25 years.

Scenario Comparison

As shown in **Figure 6-14**, in all three scenarios, the ethanol plant could have an operational energy CI score of zero by the end of the assessment period. See **Appendix M** for detailed inputs and calculations.

Figure 6-14 Operational Energy Carbon Intensity Score Over Time



With a sequence of energy efficiency measures coupled with alternative energy sources, it appears feasible to eliminate GHG emissions associated with the energy use of the ethanol plant, bringing the CI score down from approximately 20 to 0. This conclusion has been corroborated by several studies.^{96, 97, 98} Realistically, the necessary technology, infrastructure, operations and maintenance adjustments, sourcing of alternative resources, and financial investment would require time to mobilize and implement, both for the ethanol plant and for the utility providers. Once a project is implemented, there would be an associated drop in the CI score of the ethanol plant, followed by a flat line while resources were being organized for the next project. Thus, in practice, the graph would look more like a staircase rather than smooth lines.

Due to the significant capital investment associated with implementing energy efficiency measures and alternative energy sources, it is unlikely such strategies would be reversed within the assessment period.

6.4 Energy Use and Efficiency – Corn Feedstock Producers

Energy is used to accomplish various tasks during the cultivation and harvesting of corn grain. Energy use information by producers is not available, thus an analysis cannot be performed to approximate CI score reductions. However, generalizations can be made to inform opportunities for the ethanol plant to reduce the CI score of its product.

Most energy during feedstock production is consumed by heavy farming equipment. Mobile heavy machines (tractors, harvesters, etc.) are used to plant seeds, manage pests, harvest corn and corn residue, and till the soil. This heavy machinery predominantly runs on petroleum diesel fuel. Minnesota passed a law in 2018 requiring diesel fuel sold from April through September to contain at least 20 percent biodiesel. Between the months of October and April, diesel fuel sold must contain at least 10 percent biodiesel.

According to Argonne National Laboratory, the life cycle GHG emissions for biodiesel are 74 percent less than petroleum diesel.⁹⁹ As such, the CI score of ethanol produced could be lowered by corn producers using even higher percentages of biodiesel fuel during the cultivation and harvesting of corn for feedstock. Drying corn grain prior to transporting it also requires energy. While corn could dry naturally, often farmers will use industrial driers to bring the moisture of corn grain down to a level acceptable to the ethanol plant. These driers are typically fueled by propane or natural gas. Strategies for reducing the GHG emissions associated with the drying process include:

- allowing the grain to dry naturally;
- electrifying the drying process that then uses renewable electricity sources such as solar photovoltaic, wind, or hydropower; and
- using an alternative process fuel such as biogas from anaerobic digesters or steam from a solar heating system.

By reducing the time of mechanical drying and switching fuel sources, the CI score of ethanol produced at the ethanol plant could be reduced.

6.5 Impacts and Mitigation

What are the potential impacts on resources for each suite of technology alternatives?

This section identifies which of the resources addressed in Chapter 5 could be impacted by adoption of one or more of the alternative technologies described above. It describes the potential impacts in a qualitative manner and identifies applicable mitigation measures that could reasonably be implemented to avoid or minimize the impacts. Consistent with Chapter 5, the discussion is organized under four resource categories: human settlement, economies, archaeological and historic resources, and natural environment. Existing conditions are described generally in Chapter 5.

This analysis assumes that the alternative agricultural practices described in Section 6.2 would be implemented within the current cultivated land footprint; that is, no additional clearing of land would occur. As indicated in Section 6.3, the energy and efficiency changes could be implemented within the existing property lines of the ethanol plant, and thus, this analysis also assumes that no expansion of the ethanol plant site would be required.

6.5.1 *Human Settlement*

Implementation of the alternative technologies would be expected to have negligible impacts on cultural resources, populated areas, property values, public health and safety, public services and infrastructure, recreation, and Tribal treaty rights. Potential impacts on aesthetics, EJ, land use, noise, and socioeconomics are described below.

6.5.1.1 **Aesthetics**

The alternative agricultural practices (no-till or reduced tillage, cover cropping, fertilizer reduction, and retaining corn stover and residues) and energy efficiency strategies inside the ethanol plant would not be expected to impact aesthetics.

Potential impacts associated with alternative energy sources described in Section 6.3.3.3 would occur within the ethanol plant property boundary. These facilities would be expected to blend aesthetically with the industrial character of the existing facility.

6.5.1.2 **Environmental Justice**

The ethanol plant and some farms are within the census tract marked as an EJ area of concern by the MPCA screening tool. Alternative agricultural practices (no-till or reduced tillage, cover cropping, fertilizer reduction, and retaining corn stover and residues) would not have adverse impacts on EJ communities.

Implementation of energy alternatives at the ethanol plant would have similar impacts on EJ areas of concern as construction of the capture facility. The impacts could include increased traffic during construction, noise, and air impacts from construction and operation. As described in Section 5.4.3, these impacts would be unlikely to result in disproportionate adverse impacts for EJ areas of concern.

6.5.1.3 **Land Use**

The alternative agricultural practices (no-till or reduced tillage, cover cropping, fertilizer reduction, and retaining corn stover and residues) would not change the current land use of agricultural land. Additionally, the energy efficiency strategies inside the ethanol plant property boundary would not impact land use.

Enough space exists within the current property boundary of the ethanol plant that alternative energy sources could be added without the need for acquiring new land. However, if the ethanol plant were to expand in the future, the presence of alternative energy sources could preclude this expansion and require the ethanol plant to acquire additional land. An expansion beyond the current boundary could result in changes to land use.

6.5.1.4 **Noise**

The alternative agricultural practices and energy efficiency strategies would not be expected to have a noticeable effect on noise compared to existing conditions. No-till practices would reduce noise related impacts given less use of agricultural equipment. Impacts could be beneficial. Conversely, cover cropping would increase noise-related impacts from use of agricultural equipment.

Equipment installed for alternative energy technologies would be required to meet state noise standards at the nearest receptor. Implementation of these technologies would not likely result in a perceptible increase in the sound levels experienced at NSRs near the ethanol plant and generally would be indistinguishable from the noise already produced at the plant.

6.5.1.5 Socioeconomics

Alternative agricultural practices (no-till or reduced tillage, cover cropping, fertilizer reduction, and retaining corn stover and residues) and energy efficiencies would have negligible impacts on socioeconomic factors such as population, income, employment, or tax revenues.

Implementation of alternative energy sources at the ethanol plant would have similar impacts on socioeconomics as construction of the capture facility (see Section 5.4.11), although the magnitude would depend on the type of alternative energy source. Short-term beneficial impacts could include creation of local jobs as well as revenues from materials purchased locally and taxes.

6.5.2 Economies

Implementation of the alternative technologies would have no or negligible impacts on commercial economies, forestry, industrial economies, mining, or tourism. Potential impacts on agriculture are described below.

The alternative agricultural practices evaluated (no-till or reduced tillage, cover cropping, fertilizer reduction, and retaining corn stover and residues) would require some changes to existing agricultural practices. Some of these practices, such as reduced tillage, are likely already being used. These strategies can have beneficial effects on agriculture.

The costs to implement these practices would depend on several variables, including increases or decreases in the use of equipment and machinery; need for fuel, supplies, and transportation; and corn yield. For example, no-till or reduced tillage would eliminate or reduce the costs associated with tilling but might require more use of herbicides and result in lower corn production.¹⁰⁰ Similarly, reduced fertilizer use would reduce the costs of fertilizer and its application but could result in lower corn production if not implemented with one or more other alternative practices. Cover crops would require time and equipment to plant and purchase of seed, but as indicated in Section 6.2.2, cover cropping has been shown to increase corn yields. Retained corn stover and residue could not be used for grazing or sold to another user, but transportation costs would be avoided, and corn yields would likely increase.

Alternative energy use and efficiency technologies would have no or negligible impacts on agriculture.

6.5.3 Archaeological and Historic Resources

Because the alternative agricultural practices described in Section 6.2 would be implemented within the current cultivated land footprint and no expansion of the ethanol plant would be required for energy use and efficiency changes, the alternative technologies would be expected to have no or negligible impacts on archaeological and historic resources.

6.5.4 Natural Environment

Implementation of the alternative technologies would have no or negligible impacts on geology and topography, public and designated lands, rare and unique resources, vegetation, and wetlands. Potential impacts on air quality, climate change, soils, water resources, and wildlife are addressed below.

6.5.4.1 Air Quality

As described in Section 6.2, the alternative agricultural practices would reduce GHG emissions compared to existing practices by promoting soil carbon sequestration. The no-till or reduced till and fertilizer reduction alternatives would reduce emissions from fossil fuel combustion in farm equipment. Fertilizer reduction would also reduce GHG emissions from fertilizer production and transportation. Conversely,

cover cropping would entail additional emissions from fossil fuel combustion in farm equipment. Corn stover and residue retainage would reduce emissions associated with grazing, burning, or processing for further transportation to the end user.

All energy efficiency measures described in Section 6.3 would reduce GHG and other air pollutant emissions compared to the current operations. Emissions associated with burning natural gas at the ethanol plant would be reduced by decreasing the volume of fuel burned per year. Emissions associated with fossil fuel electricity generation would be reduced by decreasing the electricity demand at the ethanol plant.

Alternative energy sources described in Section 6.3 would decrease GHG emissions for both process fuel and electricity. Anaerobic digestors would increase ammonia emissions and possibly nitrogen oxides. Synthetic methane and solar thermal systems would not be expected to have any additional air quality impacts. Combined heat and power and solar photovoltaics would reduce additional air pollutants emitted by displacing electricity from higher air pollutant emitting sources. These additional air pollutants largely come from burning coal, which emits sulfur dioxide, nitrogen oxides, mercury and other heavy metals, and particulate matter. Geothermal power would reduce all air emissions associated with both process fuel on-site and electricity generation off-site. They still may release traces of sulfur dioxide and carbon dioxide, but between 97 and 100 percent less than that of fossil fuels.

Overall, energy reduction and alternative energy sources would improve air quality at the site and surrounding area.

6.5.4.2 Climate Change

The alternative agricultural practices (no-till or reduced tillage, cover cropping, fertilizer reduction, and retaining corn stover and residues) would reduce GHG emissions. The MPCA estimates that while emission reductions per acre for such practices are small, the benefits would be significant if applied to the entire state of Minnesota. For example, 25 acres of cover crop remove as much atmospheric carbon as taking one car off the road.¹⁰¹ Implementation of the agricultural practices described in Section 6.2.3 would contribute to efforts to reduce the effects of climate change. In addition, some strategies could help maintain soil health and reduce erosion, which MPCA states would help farmers adapt to warmer and wetter climate conditions.¹⁰²

The strategies described in Section 6.3.3.2 to eliminate energy losses, optimize equipment, improve efficiency, and reuse energy could reduce GHG emissions by reducing the amount of energy used at the ethanol plant.

6.5.4.3 Soils

Some of the agricultural practice alternatives could help maintain soil health and reduce erosion.¹⁰³ This would be a beneficial impact on soils. For example, some types of cover crops are rich in nitrogen and can limit or wholly eliminate the need for nitrogen-based mineral fertilizer applications to cropland.¹⁰⁴ Additionally, cover crops can improve soil structure, reduce water and wind erosion of soils, decrease soil compaction, suppress weeds, and increase biodiversity. Corn stover and residue retention builds soil carbon stocks and increases soil N₂O production. Other beneficial impacts of crop residue retention include lower soil temperatures, greater soil water-holding capacity, improved soil nutrient status, and reduced wind and water erosion.¹⁰⁵ Alternative energy use and efficiency technologies would have no or negligible impacts on soils.

6.5.4.4 Water Resources

No-till or reduced tillage, cover cropping, and retaining corn stover and residues would help reduce soil erosion. Soil erosion and sediment transport can negatively impact surface water quality by increasing turbidity. Fertilizer reduction would help reduce the potential for impacts on groundwater and surface water resulting from infiltration and runoff of excess nutrients. Similarly, cover crops scavenge excess nitrate from cropland soils, thereby reducing the potential for nitrate leaching into groundwater and entering surface waters.¹⁰⁶ The agricultural practice alternatives would be unlikely to result in adverse impacts on water resources.

Energy efficiency strategies would have no or negligible impacts on water resources. Currently the ethanol plant consumes 131 million gallons of water per year in its ethanol production process. As described in Section 6.3.2.1, the water is heated with natural gas to create steam via industrial boilers. Some of the steam is re-condensed, heated, and sent back through in a closed loop. Geothermal and solar thermal are alternative energies that could be used in place of the natural gas for heating the water. Depending on how these systems are set up (for example, how much of the water evaporates and how much can be recirculated), the amount of water use could increase or decrease. The other alternative energy sources would have negligible impacts on water resources.

6.5.4.5 Wildlife

Cover cropping could provide additional temporary habitat for some wildlife species. In general, the alternative agricultural practices and energy efficiency strategies would have negligible impacts on wildlife and their habitats.

One of the alternative energy sources, solar thermal, has potential for impacts on wildlife such as habitat alteration and bird strikes. Installation of a solar array would take about 1.5 acres within the ethanol plant site boundaries. This area might include some low-quality habitat that could be affected by the installation.

6.6 Conclusions

The purpose of the project as defined in the final scoping decision is to capture and transport CO₂ from the ethanol plant via pipeline to permanent underground sequestration facilities in North Dakota and to reduce the CI score of ethanol produced at the ethanol plant and enhance its marketability in LCFS markets. As discussed in Section 6.1.2, there are several phases within the life cycle of ethanol production that offer opportunities to reduce the total CI score of ethanol produced. This analysis focused on the two phases contributing the most to the current CI score: (1) agricultural practices for corn feedstock cultivation and (2) energy use and efficiency strategies during the biorefining phase.

The CI score of corn feedstock cultivation could be reduced by reducing GHG emissions from various land management practices. Based on the analysis in Section 6.2, the corn feedstock cultivation CI score could be reduced by approximately 8 to 27 gCO₂e/MJ by implementing the four discussed alternative agricultural practices, that is, no-till or reduced tillage, cover cropping, fertilizer reduction, and retaining 50 percent corn stover and residues. If alternative practices should stop and GHG emissions increase, the CI score would also increase. For example, if no-till practices were to revert back to intensive tillage practices, then the associated GHG would be released. Each management practice has its own associated impact on GHG emissions.

Reducing the carbon emissions associated with operational energy use at the ethanol plant can be accomplished by reducing energy usage, using an alternative energy source, or a combination of both

strategies. Reducing the energy use of the ethanol plant could result in reducing the CI score by approximately 12.8 gCO₂e/MJ, as shown in **Table 6-12**. Using renewable energy sources could potentially replace all the ethanol plant's natural gas and grid-connected electricity demand after initially reducing energy consumption. This would reduce the CI score by approximately 20.4 gCO₂e/MJ, as shown in **Table 6-14**. The energy efficiency and energy use strategies would require time to implement due to the impact on plant production, financial investment, and logistical challenges, among other constraints.

Combining alternative technologies as a CI score reduction strategy would result in an even greater reduction. Implementing both agricultural and operational energy strategies together could reduce the total CI score by approximately 28.7 to 47.6 gCO₂e/MJ. Currently the ethanol plant produces ethanol with a CARB Certified CI score of 72.83 gCO₂e/MJ. The discussed alternatives, when combined, could theoretically reduce the CI score to approximately 25.2 to 44.1 gCO₂e/MJ, as shown in **Table 6-15**.

Table 6-15 Alternative Technologies CI Score Impact Summary

Alternative Technology	Initial Plant CI Score (gCO ₂ e/MJ) ^a	Capture Facility Emissions (gCO ₂ e/MJ) ^b	CO ₂ Abated (gCO ₂ e/MJ) ^c	Net CI Score (gCO ₂ e/MJ) ^d
No Project	72.83	0	0	72.8
Project Alone	72.83	3.96	(3.5) – (35.4)	41.4 – 73.3
Agricultural Practices Alone	72.83	0	(8.3) – (27.2)	45.6 – 64.6
Energy Use and Efficiency Alone	72.83	0	(20.4)	52.4
Agricultural Practices + Energy Use and Efficiency	72.83	0	(28.7) – (47.6)	25.2 – 44.1
Project + Agricultural Practices + Energy Use and Efficiency	72.83	3.96	(28.3) – (79.1)	(2.3) – 48.5

Note: Values in parentheses are negative.

^a CARB published LCFS Pathway Certified Carbon Intensities as of July 2024; Applicant & Pathway: Fuel Producer: Green Plains Otter Tail LLC (4180); Facility Name: GREEN PLAINS OTTER TAIL, LLC (70110); Midwest Corn, Dry Mill; Dry DGS and Wet DGS, Corn Oil and Syrup; Natural Gas, Grid Electricity; Starch Ethanol produced in Fergus Falls, MN; Finished fuel transported by rail to California; Current CI Score = 72.83 gCO₂e/MJ.¹⁰⁷

^b Estimated total emissions from project energy use and operational emissions are detailed in **Table 6-2**; includes first year construction emissions estimate.

^c Estimated total emissions abated from capture, soil carbon sequestration, or avoided.

^d Estimated total emissions minus CO₂ abated.

The project is estimated to accomplish a 3.5 to 35.4 gCO₂e/MJ reduction. In combination, the alternative agricultural practices, energy efficiency improvements, renewable energy use, and the project (carbon capture and storage) could reduce the CI score to approximately negative 2.3 to 48.5 gCO₂e/MJ depending on capture efficiency and soil carbon sequestration scenarios summarized in Table 6-15. These values take into account the capture facility emissions.

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Chapter 7 No Action Alternative

This chapter describes the conditions that would be expected if a pipeline routing permit were not issued and the project were not constructed.

If the project is not constructed, the impacts described in Chapter 5 would not occur—there would be no human or environmental impacts because of the project. There would be no potential risk from a pipeline rupture. Likewise, increased tax revenues would not be realized, and the ethanol plant would continue to emit CO₂ into the atmosphere as permitted.

Consistent with the scoping decision, this EIS does not predict future ethanol production. Ethanol production might increase, decrease, or remain the same without the project. It might fluctuate up and down. Such changes are expected to happen gradually. Future production will likely be influenced by a variety of factors, such as world events, oil prices, agricultural commodity prices, government policies, and weather. LCFS are also expected to play a role in future ethanol production. In the near term, however, this EIS assumes that ethanol use is not expected to decrease without a corresponding shift in world events or government policies concerning biofuels.

7.1 Project is Not Constructed

This section discusses what might occur if the project is not constructed under three scenarios: ethanol production at the ethanol plant decreases, remains the same, or increases with corn as a feedstock. Impacts of ethanol production are generally discussed in Section 7.2. As discussed in this EIS, the ethanol plant uses corn as feedstock to produce ethanol.

The analysis here assumes that farmers are influenced more by the price of corn than where it is sold. Corn prices are influenced by a variety of factors including supply and demand. Demand is global. Without an increase in global supply coupled with a decrease in global demand, corn prices are expected to stay relatively the same with or without sales at the ethanol plant. Other global factors include weather, such as extreme drought or prolonged rains during critical times in important corn-producing regions; world events; and government regulations and policies, such as tariffs.

Prices could also fluctuate based on location. “This is because in local markets, the futures price for a commodity is going to be adjusted [from the price indicated by the Chicago Board of Trade] for variables such as freight, handling, storage and quality, as well as supply and demand factors impacting that particular area. This price difference is known as the basis, which is calculated as the cash price minus the futures price.”¹

For the purposes of this EIS, EERA staff assumes that potential impacts from ethanol production would rise and fall with the amount of ethanol produced. For example, the amount of corn used by the plant is directly related to the amount of ethanol produced. The amount of fertilizer, pesticides, and emissions would be directly related to the amount of corn produced and purchased by the ethanol plant. Any increase or decrease in ethanol production would result in a largely proportional increase or decrease in potential impacts. While this might not hold true for all impacts (for example, transportation) a proportional relationship is a reasonable assumption.

7.1.1 Production Decreases

Ethanol production might decrease. Likewise, the ethanol plant might not pursue other emerging markets such as sustainable aviation fuel.

Decreased ethanol production means lower energy and water usage and decreased GHG emissions from ethanol production and shipment. Shipping impacts would decrease. While ethanol plants may increase the local price of crops, crop production would not be expected to decrease because other markets would remain for farmers to sell to. Should corn prices fall, agricultural production would be expected to shift to soybeans or another crop—farm production would still occur on cultivated lands. It would be expected that farm practices would not change significantly, and fossil fuel, fertilizer, and pesticide use would continue with a trend toward less intensive agricultural practices, such as no-till, cover cropping, and precision fertilizer application, that would reduce impacts. Should corn prices fall significantly along with the price of other commodity crops commonly grown in the project area, it is possible, though unlikely, that some marginal crop land could be taken out of production and converted to other uses.

From a social and economic standpoint, a decrease in ethanol production would result in decreased corn sales to the ethanol plant. The ethanol plant purchases about 22.4 million bushels of corn grain per year. Given that Otter Tail and Wilkin Counties produce approximately 47 million bushels of corn for grain each year, the ethanol plant constitutes a significant regional demand.² It is expected that this corn would be sold for use in other markets. This could result in increased shipping costs for farmers depending on the location of these markets, which would decrease profits because shipping costs are not included in the value of a bushel of corn. Different crops could be grown, such as soybeans, if the farmer predicts the crop would perform better financially. Agricultural production is expected to remain steady. Prices are not expected to change significantly with or without sales to the ethanol plant but would likely be more directly influenced by world events.

The ethanol plant is expected to remain in operation for the near term if the project is not constructed. Mid-term and long-term operations are more susceptible to macroeconomic and political trends. If lower CI fuels are necessary to remain viable in the future, alternative strategies, such as those discussed in Chapter 6, could be pursued.

7.1.2 Production Remains the Same

Ethanol production might remain stable as the ethanol plant continues to compete in standard fuel markets and sells by-products.

The status quo means steady energy and water usage and steady GHG emissions from ethanol production and shipment. Shipping impacts would not be expected to change. Production of corn sold at the ethanol plant would be expected to be steady. It would be expected that farm practices would not change significantly, and fossil fuel, fertilizer, and pesticide use would continue with a trend toward less intensive agricultural practices, such as no-till, cover cropping, and precision fertilizer application, that would reduce impacts. Yields might increase over time, meaning less land would be required to grow the corn needed by the ethanol plant; however, it is expected that this would not result in fewer cultivated acres.

From a social and economic perspective, corn sales would remain stable at the ethanol plant. Prices are not expected to change significantly with or without sales to the ethanol plant and to be more directly influenced by world events. Local jobs and tax revenues would continue at current levels.

7.1.3 Production Increases

Ethanol production might increase. The ethanol plant could pursue other means to compete in LCFS markets in the form of the agricultural and energy efficiency practices discussed in Chapter 6, pursuit of alternative carbon sequestration projects, or other actions that would decrease the CI score of the ethanol produced at the ethanol plant. Assuming the ethanol plant can lower its CI score and compete in

LCFS markets, ethanol production could increase. Likewise, the ethanol plant could enter into other markets, increasing demand. Ultimately, maximum ethanol production is based on the air permit from MPCA, but the ethanol plant could request an increase.

Increased ethanol production means increased energy and water usage and, without carbon capture and storage, increased GHG emissions from ethanol production. Impacts from shipping would increase. Some emissions could be avoided by implementing carbon intensity reducing practices, and the source of electricity provided by Lake Region Electric Cooperative is expected to shift toward including more renewable energy. Production of corn would not be expected to initially increase if the ethanol plant were to increase production; rather, a shift in corn sales to the ethanol plant from other markets would likely occur. Should the ethanol plant pay a premium for corn, farmers might choose to grow and sell corn over other grains or expand the amount of cropland in production. Over the long term, shifting cropland to produce corn for ethanol is likely to motivate the expansion of cropland to replace what was displaced. As discussed above, farm practices could trend toward less carbon intensive agricultural practices, such as no-till, cover cropping, and precision fertilizer application, that would reduce impacts.

From a social and economic standpoint, increasing ethanol production would result in increased corn sales to the ethanol plant. Prices are not expected to change significantly with or without sales to the ethanol plant. Local jobs and tax revenues would continue and might increase.

7.2 Ethanol Production Impacts

Section 7.1 discusses a no action alternative specific to the project. Section 7.2 discusses impacts from ethanol production at a broad scale based on varying levels of ethanol production. As discussed above, impacts from ethanol production are expected to be proportional to the amount of ethanol produced. An increase or decrease in ethanol production would result in a relatively proportional increase or decrease in potential impacts.

The scoping decision indicated that this EIS would “review existing studies of the human and environmental impacts of ethanol production and provide a synthesized analysis of potential impacts to human and environmental resources.” Ethanol production, transport, and use cause unique human and environmental impacts. The following sections summarize the regulatory framework of ethanol production, as well as review and discuss production (agriculture in-field and ethanol plant production facility), transportation, and end use impacts on human and environmental resources.

7.2.1 Regulatory Framework

Agricultural operations involving crop production are regulated under various federal, state, and local regulations.³ Regulations apply to use of chemicals (pesticides and herbicides concerning use, application, worker protection, runoff, etc.), land application of biosolids (manure), impacts on land, conversion of land to agriculture (for example, wetlands, waterways), dredge and fill, drain tiles and ditches, irrigation and water use, air emissions (stationary engines, reciprocating internal combustion engines, etc.), dust and particulate matter, oil storage, storage tanks (underground and aboveground), used oil, oil spills, hazardous substances, building construction, toxic and flammable substances, and waste storage and disposal (manure, crop residues, solid or dissolved materials in irrigation return flows, etc.). Depending on the specific agricultural operation, feedstock, and location, some or all of these regulations may apply.

Ethanol production facilities are regulated under various federal, state, and local regulations.⁴ Regulations apply to facility construction, air emissions (ethanol production, boilers/heating, stationary

engines, reciprocating internal combustion engines, etc.), materials storage and handling (feedstock, ethanol produced, denaturant, etc.), loadout (rail, tanker truck, etc.), use of chemicals (concerning storage, use, handling, and worker protection of fertilizers, herbicides, pesticides, and equipment fuel), impacts on land, conversion of land at the production facility (for example, wetlands, waterways), dredge and fill, water use and supply, dust and particulate matter, storage tanks (underground and aboveground), spills and spill management, hazardous substances, toxic and flammable substances, and waste storage and disposal. Depending on the specific ethanol facility, operation, and location, some or all of these regulations may apply.

Federal regulations associated with ethanol facilities from the Oil Pollution Act of 1990 and Section 311 of the Clean Water Act require preparation of a Facility Response Plan for oil facilities (including ethanol facilities) with a storage capacity of greater than 1 million gallons and a Spill Prevention, Control, and Countermeasure (SPCC) Plan for facilities storing 1,320 gallons aboveground from EPA. EPA also requires a Risk Management Plan, and the Occupational Safety and Health Administration requires a Process Safety Management Plan for facilities handling hazardous chemicals above a certain threshold.

Other relevant plans for ethanol facilities include an Emergency Action Plan, a Stormwater Pollution Prevention Plan, and Oil Spill Prevention and Response Plans during transportation.⁵ Required permits may include a NPDES permit (both construction and operation) and an EPA Title V Air Permit and/or equivalent state-issued air permit. The Renewable Fuels Association released technical guidance for plant and employee safety regulatory requirements specific to ethanol production facilities. This guidance details the process and safety procedures required by the Occupational Safety and Health Administration when handling hazardous chemicals such as denatured fuel ethanol, anhydrous ammonia, hydrochloric acid, denaturant, and chlorine dioxide.⁶

7.2.2 Production Impacts – Agriculture Operations

Biofuels are typically liquid fuels created by blending components produced from biomass materials, also known as feedstocks. The increase in production and consumption of biofuels has placed an increased demand on agricultural activities to produce such feedstocks. Ethanol is a biofuel that can be produced from a variety of feedstocks including corn, sorghum, barley, and sugar beets.⁷ The following sections summarize human and environmental impacts typically associated with in-field agricultural operations in providing feedstock to ethanol production facilities in Minnesota.

7.2.2.1 Human Impacts

Agriculture operations have the potential to impact the following resources: health and safety, and socioeconomics. Potential impacts on these resources are discussed below.

Health and Safety

Agricultural operations can expose farmworkers to numerous health and safety hazards. In order to supply feedstock to ethanol plants, farmworkers must till and prepare the soil, sow seed, manage pests, fertilize, water, harvest the feedstock, process the feedstock, and typically deliver the feedstock. Each step in the cultivation process poses unique risks, but several risks are present throughout. Heavy machinery is used by farmworkers at each step, and this presents hazards such as falling, entanglement, fire, explosion, musculoskeletal injuries from vibrations and non-ergonomic positioning, noise, and air pollution from diesel exhaust.⁸

Pest management can expose farmworkers to toxic chemical compounds through inhalation, ingestion, or absorption through the skin.⁹ Weather-related hazards such as lightning strikes, extreme heat, ice, and extreme cold are also experienced by farmworkers managing ethanol plant feedstock.

Available incident statistics broadly cover all agricultural operations. Therefore, they are not specific to ethanol feedstock production; however, some statistics are worth mentioning. According to the United States Bureau of Labor Statistics, workers categorized in the crop production industry had one of the highest fatality rates between 2015 and 2019 at 17.4 deaths per 100,000 full-time workers.¹⁰ The rate for all industries was 3.8 deaths per 100,000 full-time workers. Non-fatal incidents resulted in 1.4 days away from work for every 100 crop production workers. The rate for all industries was 0.9. However, this industry is known to underreport injuries.¹¹

Socioeconomics

Agricultural operations are anticipated to have a beneficial impact on the socioeconomics of the regional economy. Agricultural operations rely on growers' extensive social networks that extend from the local farm level to the national level across both private and public sectors.¹² Agricultural operations that support ethanol feedstock production have socioeconomic impacts on the farmers depending on the state of the market. The conversion of feedstock into ethanol is one market for farmers to sell their crops. Farmers have the potential to benefit economically from increased demand for biofuel feedstocks, which can lead to higher production and prices and ultimately can increase net farm income. As biofuel producers absorb a larger share of crop production, higher prices will affect domestic use and exports, inducing more intense demand competition between buyers of feed grains for livestock and grain for human consumption.

Higher commodity prices can reduce government payments to farmers. Corn prices would be affected by changes in demand for ethanol feedstocks. These impacts are expected to provide \$21.2 billion in gross domestic product for the United States economy with \$8.8 billion in gross domestic product and \$6.1 billion in income for agriculture producers.¹³

"Section 45Z of the Inflation Reduction Act (IRA) provides a tax credit for the domestic product of clean transportation fuels including ethanol, biodiesel, and sustainable aviation fuels. Also known as the Clean Fuel Production Credit, the tax credit applies to fuels produced after December 31, 2024, and sold before Dec. 31, 2027."¹⁴ A combination of operational changes by ethanol producers and increased use of low CI score corn feedstock can reduce the carbon intensity of ethanol leading to a per gallon tax credit. Because low CI score corn plays a substantial role in this reduction, ethanol producers are expected to pay a premium for qualifying feedstock, with \$0.10 per gallon (3.3 cents per bushel) of the Inflation Reduction Act tax credit going to farmers supplying low CI score corn.¹⁵

7.2.2.2 Environmental Impacts

Agriculture operations have the potential to impact the following resources: soil and ecosystems, water availability, water resources (surface and groundwater), and air quality and GHGs. Potential impacts on these resources are discussed below.

Soil and Ecosystems

Agricultural activities associated with the cultivation of corn feedstock for ethanol production can result in environmental impacts, such as soil nutrient depletion, soil erosion, and herbicide/pesticide runoff. Erosion diminishes soil quality and reduces the productivity of natural and agricultural ecosystems. Conventionally managed continuous corn monocropping requires high pesticide and nutrient applications that can lead to extensive water impairments due to runoff. However, precision farming practices and conservation measures are becoming more commonplace. Such practices improve the efficiency of fertilizer application, irrigation, and other chemical input usage in feedstock production as well as reduce constituent volumes running off into waterbodies.

According to U.S. Agriculture census data, land use for crop production has decreased in the last decade for Otter Tail and Wilkin Counties. This can be attributed to several factors, including technological improvements, market shifts, and increased importing. However, an increase in corn ethanol production is likely to directly or indirectly influence land use conversion to cropland over the long term.

Increases in crop production can create pressures to expand into areas previously conserved through USDA's Conservation Reserve Program (CRP), which was established for the purposes of reducing erosion, improving water quality, and reducing habitat loss. About 30 million acres throughout the United States are included in the CRP, which represents approximately one-third of the amount of land used for corn.¹⁶ Landowners who enroll in the federally funded CRP must commit to contracts of 14 to 15 years. When a CRP contract expires, the enrollee can re-enroll if there is room in the CRP, return the land to crop production or livestock grazing, leave the land unused, or develop the land for non-farm use. It has been estimated that if CRP contracts were to expire and there were no further enrollments, roughly 51 percent of CRP land would return to crop production within 1 year.¹⁷

Conversion of grasslands to annual cropland typically negatively affects soil quality, with increases in erosion, and the loss of soil nutrients and soil organic matter, including soil carbon. Impacts of this conversion can be partially mitigated through the adoption of management practices such as conservation tillage. Overall, these land use trends suggest that negative impacts on soil quality from biofuel feedstocks have increased since 2011, but this has not been quantified, and the magnitude of effects depends predominantly on the relative areas of grasslands converted versus existing croplands attributable to biofuels.¹⁸

Land use changes for biofuel production have negative impacts on ecosystem health and biodiversity. For example, the loss of wetlands to row crops and related production practices is associated with reduced species habitat and associated food sources, including aquatic plants and invertebrates. Similarly, the degradation and loss of grasslands can negatively impact grassland bird populations. The type and severity of the environmental impact depends on the crop type, geographic location, and management practices. Pollinators are also affected by land use changes due to the use of insecticides on corn, such as neonicotinoids. Neonicotinoids travel through the soil food web and affect beneficial arthropods, which can disrupt biological control of crop pests. Increased applications of the pesticides imidacloprid and atrazine, resulting from corn and soybean expansion/intensification, have also been shown to have aquatic ecological effects.¹⁹

More recent scientific analysis links corn for ethanol to declining bee populations, with adverse implications for many other high-value agricultural crops (almonds, apples) that rely on these insects for pollination.²⁰ Declines in bee populations are greatest in primarily agricultural areas in the Midwest corn belt and California's Central Valley.

Water Availability

Corn irrigation makes up a relatively large portion of agricultural water usage. In an assessment of several fossil-derived and biomass-derived energy systems, it was determined that the water footprint of biomass-derived energy is 70 to 400 times larger than the water footprint of fossil energy systems on a life cycle basis.²¹ The embodied water in ethanol can vary drastically from a low of 5 gallons of water to 1 gallon of ethanol in Ohio to 2,138 gallons of water to 1 gallon of ethanol in California. This depends on the large range of irrigation required to grow the feedstock. Most of this water is consumed during the agricultural phase (99 percent) and not at the ethanol production plant (less than 1 percent). Ethanol plants rely on a constant supply of water to operate, including process water and cooling water. Sources of water are mostly from groundwater but also can come from third-party providers such as municipal

water, including recycled municipal water.²² Generally, corn ethanol plants use approximately 2.5 to 3 gallons of water per gallon of ethanol produced.²³

Water Resources

EPA has found that corn production intensification was associated with higher levels of erosion, chemical loading to surface water, and eutrophication (excess nutrients).²⁴ Additionally, because ethanol is water soluble, while traditional hydrocarbon fuels (crude oil) are not, ethanol releases into the environment have the potential to result in greater impacts.

Because corn has the highest fertilizer use per acre of any biofuel feedstock, increased corn production can result in water quality concerns associated with nutrient pollution from spills or surface runoff of nitrogen and phosphorus fertilizers that infiltrate groundwater, surface water, wetlands, and floodplains. Both nitrogen and phosphorus are known to have negative effects on aquatic biodiversity. Conservation and crop management practices can help reduce these impacts.²⁵

Increased nutrient loading to surface water can lead to eutrophication, which is the presence of excessive nutrients. Eutrophication promotes rapid algal growth. Once the algae stop growing, they die and decay. The decay process consumes dissolved oxygen in the waterbody, which can lead to hypoxia or an oxygen deficiency. Hypoxia usually occurs in estuaries and coastal waters.

Watersheds in heavily farmed areas have been found to have high levels of nitrogen, phosphorus, and suspended solids, which damage aquatic life and reduce recreational opportunities. In a 2009 report, the State-EPA Nutrient Innovations Task Group pointed out that nutrient-related pollution significantly affects drinking water supplies, aquatic life, and recreational water quality. Nitrogen contamination in drinking water could lead to cancer and reproductive effects, but the primary concern is methemoglobinemia (a blood disorder in which an abnormal amount of methemoglobin is produced) in infants.²⁶

Air Quality and Greenhouse Gas Emissions

Upstream air quality impacts of biofuels include emissions associated with cultivation, harvesting, and transporting of corn or other feedstock; conversion to biofuels; and sale.

Several studies have speculated that land use change required for biofuel production might be counterproductive to the overall goal of reducing GHG emissions.²⁷ Conversion of certain land types, such as grasslands or peatlands, can create a biofuel carbon debt by releasing 17 to 420 times more CO₂ through land conversion than the biofuels would displace. However, biofuels made from biomass on degraded agricultural lands can achieve a net GHG benefit.²⁸

Land Conversion

A study from UCLA evaluated how CRP re-enrollments were impacted in areas near ethanol plants after the ethanol mandate from the federal Renewable Portfolio Standard went into effect. UCLA researchers did not find a statistically significant relationship between ethanol capacity and CRP re-enrollment. In fact, more land was re-enrolled in CRP after the ethanol mandate took effect in ethanol intensive locations. Other factors including crop prices, CRP policy changes, state programs, soil quality, and parcel sizes were also considered.²⁹

7.2.3 Production Impacts – Ethanol Plant Operation

7.2.3.1 Human Impacts

Ethanol production has the potential to impact the following resources: health and safety, and socioeconomics. Potential impacts on these resources are discussed below.

Health and Safety

As biofuel production and use have increased, the associated risk and number of incidents have correspondingly increased. Potential hazards of operating an ethanol plant include materials, material handling, and operations and maintenance and are described below.

According to incident statistical reports, hazards from materials used to produce ethanol include fire, explosion, overpressure releases, runaway and uncontrolled reactions, toxic substance exposure, and steam flashes. Ethanol remains highly flammable and easily ignited. Approximately six fire and explosion incidents are reported every year from the bioethanol and biodiesel industries in the United States.³⁰ Undenatured ethanol is toxic when ingested in large quantities. Ethanol ingestion has been linked to increased risk of cirrhosis of the liver, multiple forms of cancer, and alcoholism.³¹

Hazards from materials handling as well as operations and maintenance include storage of flammable and toxic materials and processing of hazardous materials. There is a potential for dust explosions during grain handling, especially if particles are allowed to accumulate close to sources of static charge build-up. Proper grounding, sealing, installation, and use of all electric equipment would reduce fire and explosion risk.³² To further reduce the risk of ignition, a system for removal of tramp metal from grain shipments should be installed at the grain receiving areas. Screens, magnets, or other equipment items are required on facilities constructed after 1973.

To minimize the amount of ethanol vapors in the open workspace, tanks and railcars can be equipped with vapor recovery systems that collect ethanol vapors that would otherwise be released when tanks are filled with liquids.³³ Additionally, some storage tanks at tank farm facilities have fixed fire protection systems that will spray foam down inside of the tank wall and onto the top of burning liquids inside of the tank.³⁴

Socioeconomics

An ethanol plant would increase tax revenues in the short term and long term, resulting in a beneficial impact on the area where it is located. The combination of gross domestic product and household income supported by the ethanol industry contributed an estimated \$7.2 billion in tax revenue to the federal Treasury in 2022.³⁵ State and local governments also benefit from the economic activity supported by the ethanol industry, earning \$5.1 billion in 2022. It is expected that an ethanol plant would generate property tax revenues where it is located during the life of the facility operations.

An ethanol plant would create job opportunities during construction and operation of the ethanol plant. Depending on the size of the ethanol facility, over 100 construction workers would be needed to build the facility over a relatively short timeframe of 1 to 2 years. In more than 200 communities across the United States, ethanol biorefineries continued to play an important role in driving economic growth in 2021.³⁶ More than 73,000 United States jobs were directly associated with the ethanol industry, which contributed just over \$52 billion to the gross domestic product and \$28.7 billion in household income in 2021.

7.2.3.2 Environmental Impacts

Ethanol production has the potential to impact the following resources: soil and ecosystems, water resources, and air quality and GHGs. Potential impacts are discussed below.

Soil and Ecosystems

Ethanol plants are often sited on a few dozen acres of former farmland near their source of feedstock. The construction of an ethanol plant initially displaces a large quantity of soil for facility foundations and prevents future soil building capacity. Topsoil is excavated and exported during the conversion of land to an industrial use. In addition, subsoil is capped by impervious surfaces, which prevents an exchange of nutrients, oxygen, moisture, microbes, and microorganisms. Vegetated areas that remain tend to be regularly mowed turf grass.

Ethanol plants often store large quantities of ethanol on site. Storage of ethanol increases the risk and severity of soil and groundwater contamination from the risk of storage tank corrosion. The oxidation of ethanol can lead to the creation of corrosive by-products, which can increase the risk of storage tank leakage. When ethanol biodegrades in water, it can also deplete dissolved oxygen, produce methane, and inhibit further biodegradation.³⁷ The accumulation of methane in some scenarios can produce a high-risk situation that may require emergency mitigation measures or the use of engineering controls.³⁸ The SPCC regulations establish guidelines and measures to prevent, control, and respond to oil spills, including those involving biofuels like ethanol-blended gasoline. The regulation considers factors such as containment measures, secondary containment, and proper management practices to mitigate the potential environmental impacts. Qualified facilities are required to assess and address the specific characteristics of the biofuel to prevent adverse effects on the environment in accordance with SPCC guidelines.³⁹

Water Resources

Ethanol plants contain substantial expanses of impervious ground cover such as access drives, parking lots, and large processing structures, which create stormwater runoff. To receive a necessary stormwater discharge permit from the applicable regulatory agency, stormwater quantity and quality requirements must be adhered to. From a quantity perspective, ethanol plants must demonstrate that, at a minimum, peak stormwater runoff rates do not exceed the peak runoff rates prior to development for a prescribed design storm. This is often accomplished through retention or detention ponds. However, the volume of rainfall contributing to runoff will typically far exceed that of predevelopment land cover. This is because cropland would still allow for shallow and deep infiltration, as well as greater evapotranspiration. Shifting the hydrology creates several effects. Groundwater tables do not receive the same recharge volume. This in turn affects the available groundwater able to be drawn and used for ethanol production at the plant or for irrigation. Streams receive more frequent and larger magnitude flow rates; experience increased channel widths, increased downcutting, reduced bank stability, and disrupted sediment transport; and have altered in-stream hydraulics, which affect channel velocities and shear stress.⁴⁰

From a stormwater quality perspective, the increased velocities and volumes can cause downstream erosion and increased turbidity. Additionally, impervious surfaces transfer heat to stormwater runoff that in turn increases temperatures of receiving waterbodies. Surfaces at industrial facilities can contain organic and inorganic pollutants. These substances can be suspended and conveyed into watercourses during a rain event, reducing the water quality of the receiving body.⁴¹ Retention and detention ponds can also allow settling of substances, which can improve the quality of stormwater discharge from the ponds. Some regions have enhanced stormwater quality permitting requirements. This often consists of

capturing and treating the “first flush” of stormwater prior to releasing runoff downstream. The “first flush” contains the largest concentration of pollutants. However, these requirements are not consistent across the United States.

An ethanol plant that produces 100 million gallons of ethanol per year can require between 300 and 400 million gallons of water.⁴² An ethanol plant would need to obtain a water withdrawal permit from the applicable regulatory agency for water use.⁴³ The source of the water can vary but often comes from groundwater wells. Underground reserves of fresh water are limited. Recharge time is highly variable and can take between 100 years to tens of thousands of years to recharge.⁴⁴ Ethanol plants primarily use water for steam generation and cooling. The bulk of water for these end uses evaporates into the atmosphere.

Wastewater from operation of ethanol plants is primarily generated from cooling tower blowdown, boiler blowdown, and water softener discharge. This wastewater is often managed by ethanol plants in one of two ways: direct discharge to a receiving stream or discharge to a municipal wastewater treatment system.⁴⁵ If discharged directly into a receiving waterbody, a more involved NPDES permit from the applicable regulatory agency is required to demonstrate that pollutant concentration limits will not exceed a prescribed threshold. If discharged into a municipal wastewater treatment system, the ethanol plant may be required to receive a discharge permit from the applicable regulatory agency and commit to pretreating the wastewater prior to discharge. These additional measures are determined by the volume of discharge in relation to the size of the receiving plant, as well as the concentration of various pollutants being discharged.

Air Quality and Greenhouse Gas Emissions

As stated above, upstream emissions include cultivation, harvesting, transporting of corn or other feedstock, conversion to biofuels, and sale. This includes emissions from production of biofuels at a biofuel plant. Biofuel plants are typically more energy intensive compared to petroleum refineries because of the combustion of feedstocks in boilers compared to production and distribution of gasoline. Upstream emissions are considerably higher for corn ethanol than for gasoline for most criteria pollutants.⁴⁶

Most of the GHG emissions (95 percent) associated with corn ethanol are from upstream sources in the agricultural fields and ethanol production at the plant. Overall, life cycle GHG emissions from corn ethanol have been declining. The CI score of corn ethanol has decreased from 58 gCO₂e/MJ in 2005 to 45 gCO₂e/MJ in 2019. Ethanol plants have used improved technologies to increase ethanol yield and reduce energy use, resulting in reduced ethanol production emissions by 30 percent (or 11 gCO₂e/MJ) over the 15-year period of 2005 to 2019. Farmers have reduced chemical and energy input intensities, which contributes to a 17 percent reduction in farming-related emissions (4.9 gCO₂e/MJ). Land use change GHG emissions were initially estimated to be very high in 2008, but the GREET model currently estimates the land use change GHG emissions rate at 7.4 gCO₂e/MJ for United States corn ethanol according to Argonne’s Carbon Calculator for Land Use and Land Management Change from Biofuels Production.⁴⁷

As discussed in EPA’s *Biofuels and the Environment: Second Triennial Report to Congress*, air quality impacts are highly localized and dependent on feedstock type, land use change, land management/cultivation practices, and the energy source at the ethanol plant.⁴⁸ Facilities producing ethanol from corn and cellulosic feedstocks tend to have greater air pollutant emissions relative to petroleum refineries on a per-British thermal unit of fuel produced basis, but emission rates vary widely among facilities. Ethanol from corn grain has higher emissions across the life cycle than ethanol from

other feedstocks. Ethanol plants relying on coal have higher air pollutant emissions than plants relying on natural gas and other energy sources.⁴⁹

Air permits associated with ethanol plants identify particulate matter (PM) sources from grain receiving, milling, dried distiller's grains with solubles (DDGS), handling and drying, combustion of natural gas or propane (boilers, regenerative thermal oxidizer, DDGS dryer), and vehicle traffic on paved and unpaved roads. Nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), and GHG (primarily CO₂) are emitted from combustion of natural gas or propane. Volatile organic compounds (VOC) and hazardous air pollutants (HAP) are emitted from combustion of natural gas or propane, fermentation, drying and cooling of DDGS, wetcake production and storage, distillation, ethanol and denaturant storage and loadout, and volatile organic liquid piping leaks.⁵⁰ CO₂ emissions are a typical natural by-product of the ethanol fermentation process as sugars are broken down to create ethanol.

Control equipment at the facility includes fabric filters for control of particulate emissions from grain, flour, and DDGS handling operations; packed scrubbers for control of VOC and HAP emissions from fermentation and distillation; a regenerative thermal oxidizer for control of VOC and HAP emissions from DDGS drying and cooling; and a flare for control of VOC and HAP emissions from ethanol loadout into trucks and railcars.⁵¹

7.2.4 Transportation Impacts

Transportation-related impacts occur in three different phases: (1) transporting ethanol feedstock, such as corn, from farms to ethanol plants, (2) transporting ethanol from ethanol plants to finished motor gasoline blending terminals, and (3) distributing the ethanol-blended fuel to fueling stations. About 90 percent of ethanol produced in the United States is transported via train or large tanker truck. Barges are used for about 10 percent of all United States ethanol, and a very small percentage is transported through pipelines.⁵²

7.2.4.1 Human Impacts

Transportation has the potential to impact the following resources: health and safety, and socioeconomics. Potential impacts are discussed below.

Health and Safety

Ethanol feedstock transported via truck or rail is susceptible to grain dust explosions.⁵³ According to Purdue University, 9 grain dust explosions were reported in the United States in 2022, which compares to the 10-year average of 7.8 explosions.⁵⁴ Such explosions could kill or injure workers and bystanders. Additionally, grain dust can become suspended in the air during transit, resulting in eye, skin, and respiratory effects.⁵⁵ Because ethanol is flammable and considered a hazardous material, railroad tanker car operators and truck drivers must adhere to strict safety guidelines from the USDOT and the Federal Motor Carrier Safety Administration. The Federal Motor Carrier Safety Administration requires truck drivers to carry a safety permit to transport hazardous materials including ethanol. There is risk associated with ethanol spills from truck, train, and barge accidents.

Socioeconomics

Transportation contributes to the regional economy, particularly in rural communities, by increasing the use of truck, rail, and barge transportation and the associated economic growth and job creation. Ethanol is primarily produced in the Midwest and is transported long distances by rail to reach facilities in coastal areas. Trucking is preferred over rail transport for shorter haul distances, resulting in more trucking jobs near ethanol plants. Feedstocks are most frequently delivered to ethanol plants by truck,

typically from farms or grain storage locations within a 50-mile radius.⁵⁶ For example, a 100-million gallon per year facility would require an average of 160 trucks to deliver corn each day, which is over 41,000 loads per year.⁵⁷ These shipping employment opportunities can represent a major economic growth opportunity, not only for the community, but also for the larger regional economy surrounding the ethanol plant location.

7.2.4.2 Environmental Impacts

Ethanol is a clear, colorless liquid that is highly flammable, toxic in high concentrations, water soluble, and capable of moving through soil and into groundwater.⁵⁸ Transportation has the potential to impact the following resources: soil and ecosystems, water resources, and air quality and GHGs. Potential impacts are discussed below.

Soil and Ecosystems

Ethanol spills are rare during transportation, but they do occur in all three primary modes of transportation: rail, freight truck, and barge. Ethanol is almost entirely derived from natural materials and oxygen; as such, ethanol biodegrades rapidly in soil. In surface water and groundwater, ethanol will completely dissolve with low likelihood of volatilization or adsorption.⁵⁹ Once ethanol is depleted of oxygen, anaerobic biodegradation of ethanol produces methane. Elevated levels of methane in soils can harm and even kill plants. While biogenic methane gas is naturally present in soils, elevated concentrations reduce the availability of oxygen in the soil, thereby depleting oxygen availability to plant roots and other oxygen-dependent organisms.⁶⁰

Impacts associated with transportation infrastructure vary by mode. Freight trucks have the largest physical footprint, requiring roadways that cap the soil, increase stormwater runoff, and decrease stormwater quality. This infrastructure fragments habitats and leads to premature species deaths via vehicle strikes. Railroads can also reduce habitat connectivity, but animal strikes by railcars are far less frequent than by vehicles, and the physical footprint of railways is significantly smaller than that of the road system. Barges traverse existing water courses and thus have a minimal impact on soil and terrestrial ecosystems. However, management of watercourses is increasingly centered around serving barge traffic rather than supporting marine ecosystems. This results in altering natural hydrology, removing habitat, polluting waters, and reducing populations of native species.⁶¹

Water Resources

In the case of an ethanol spill into the environment that is not otherwise contained, water resources may be impacted. Ethanol-blended fuel might have increased risk to water resources compared to petroleum hydrocarbons because of its ability to degrade rapidly. Once dissolved, ethanol is unlikely to volatilize or be adsorbed. In aerobic environments, oxygen is depleted as a result of aerobic degradation. In anaerobic environments, anaerobic biodegradation of ethanol can produce methane, which creates the potential for an explosion hazard.⁶² Methane generation may be delayed for months to years after a release and may persist for years after the ethanol is no longer present in groundwater. At some sites, methane might be the primary contaminant of concern and the risk driver for corrective action or long-term monitoring.⁶³

Air Quality and Greenhouse Gas Emissions

Transporting ethanol causes increased truck, train, and barge traffic from fuel distribution. Because these modes of transportation would likely use diesel as their main fuel, there would be adverse air quality and GHG impacts along the transport routes. These transportation-related impacts on air quality would be similar for both ethanol-blended gasoline and regular gasoline depending on the distance

travelled and mode of travel. Per energy unit, truck travel would create more emissions compared to train and barge because it would be the least efficient.

Diesel engines emit a complex mixture of air pollutants, including both gaseous and solid material. In particular, diesel particulate matter (DPM) is a known carcinogen. A large proportion of DPM is composed of black carbon. Black carbon is the second largest contributor to global warming after CO₂ emissions. Ninety percent of DPM is less than 1 micrometer in diameter and is thus able to travel deep within a person's lungs and bloodstream. Adverse health effects from DPM and other PM_{2.5} emissions from diesel exhaust include cardiovascular and respiratory hospitalizations, and premature death. Environmental effects of DPM include haze and reduced visibility as particles in the air scatter and absorb sunlight. DPM exposure can be reduced through cleaner-burning diesel fuel, retrofitting engines with particle-trapping filters, alternative fuels, and advanced technologies to reduce particle emissions.⁶⁴

7.2.5 End Use Impacts

A second source of emissions from use of ethanol-blended fuels used in the transportation industry is vehicular emissions (downstream emissions). Downstream emissions of corn ethanol and gasoline are similar. The following sections briefly summarize impacts from downstream emissions.

7.2.5.1 Human Impacts

End use has the potential to impact health and safety. Potential impacts are discussed below.

Health and Safety

Gasoline and diesel fuel are mixtures of hydrocarbon compounds and other additives such as ethanol. Ethanol is classified by USDOT as a Class 3 flammable liquid just like gasoline and diesel fuel. Ethanol is a member of the alcohol hydrocarbon derivative family of chemicals, which are all flammable and toxic. Use of ethanol can be a fire hazard, produce toxic fumes, and have both short- and long-term health risks. Short-term risks of exposure to ethanol include intoxication due to inhalation (vapors), headaches, difficulty breathing, and eye irritation. Long-term risks include liver damage, similar to alcohol consumption.

Combustion of gasoline and diesel fuels produces emissions of airborne pollutants that negatively impact human health. These pollutants include CO, NO_x, PM, VOCs, and CO₂.

Ethanol additions to gasoline can improve the combustion performance and reduce CO emissions by nearly 16 percent.⁶⁵ Blending ethanol with gasoline can increase or decrease NO_x emissions depending on the percentage of ethanol-gasoline mix. Studies have shown inconsistent NO_x emission results related to the variation of ethanol proportion in gasoline. However, many studies conclude that there is an increased NO_x emissions tendency with high-ethanol-content blends.⁶⁶ NO_x are harmful pollutants that can damage the lungs, cause respiratory diseases, reduce oxygen transport in the bloodstream, and disrupt cellular functions.⁶⁷

Transportation sector employees, such as gasoline station workers who are in close proximity to fuel dispensing areas during working hours, are exposed to increased concentrations of combustion pollutants and longer exposure times. Long-term effects associated with combustion emissions exposure are chronic asthma, pulmonary insufficiency, cardiovascular diseases, and cardiovascular mortality.⁶⁸ These workers, as well as people living in urban areas, have potentially increased cancer risks compared to those living in rural areas or those with occupations outside of the transportation sector.⁶⁹

7.2.5.2 Environmental Impacts

End use has the potential to impact the following resources: soil and ecosystems, and air quality and GHG emissions. Potential impacts are discussed below.

Soil and Ecosystems

End use of ethanol is typically in the form of a combustible liquid transportation fuel. Ethanol is used as a gasoline additive and is commonly blended in 10 and 85 percent mixtures, referred to as E10 and E85 blends, respectively. High ethanol blends, such as E85, pose a higher risk of contaminating soil and groundwater because ethanol causes both physical and chemical changes to gasoline. Storage of ethanol and ethanol-blended gasoline increases the risk and severity of soil and groundwater contamination by increasing the risk of tank corrosion. The oxidation of ethanol can lead to the creation of corrosive by-products, which can increase the risk of storage tank leakage. Because ethanol makes gasoline and associated contaminant compounds more soluble, it becomes easier for these toxic compounds to mix with groundwater and impact living organisms in soils and waterways. When ethanol biodegrades in water, it can also deplete dissolved oxygen and produce methane.⁷⁰

The accumulation of methane in some scenarios can produce a high-risk situation that may require emergency mitigation measures or the use of engineering controls.⁷¹ The SPCC regulations establish guidelines and measures to prevent, control, and respond to oil spills, including those involving biofuels like ethanol-blended gasoline. The regulation considers factors such as containment measures, secondary containment, and proper management practices to mitigate the potential environmental impacts. Qualifying facilities are required to assess and address the specific characteristics of the biofuel to prevent adverse effects on the environment, in accordance with SPCC guidelines.⁷²

Air Quality and Greenhouse Gas Emissions

Ethanol use in transportation fuels results in vehicular emissions including both tailpipe and evaporative emissions. Tailpipe emissions result from fuel combustion in a vehicle's engine. For tailpipe emissions, introduction of ethanol into gasoline because of the Renewable Portfolio Standard was intended to reduce GHG emissions associated with gasoline. In addition to reducing GHG emissions, ethanol-blended gasolines decrease the amount of CO and PM exhaust. Changes to VOCs and NO_x exhaust emissions stay similar or increase depending on the blending percentage. Incomplete combustion in a vehicle's engine may occur when not all the fuel is burnt. When ethanol doesn't burn completely, it produces harmful pollutants like formaldehyde, VOCs which also contribute to formation of ozone and smog.⁷³

Evaporative emissions are emissions that evaporate from fuel in open-air conditions. These emissions are highly dependent on temperature, vehicle activity, and vehicle system materials and mostly occur when the car is parked or refueling. Low-level ethanol blends evaporate more easily and can increase evaporative emissions, which contribute to the formation of ozone and smog. However, vapor pressure for low-level ethanol blends can be adjusted to adhere to the same volatility standards as gasoline. E85, a high-level gasoline-ethanol blend, is less volatile than gasoline and results in lower evaporative emissions.⁷⁴

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Chapter 8 Accidental Release of CO₂

This chapter describes the potential for an unanticipated release of CO₂ from the capture facility or pipeline. It assesses the potential for adverse human and environmental impacts of an unanticipated release of CO₂. This chapter provides context regarding observations from historical incidents and relevant studies while focusing on the design characteristics of the project. Also described are prevention, preparedness, and response measures that could prevent or reduce the impacts of a release.

Chapter 5 describes the effects of construction and routine operation of the project. This chapter describes the effects of an accidental release of CO₂ from the project. A large rupture of the pipeline is unlikely to occur.

Short-term impacts associated with construction of the project are discussed in Chapter 5. Because an unanticipated release of CO₂ would occur during the operational phase of the project, impact definitions as they relate to duration have been modified in Chapter 8 to the following: short-term impacts would last several days, weeks, or months; long-term impacts would last several months to years. Permanent impacts would continue to extend beyond project decommissioning and reclamation.

8.1 How could CO₂ be accidentally released?

CO₂ could be accidentally released by leak or rupture. For CO₂ pipelines, leakage is the main form of accidental release and rupture is the most unusual failure mode.

The piping and aboveground facilities associated with the project must be designed, constructed, operated, and maintained in accordance with the PHMSA federal safety standards in 49 CFR Part 195. The regulations are intended to ensure adequate protection for the public and to prevent accidents and failures. PHMSA specifies material selection and qualification; minimum design requirements; and protection from internal, external, and atmospheric corrosion.

As described in Chapter 2, the applicant has incorporated engineering and design elements into the project to reduce the likelihood of pipeline leaks or failure, including inspection and corrosion control facilities. A pipeline leak is defined by PHMSA as a “small opening, crack, or hole in a pipeline allowing a release of oil or gas. Pipeline operators periodically perform leak surveys as leaks may not be readily or immediately detected.”¹ PHMSA defines a rupture as “the process or instance of breaking open or bursting, as in the rupture of a pipe. Technically speaking: A rupture is the propagation or growth of a defect to such an extent that the pipe becomes completely unserviceable.”²

During the pipe manufacturing process, longitudinal seam welds join the edges of steel plate to form sections of pipe. During construction, girth (or circumferential) welds are used to join sections of pipe and other components such as MLVs to create a pipeline system.³ Material or weld failures can lead to ductile or brittle fractures of the pipeline. A failure in a longitudinally welded seam can propagate for a distance along the pipe and can quickly release large quantities of product to the environment.⁴

Frost heave displaces soil vertically. It is the result of the formation of lens-shaped masses of almost pure ice, called ice lenses, that form in frozen soil or rock as the ground freezes.⁵ Frost heave has the potential to lead to movement of the pipe, stress on the pipe, or deformation of the pipe. The applicant conducted a study on frost heave (see **Appendix I**). For frost heave to occur, soil freezing and ice lensing must occur below the pipe, pressing upward on it from below. It is anticipated that the pipeline would

be buried deep enough that any ice lens would form above the pipeline rather than below it, preventing frost heave. As noted in Section 5.7.3.4, the applicant has committed to conducting geohazard assessments to identify areas surrounding the pipeline that may be prone to large earth movement, as recommended by PHMSA in its June 2022 Advisory Bulletin,⁶ and EERA staff recommends that the results of the assessments be provided to the Commission as a pre-construction filing.

8.1.1 Pipeline Leaks

Pipeline leaks create a significantly lower hazard than pipeline ruptures. Leaks can be detected during routine pipeline inspections and are not necessarily hazardous depending on their location and size.

As described in more detail in Section 8.2.2, PHMSA maintains a database of accidental releases from CO₂ pipelines.⁷ A 2023 article by Xi et al. in the *Journal of Loss Prevention in the Process Industries* analyzed PHMSA data from 2010 to 2021.⁸ This analysis showed that, for natural gas pipelines, rupture is the most common form of accident. However, for CO₂ pipelines, between 2010 and 2021, 66 CO₂ pipeline accidents were reported to PHMSA. Of these 66 accidents, 56 were leaks, 2 were ruptures, and 8 were classified as “other.”⁹ The analysis showed that leaks are the leading form of accident and rupture is the most uncommon form of accident for CO₂ pipelines.

8.1.2 Pipeline Rupture

A rupture could occur if the pipeline is damaged. Most pipeline failures are ductile fractures, which is a type of fracture marked by permanent deformation prior to the failure of the pipe. Ductile fractures can result in leaks or ruptures of various lengths and sizes. One of the most impactful types of ductile fracture is a guillotine rupture, which is when the size of the pipeline break is the same or nearly the same as the full width of the pipeline. The effect is like suddenly uncorking a hose—all of the contents rush out in the shortest amount of time possible. Another serious type of failure is when a pipeline break rapidly propagates down the length of the pipe either in the seam weld or in the pipe wall. These longitudinal failures, when long enough, look like someone has “unzipped” the pipeline. The effect of this type of rupture is very similar to the effect of a guillotine rupture in that the contents of the pipeline rapidly depressurize and vent to the atmosphere. Pipeline designers prevent and mitigate these types of failure in different ways. Increasing pipeline thickness at select locations along the pipeline or adding crack-arrestors are two such strategies.¹⁰

8.1.3 What happens during a rupture?

When CO₂ is released from a pipeline in which it is transported as a pressurized liquid, such as the project, the release is characterized by a white plume or cloud containing a mixture of vapor and solid CO₂ (dry ice). CO₂ in its vapor state is not visible but becomes visible due to the condensed water vapor formed by the humidity of the air combined with the cold temperature of the CO₂ upon release that brings the surrounding air temperature below the dew point. CO₂ concentrations cannot be assessed only by looking at the size of the visible plume because what is visible is usually condensed water vapor generated by the low temperatures associated with the rapid depressurization of CO₂ during a rupture and is not representative of the concentration of CO₂.

The initial release associated with a rupture can be explosive in the immediate area. Near a rupture, liquid CO₂ would escape and immediately vaporize and expand. In the case of a rupture in a buried pipeline, CO₂ would escape by pushing the overlying soil upward at an explosion-like speed. The expansion of CO₂ would occur at sonic speed and continue until the pressure ratio between the CO₂ and the ambient air begins to equalize.¹¹

After the initial release, the CO₂ plume would spread and eventually disperse. The CO₂ released from a pipeline would be heavier than air, and the high-rate release from a pipeline rupture would form cold dense gas plumes composed of dry ice particles and visible water vapor as the humidity in the air condenses from the extreme cooling. Such high-rate releases can produce areas of low visibility from “fog,” both from dry ice particles and water condensation. The CO₂ “fog” or plume becomes transparent when eventually warmed by the surrounding environment. Upon warming, the CO₂ plume can flow unobserved for considerable distances from the pipeline. Because CO₂ is denser than air, a plume would settle into lower-lying areas, displacing oxygen.

Following a pipeline rupture, deposits of solid CO₂ are typically observed on the ground surrounding the release point. These deposits slowly transform into CO₂ vapor.¹²

8.2 What is the safety record of CO₂ pipelines?

A 2020 pipeline rupture in Mississippi resulted in 45 people being taken to the hospital and 200 people having to be evacuated. No fatalities occurred. PHMSA data indicates that 66 accidents involving CO₂ pipelines occurred between 2010 and 2021. Of these 66 accidents, 85 percent were classified as leaks, 12 percent as “other,” and 3 percent as ruptures. CO₂ pipelines tend to have more accidents during their first decade of operation. The number of incidents per mile of CO₂ pipeline in the United States has declined over the past 5 years.

8.2.1 Historical CO₂ Releases

8.2.1.1 Lake Nyos, Cameroon

In August 1986, a large release of natural CO₂ from Lake Nyos in northwestern Cameroon killed 1,746 people and more than 3,000 livestock as well as an unknown number of wild animals and birds in the valley below the lake. The size of the release has been estimated between 100,000 tons¹³ to 1.6 million tons of CO₂.¹⁴ For comparison, the maximum amount that could be released by the project (the amount between two MLVs) is 52.5 tons.¹⁵

The Lake Nyos release caused deaths by asphyxiation as the CO₂ plume displaced oxygen, traveling downhill at more than 60 miles per hour.¹⁶ After the 1986 eruption, scientists learned that CO₂ from a pocket of magma about 50 miles below Lake Nyos was naturally recharging and accumulating at the bottom of the lake.¹⁷ A system of artificial degassing pipes was installed in Lake Nyos by an international team of researchers, and the system has been progressively scaled and fine-tuned since 1992 to siphon most of the CO₂ content from the lake.¹⁸

8.2.1.2 Satartia, Mississippi

On February 22, 2020, the 24-inch-diameter CO₂ pipeline known as the Delhi Pipeline operated by Denbury Gulf Coast Pipelines, LLC (Denbury) ruptured near Satartia, in Yazoo County, Mississippi. No fatalities occurred, but 200 people were evacuated and 45 people sought medical treatment at local hospitals. Information on this incident is provided from PHMSA’s Pipeline Incident Flagged Files¹⁹ and from PHMSA’s 2022 Failure Investigation Report.²⁰

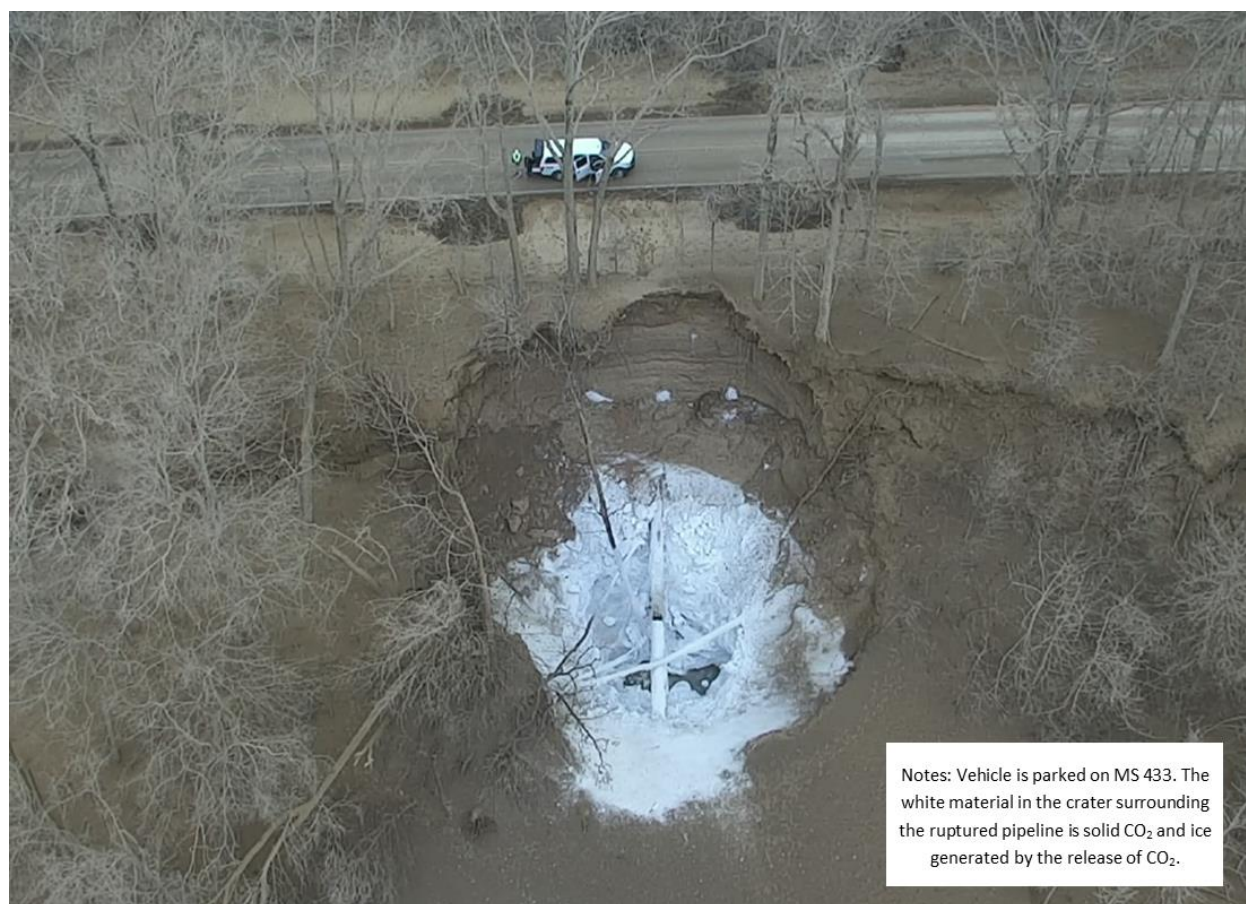
The Delhi Pipeline is 24 inches in diameter, and its pipe wall thickness is 0.54 inch. The Delhi Pipeline is primarily used for transporting CO₂ from the Jackson Dome in Mississippi to Delhi, Louisiana, for Denbury’s use in EOR at onshore oil wells. The pipeline was installed under Mississippi Highway 433 (MS 433) using HDD technology in 2009, and the depth of cover at the site of the rupture was 30 feet. The site of the rupture was on the northeast side of MS 433, about 1 mile southeast of the community

of Satartia. At the time of the rupture, the pipeline was operating at an estimated pressure of 1,400 pounds per square inch gauge (psig). This pressure was below the maximum operating pressure of the Delhi Pipeline (2,160 psig) and above the 1,070 psig needed to maintain CO₂ in a supercritical state.²¹

When the pipeline ruptured, it released liquid CO₂ that immediately began to vaporize at atmospheric conditions. The vapor did not rapidly disperse because of weather conditions and steep topography. The topography at the site was described in PHMSA's 2022 Failure Investigation Report as "a steep hill that rises from the valley containing the Big Black River to the east, goes relatively flat across the crest of the hill containing MS 433, and then slopes downward toward the valley containing the Yazoo River to the west." A plume of CO₂ formed at the site of the rupture and flowed toward Satartia.²²

Figure 8-1 shows the site of the rupture the day after the rupture. The photo shows a vehicle on MS 433, adjacent to the steep embankment and exposed ruptured pipeline. PHMSA investigators determined that a landslide had occurred on the slope below MS 433, which was caused by recent heavy rains, and that the force of the landslide placed strain on the pipeline and resulted in a full circumferential girth weld failure—a guillotine rupture.²³ PHMSA classified the cause of the incident as "Natural Force Damage" from heavy rains/floods.²⁴

Figure 8-1 Photo of Pipeline Rupture Site near Satartia, Mississippi

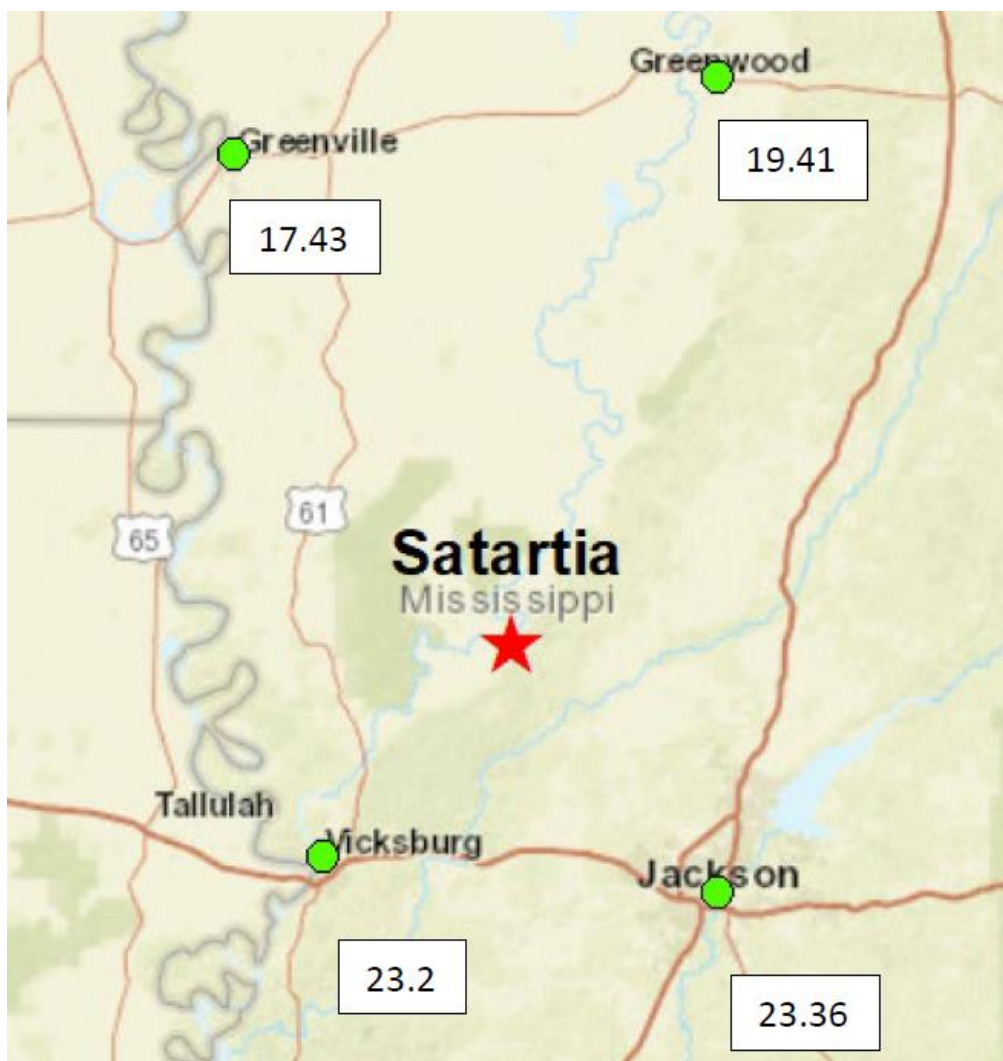


Source: Aerial drone photograph courtesy of the Mississippi Emergency Management Agency, taken February 23, 2020. Photograph from PHMSA *Failure Investigation Report – Denbury Gulf Coast Pipelines, LLC – Pipeline Rupture/Natural Force Damage*, issued May 26, 2022.

The Satartia area had experienced unusually high rainfall during the days preceding the rupture. National Weather Service data indicates that accumulated rainfall amounts between January 1 and February 29, 2020, (60 days) for the cities of Greenville, Greenwood, Vicksburg, and Jackson, Mississippi, were between 7.4 and 13.6 inches above the annual historical average for the same 60-day timespan.

Figure 8-2 shows the amount of rainfall that was recorded in the cities surrounding Satartia between January 1 and February 29, 2020.²⁵

Figure 8-2 January and February 2020 Rainfall, in Inches, in the Vicinity of Satartia²⁶



Upon learning of the incident, the Yazoo County Office of Emergency Management closed MS 433 to all traffic and began to evacuate the area. About 200 people near the rupture, including the entire town of Satartia (around 50 residents) and three homes on the other side of the Yazoo River, were evacuated by local emergency responders.

According to Denbury's accident report, 45 people sought medical attention at local hospitals, including individuals who were caught in the vapor cloud while driving a vehicle. One individual was admitted to the hospital for reasons not directly related to the pipeline failure. There were no fatalities.²⁷

The PHMSA Failure Investigation Report, issued May 26, 2022, did not identify any harm to wildlife or water resources from the CO₂ release.²⁸

In addition to the heavy rains, PHMSA's investigation identified these additional factors that contributed to the accidental release and emergency response issues:

- The pipeline operator did not consider geohazards in its plans and procedures.
- The pipeline operator's CO₂ dispersion model underestimated the potential affected area that could be impacted by a rupture. Pipeline operators are required to establish atmospheric models to prepare for emergencies. Denbury's model did not contemplate a release that could affect Satartia, and Satartia was not included in Denbury's Public Awareness Program. Moreover, Satartia was not considered in any emergency response plans. The rupture location was 1 mile from the center of Satartia, where the entire town was evacuated.
- The pipeline operator did not notify first responders to advise them of a potential failure. Local emergency responders were not informed by Denbury of the rupture and the nature of the unique safety risks of the CO₂ pipeline. As a result, responders had to make assumptions based on reports of a "green gas" and "rotten egg smell" and had to determine appropriate mitigative actions without knowing the nature of the risk.²⁹

A summary of significant differences between the proposed project and the pipeline involved in the Satartia incident are listed in **Table 8-1**.

Table 8-1 Differences between the Pipeline near Satartia and the Proposed Project

Factor	Denbury Delhi Pipeline near Satartia, MS, that Ruptured in 2020	Proposed Project
Pipeline Diameter, inches	24	4
Topography	The rupture occurred in an area of steep topography.	The project would not cross areas of steep topography.
CO ₂ Dispersion Model	Denbury did not correctly model impacts of an accidental release on the Village of Satartia.	The applicant conducted its dispersion modeling after PHMSA issued an updated nationwide advisory bulletin.
Public Awareness Program	Satartia was not included in Denbury's Public Awareness Program or considered in any emergency response plans.	EERA staff recommends as a special permit condition that the applicant provide a public education plan for Commission review prior to beginning construction. The public education plan must include specific safety information for neighboring landowners including what to do in case of a rupture (see Section 8.5.3).
Emergency Responder Awareness Program	Emergency responders did not know of the presence of the CO ₂ pipeline.	The applicant has initiated coordination with emergency responders in Otter Tail and Wilkin Counties. EERA staff recommends as a special permit condition that the applicant prepare a plan in coordination with emergency responders for Commission review prior to beginning construction. The plan must include specific equipment, training, and reimbursement that would be provided to emergency managers. The plan must also list the names of the emergency responders (see Section 8.5.3).
PHMSA Regulations	Pipeline was constructed before PHMSA issued an updated nationwide advisory bulletin to all pipeline operators underscoring the need to plan for and mitigate risks related to land movements and geohazards that pose risks to pipeline integrity like the 2020 incident in Satartia.	The project would be constructed after PHMSA issued an updated nationwide advisory bulletin to all pipeline operators underscoring the need to plan for and mitigate risks related to land movements and geohazards that pose risks to pipeline integrity like the 2020 incident in Satartia.
Potential New PHMSA Regulations	Pipeline was constructed before PHMSA initiated rulemaking for updates to CO ₂ pipeline safety regulations.	Project construction timing with respect to planned PHMSA updates to its CO ₂ pipeline safety regulations is unknown, meaning pipeline construction might or might not incorporate these regulations.

In May 2022, PHMSA announced the following actions:

- Initiating a new rulemaking to update standards for CO₂ pipelines, including requirements related to emergency preparedness and response.
- Issuing a Notice of Probable Violation, Proposed Civil Penalty, and Proposed Compliance Order to Denbury for multiple probable violations of federal pipeline safety regulations. The proposed civil penalties amount to \$3,866,734.
- Completing a failure investigation report for the 2020 pipeline failure in Satartia.
- Issuing an updated nationwide advisory bulletin to all pipeline operators,³⁰ underscoring the need to plan for and mitigate risks related to land movements and geohazards that pose risks to pipeline integrity like the 2020 incident in Satartia.
- Conducting research solicitations to strengthen pipeline safety of CO₂ pipelines.³¹

8.2.1.3 Sulphur, Louisiana

On April 3, 2024, CO₂ leaked from the Delhi Pipeline, now owned by ExxonMobil, at a pump station near the town of Sulphur in Calcasieu Parish, Louisiana.³² The leak was reported by a nearby resident in the late evening after they observed a plume of dense white gas escaping from the pump station. PHMSA Flagged Incident Files list the cause of the leak as a connection failure of the trap door O-ring and seal on the scraper/pig trap.³³ The leak took more than 2 hours to fix, as no operator was on site and the camera monitoring at the pump station was not functional. Remote operators also did not detect the leak through pressure loss. The operator was notified of the leak after emergency services were alerted. The leak was controlled through upstream and downstream valve closures.³⁴ No impacts on wildlife, soils, or water resources were recorded.

A shelter-in-place order was issued for residents within a quarter mile of the pump station; however, no residents were evacuated, and no injuries, medical treatment, or fatalities were reported because of this leak. Dry, windy conditions might have lessened effects of the rupture by dispersing the CO₂.

ExxonMobil was required to submit a report to PHMSA within 30 days of the leak. As of July 1, 2024, ExxonMobil's report has not been made public. PHMSA is also required to complete an investigation into the cause of the rupture; however, the agency is not required to publish their findings, and at the time of this EIS, no investigation report has been made available to the public. EERA staff notes that this incident and the Satartia incident occurred on the same pipeline and may not be representative of the industry as a whole, as indicated by the data in Section 8.2.2.

8.2.2 PHMSA Data on Accidents Involving Liquids Pipelines

PHMSA collects data from pipeline operators to track the frequency of failures, incidents, and accidents, and then analyzes the causes and resulting consequences. PHMSA reports this data in various categories such as year, state, type, cause, and result.

PHMSA requires an accident report if one of the following occurs on a CO₂ or hazardous liquid pipeline:

- Explosion or fire not intentionally set by the operator
- Unintended release of 5 gallons or more of hazardous liquid or CO₂
- Death of any person

- Personal injury necessitating hospitalization
- Estimated property damage, including cost of clean-up and recovery, value of lost product, and damage to the property of the operator or others, or both, exceeding \$50,000³⁵

PHMSA records each accident report and maintains a publicly available database of pipeline accidents.³⁶ According to PHMSA, pipelines are the safest mode to transport products, including CO₂.³⁷ None of the CO₂ pipeline leaks or ruptures resulted in a fatality, impact on wildlife, or water contamination. Only one injury, to a pipeline contractor, has been reported in the past 20 years.³⁸ As noted in Section 8.1.1, a 2023 article by Xi et al. in the *Journal of Loss Prevention in the Process Industries* analyzed PHMSA data from 2010 to 2021.³⁹ During this timeframe, 66 CO₂ pipeline accidents occurred including 56 leaks, 2 ruptures, and 8 classified as “other.” “Other” incidents typically involved multiple factors, but only one of these was caused by external forces (a truck collision).⁴⁰

Xi et al. also studied the effect of the number of years a pipeline has been in service compared to the frequency of accidents. CO₂ pipelines that have been in service for 0 to 10 years have the highest frequency of accidents, accounting for about 70 percent of the total.⁴¹

Based on PHMSA annual reporting data, in 2022 there were 5,385 miles of CO₂ pipelines in the United States. This total includes 27 different systems in 11 states: North Dakota, Wyoming, Colorado, Utah, Montana, Kansas, Oklahoma, Texas, New Mexico, Mississippi, and Louisiana.⁴³ CO₂ pipelines have been operating in the United States for over 35 years.⁴⁴ As shown in **Figure 8-3**, CO₂ pipeline mileage has been relatively stable over the last 10 years.

Figure 8-3 Miles of CO₂ Pipelines in the United States⁴⁵

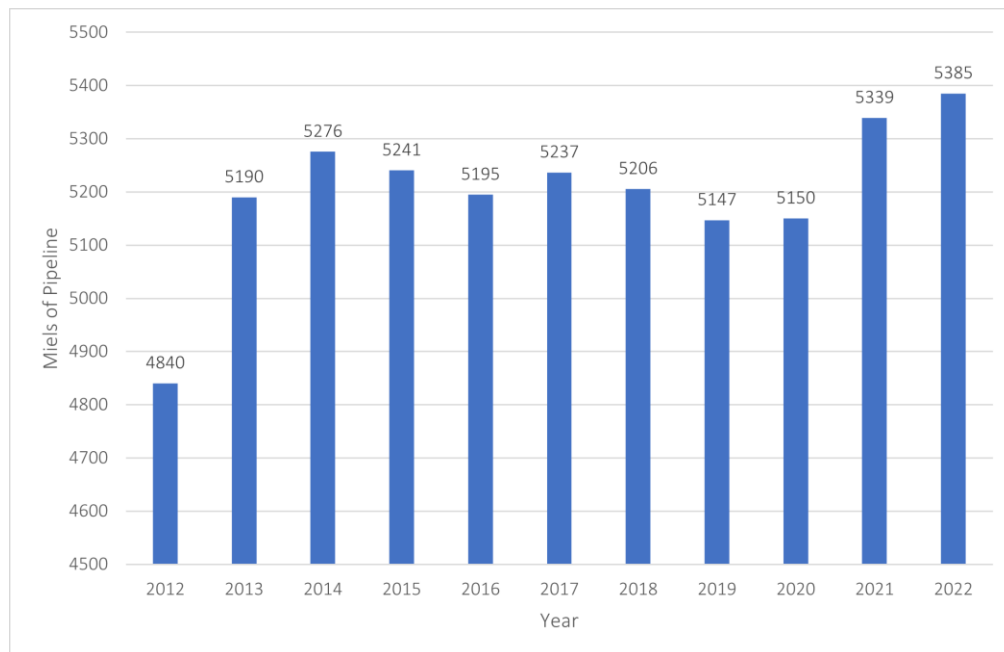
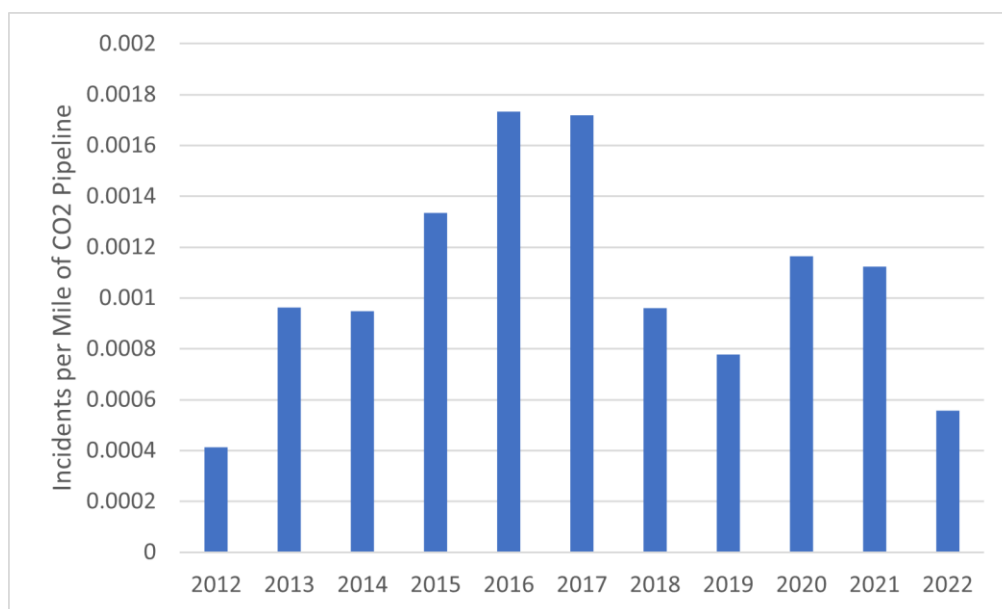


Figure 8-4 shows the number of pipeline incidents per mile for CO₂ pipelines for each year over the last 10 years. Incidents have decreased overall in the last 5 years. For example, in 2022 there were a total of three incidents (two classified as leaks and one as “other”) reported on 5,385 miles of CO₂ pipeline, or 0.00056 incidents per mile of CO₂ pipeline in the United States.

Figure 8-4 Incidents per Mile of CO₂ Pipeline in the United States^{46, 47}

There are currently no CO₂ pipelines in the state of Minnesota, but for comparison, there are 5,248 miles of other hazardous liquid pipelines in the state, as shown in **Figure 8-5**. These hazardous liquids are subject to the same PHMSA safety regulations as CO₂. There have been no safety incidents or loss of hazardous liquid on any hazardous liquid pipeline in the state of Minnesota since 2009.⁴⁸

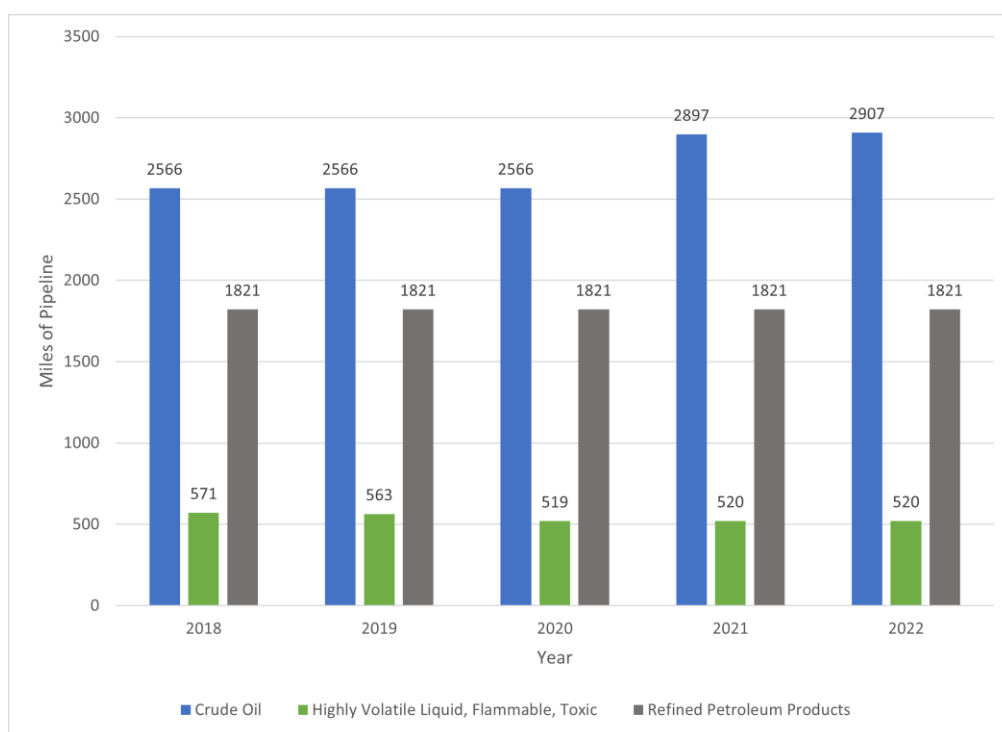
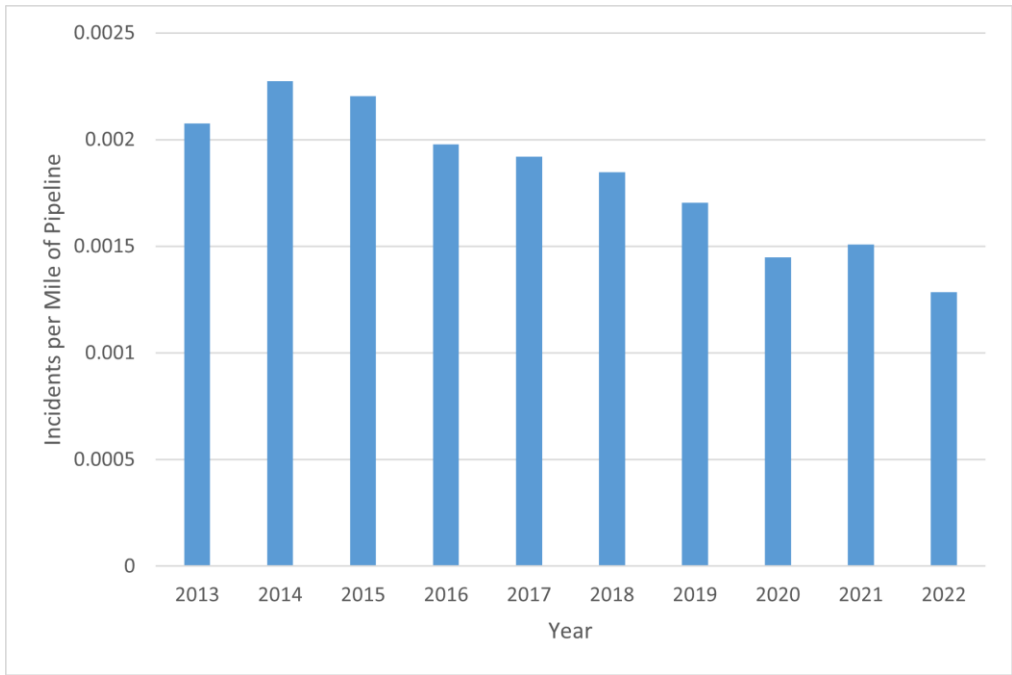
Figure 8-5 Hazardous Liquid Pipelines in Minnesota⁴⁹

Figure 8-6 shows the number of pipeline incidents per mile for all hazardous liquid pipelines for each year over the last 10 years. Incidents have decreased overall in the last 5 years. For example, in 2022 there were a total of 295 incidents (247 classified as leaks, 8 as mechanical puncture, 14 as overfill or overflow, 11 as rupture, and 15 as “other”) reported on 229,463 miles of hazardous liquid pipeline, or 0.0013 incidents per mile of hazardous liquid pipeline in the United States.

Figure 8-6 Incidents per Mile of Hazardous Liquid Pipeline in the United States⁵⁰



Review of the PHMSA Pipeline Flagged Incident Files⁵¹ shows that between 2010 and April 2024 there were 136 incidents recorded in the United States on pipelines carrying hazardous liquids (which includes CO₂) with a pressure of over 2,000 psi. Of those 136 incidents, 116 were leaks, 2 were ruptures, and the remaining 18 were classified as “other.”

8.2.3 Public Safety Services and Residences in the Vicinity of the Project

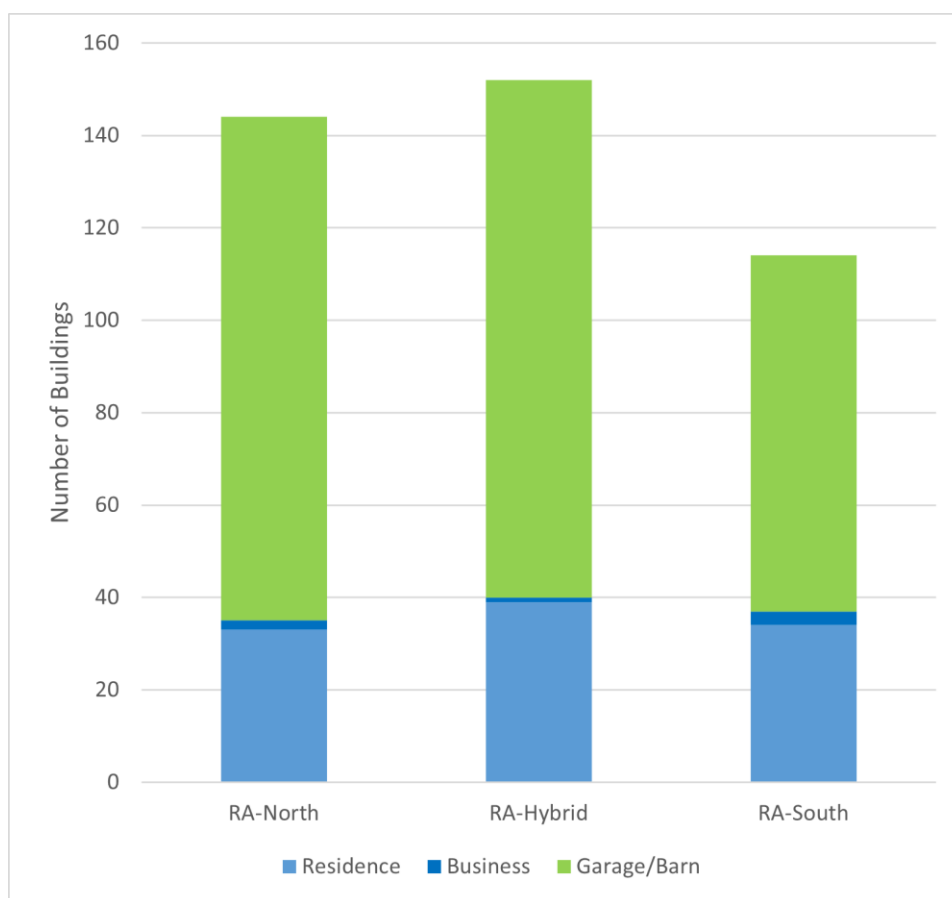
Table 8-2 lists hospitals, fire departments (career and volunteer), and law enforcement agencies (county sheriff and municipal police departments) in the counties crossed by the project. These agencies would respond to public health and safety issues during construction or operation. More information on public services is provided in Section 5.4.9. Based on this information, public services in Otter Tail and Wilkin Counties are expected to be adequate to respond to an accidental release caused by the project.

Table 8-2 Public Services within the Counties Crossed by the Project

County	Hospitals ⁵²	Number of Hospital Beds	Fire Departments (Career and Volunteer) ^{53, 54}	Law Enforcement Agencies (County Sheriff and Municipal Police Departments) ^{55, 56, 57, 58, 59, 60}
Otter Tail County	3	214	22	12
Wilkin County	1	105	6	4

Based on aerial photographs, RA-North has 33 residences, 2 businesses, and 109 garages/barns within the local vicinity (the area within 1,600 feet of the route width). RA-Hybrid has 39 residences, 1 business, and 112 garages/barns within the local vicinity. RA-South has 34 residences, 3 businesses, and 77 garages/barns within the local vicinity (see **Figure 8-7**). The closest residences to the CO₂ capture facility are about 1,300 and 1,500 feet away. These residences are listed in **Table 5-6**, **Table 5-7**, and **Table 5-8** in Chapter 5 and are shown in the maps in **Appendix B**.

Figure 8-7 Buildings, Businesses, and Residences within the Local Vicinities of the Route Alternatives



8.3 What would be the effect on humans and the environment of an accidental release of CO₂?

Project design, installation, and operation would incorporate measures to minimize the risks of an accidental release. An accidental release of CO₂ from a rupture could expose humans and terrestrial and aquatic animals to dangerous levels of CO₂ resulting in asphyxiation (unconsciousness or death) from CO₂ gas, blast injury, or exposure to very cold solid CO₂. Vegetation in contact with a CO₂ plume would likely be frozen. Impacts on vegetation might be short-term (row crops) or long-term (trees). A pipeline rupture could damage previously unidentified buried archaeological and cultural resources. A large release of CO₂ into a stream or wetland could temporarily acidify water or soil. Minor leaks

would have negligible to minimal impacts, depending on the resource. The potential for impacts would be similar across the three route alternatives.

8.3.1 Human Settlement

8.3.1.1 Aesthetics

A leak of CO₂ could kill vegetation, resulting in minimal to moderate short-term impacts on aesthetics, depending on the size, location, and duration of the leak. A rupture would result in localized and temporary areas of vegetation loss⁶¹ that would diminish the aesthetic experience in the vicinity of the rupture. Explosive forces during a pipeline rupture could displace soil or other materials over the pipeline, lowering the visual quality of the area close to the rupture. Repairs and restoration following an accidental release of CO₂ would result in impacts similar to those during construction. These impacts would be short-term and minimal to moderate, depending on the location, extent of the damage, and time needed for repairs.

8.3.1.2 Environmental Justice

As described in Section 5.4.3, Census Tract 9609 within Otter Tail County was identified as an MPCA EJ area of concern. The nearest residence to the project is in Census Tract 9609, which is about 1,500 feet southeast of the capture facility and each of the three route alternatives. The ethanol plant is also within Census Tract 9609, as shown in Figure 5-4 in Chapter 5.

The effect of a CO₂ leak(s) on EJ populations would depend on the amount of CO₂ released and the duration of the leak. The effect of a CO₂ rupture on EJ populations would depend primarily on the location of the rupture. If a rupture occurred in or near Census Tract 9609, impacts on EJ populations would occur as described throughout this chapter.

Neither of these potential impacts, that is, a leak or rupture, would be predominantly borne by an EJ community since the potential for such an impact could occur anywhere along the project. Additionally, the magnitude of the impact is not more or less severe based on the presence of an EJ community, but rather the amount of CO₂ released and the duration of the event. The potential for impacts on an EJ community from a rupture or leak would not be anticipated to be different from the potential for impacts on the general public.

8.3.1.3 Property Values

A 2020 behavioral study by Hilterbrand⁶² was intended to address the question of how purchase price would be impacted if a seller provided buyers a notice that the residential property listed for sale is located within a potential impact radius of a natural gas transmission line. The potential impact radius is defined by PHMSA as the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property (49 CFR §192.903 [Subpart O]). The study sent a survey to three groups that included three video tour treatments of a residential property. A control group was presented a video tour without any residential disclosure notice. A second group was presented a video tour with an audible notice that the residence is located within 500 feet of a natural gas transmission line. A third group was presented a video tour with an audible notice that the residence is located within the potential impact radius of a natural gas transmission line. Each respondent was asked to state a fair offer value for the residential property shown in their respective video.

The study found no statistically significant difference in the fair offer value between the control group and the group with notice the residence is located within 500 feet of a natural gas transmission line. No statistically significant difference was found in the fair offer value between the group with notice the

residence is located within 500 feet of a natural gas transmission line and the group with notice the residence is located within the potential impact radius of a natural gas transmission line. A statistical significance was found where the control group was compared to the group with notice the residence is located within the potential impact radius.

A 2022 study by Guignet et al.⁶³ focused on facilities regulated by the EPA's Risk Management Plan program, which is in place to reduce the risk of harm to offsite populations from accidental chemical fires, explosions, and releases of toxic vapors. Risk Management Plan facility and accident data were linked to residential property transactions in Michigan, Ohio, and Pennsylvania occurring between 2004 and 2014. The study found that the typical accident at a Risk Management Plan facility (which is defined as a facility that uses extremely hazardous substances) does not affect home values, but accidents resulting in offsite injuries, property damage, evacuations, or shelter-in-place orders led to a relatively small (5 percent to 7 percent) decrease in the value of homes within 5 kilometers. The proposed project is not a Risk Management Plan facility and would not use extremely hazardous substances.

A 2022 study by Cheng et al.⁶⁴ performed an assessment of pipeline incidents' impacts on housing prices using data from 864 gas distribution pipeline incidents and 17 million property transactions from 2010 to 2020 in 46 contiguous states (not including Maine or Vermont). The study determined effects by locating sales that occurred after a pipeline incident and comparing them with sales that occurred within the same radius (8 miles) prior to an incident. The study found that housing values declined by 4 percent and 6 percent on average when pipeline incidents occurred nearby.

Based on the study by Cheng et al., an accidental release of CO₂ from the project could result in a decrease in property values of approximately 4 to 6 percent for nearby residences.

8.3.1.4 Public Health and Safety

Risks of Inhalation of CO₂

CO₂ is a colorless, odorless, non-flammable gas that naturally occurs in the atmosphere. CO₂ is produced by human, animal, and plant metabolism and is a normal component of respiration. It also results from natural sources such as volcanic eruptions and forest fires and from anthropogenic sources such as the burning of fossil fuels. CO₂ levels in outdoor air typically range from 300 to 400 ppm (0.03 to 0.04 percent) but can be as high as 600 to 900 ppm in urban areas. CO₂ levels directly next to an open bin of dry ice can be as high as 11,000 to 13,000 ppm.⁶⁵

Liquid CO₂ vaporizes when released to the atmosphere. CO₂ vapor is 1.53 times heavier than air. Humans cannot smell CO₂ at low concentrations, but high levels of CO₂ (greater than 300,000 ppm or 30 percent) can activate receptors in nerve cells to produce a burning sensation in mucous membranes as CO₂ is converted to carbonic acid.⁶⁶ This level is well above the immediately dangerous to life and health level of 4 percent.

CO₂ is not toxic at low levels but can be a simple asphyxiant at higher levels. A simple asphyxiant is a gas that reduces or displaces normal levels of oxygen in breathing air. Mild CO₂ exposure could cause headache and drowsiness. At higher levels, rapid breathing, confusion, increased cardiac output, elevated blood pressure and increased arrhythmias could occur. Breathing air with high concentrations of CO₂ can lead to death by suffocation.

The National Institute for Occupational Safety and Health has established that a concentration of 40,000 ppm is immediately dangerous to life and health, and that workers should not be exposed to an average concentration of 30,000 ppm for more than 15 minutes (Short Term Exposure Limit).⁶⁷ The

Occupational Safety and Health Administration has established 5,000 ppm as a permissible exposure limit, which is an 8-hour time-weighted average.⁶⁸ The symptoms of exposure to different levels of CO₂ are shown in **Table 8-3**.^{69, 70}

Table 8-3 Symptoms of Exposure to CO₂ with Increasing Concentration⁷¹

Concentration of CO ₂	Symptoms of Exposure
5,000 ppm (0.5%)	Occupational Safety and Health Administration permissible exposure limit and ACGIH Threshold Limit Value for 8-hour exposure—likely no effects
10,000 ppm (1.0%)	Typically no effects, possible drowsiness
15,000 ppm (1.5%)	Mild respiratory stimulation for some people
30,000 ppm (3.0%)	Moderate respiratory stimulation; increased heart rate and blood pressure; ACGIH Threshold Limit Value-Short Term; National Institute for Occupational Safety and Health Short Term Exposure Limit, which is a 15-minute time-weighted average exposure that should not be exceeded at any time during a workday
40,000 ppm (4.0%)	Immediately dangerous to life or health
50,000 ppm (5.0%)	Strong respiratory stimulation, dizziness, confusion, headache, shortness of breath
80,000 ppm (8.0%)	Dimmed sight, sweating, tremor, unconsciousness, and possible death

MDH notes that workplace standards were developed for healthy working adults and might not be appropriate for sensitive populations, such as children and the elderly.⁷² Researchers have indicated that CO₂ tolerance may decrease rapidly in older individuals with lower resilience and those with existing cardiac or pulmonary disease. Researchers have also indicated that healthy individuals might be able to tolerate higher exposure levels.⁷³

The USDA Food and Safety Inspection Service also notes that the “response to CO₂ inhalation varies greatly even in healthy individuals. The seriousness of the symptoms is dependent on the concentration of CO₂ and the length of time a person is exposed. Since CO₂ is odorless and does not cause irritation, it is considered to have poor warning properties. Fortunately, conditions from low to moderate exposures are generally reversible when a person is removed from a high CO₂ environment.”⁷⁴

Because CO₂ is heavier than air, it can temporarily accumulate near the ground in low-lying outdoor areas, and in confined spaces such as caverns, tunnels, and basements until it dissipates into the atmosphere. CO₂ is not flammable, combustible, or explosive.⁷⁵

The health effects of exposure to CO₂ are described in the scientific journal *Toxicological Reviews* as follows:

Its main mode of action is as an asphyxiant, although it also exerts toxic effects at cellular level. At low concentrations, gaseous carbon dioxide appears to have little toxicological effect. At higher concentrations it leads to an increased respiratory rate, tachycardia, cardiac arrhythmias and impaired consciousness. Concentrations >10% may cause convulsions, coma and death. Solid carbon dioxide may cause burns following direct contact. If it is warmed rapidly, large amounts of carbon dioxide are generated, which can be dangerous, particularly within confined areas. The management of carbon dioxide poisoning requires the immediate removal of the casualty from the toxic environment, the administration of oxygen and appropriate supportive care. In severe

cases, assisted ventilation may be required. Dry ice burns are treated similarly to other cryogenic burns, requiring thawing of the tissue and suitable analgesia. Healing may be delayed and surgical intervention may be required in severe cases.⁷⁶

Other Risks of CO₂

Depressurization of CO₂, as would occur during an accidental release from the pipeline, can result in temperatures at or below -108°F within the pipeline system components and within the CO₂ release plume.⁷⁷ Persons or animals close to the rupture could experience tissue damage from the cold temperatures.

Rapid depressurization can also cause the CO₂ to expand with great force, causing physical trauma injuries. Blasts can crush or injure the body and internal organs, including the brain and lungs. The high pressures of the blast can also damage eyes, rupture eardrums, and injure the middle ear.⁷⁸

Other risks from CO₂ ruptures could include vehicle issues for individuals caught in a vapor plume or trying to flee an incident. If enough oxygen is displaced by CO₂, internal combustion engines cannot operate. PHMSA's report on the 2020 Satartia incident noted that individuals on MS 433 and in the area of the migrating CO₂ vapor cloud experienced vehicle engine issues and required emergency assistance to be evacuated.⁷⁹

Mental Health

EERA staff acknowledge that people in the vicinity of the project might experience stress and anxiety related to fear of the effects of a potential leak or rupture.

Results of Dispersion Modeling

As described in **Appendix G**, both the applicant and an independent contractor, Allied, have conducted dispersion modeling to determine the extent and duration of a release of CO₂ during a potential pipeline rupture. The dispersion modeling assumed a guillotine fracture of the pipe because that is the scenario that would release the most CO₂ in the shortest amount of time. Allied analyzed local weather records and determined that a temperature of -22°F and a humidity level of 74.3 percent would result in the highest reasonable impact distance if a rupture were to occur.

The dispersion modeling conducted by Allied calculated the maximum distance at which CO₂ concentrations from a pipeline rupture could reach toxic levels. The impact distance at which CO₂ concentrations could reach 40,000 ppm (the immediately dangerous to life and health level) at -22°F and a humidity level of 74.3 percent was calculated at 617 feet, as shown in Table 4 in the Aerial and Thermal Dispersion Report (AD Report) in **Appendix G**. The impact distance at which CO₂ concentrations could reach 30,000 ppm (the National Institute for Occupational Safety and Health Short Term Exposure Limit, which is the maximum time-weighted average concentration to which a person could be exposed over a 15-minute period without injury) would be 701 feet. The impact distance at which CO₂ concentrations could reach 15,000 ppm would be 910 feet.

In the event of a pipeline rupture, some homes along the pipeline route could experience CO₂ concentrations of 40,000 ppm (a level classified as "immediately dangerous to life or health"). Homes with barriers at ground level that are close to and downwind of the home would be at risk for greater impacts from gaseous CO₂, which would tend to stay near ground level initially.⁸⁰ This means that such a barrier would cause the concentration of CO₂ to build up, posing a higher risk to the health of people or animals in the area.

In the event of a pipeline rupture, staff and members of the public at the Fergus Falls Municipal Airport-Einar Mickelson Field could experience CO₂ concentrations of 30,000 ppm but only if they were within the unused fields at the northern edge of the airport property boundary. The airport buildings where people would congregate would not be within the 30,000 ppm concentration. Because CO₂ gas is heavier than air, it would not be a problem for aircraft already in flight but could cause engine issues for planes taking off or landing if a rupture were to occur along the pipeline segment closest to the airport. Given the low risk of a pipeline rupture, infrequency of air traffic, and the limited length of the pipeline near the airport, the potential for impacts on aircraft operations is very low.

In the event of a pipeline rupture that causes CO₂ released from the pipeline to be trapped by ice covering a waterbody, the CO₂ would release more slowly into the atmosphere as it traveled laterally under the ice until it escaped through cracks or gaps in the ice, thereby decreasing the impact distance (the distance the CO₂ would travel through the air). The dispersion modeling, as described in Appendix G, used the worst-case scenario where the CO₂ is not trapped by ice.

Results of CFD Modeling

The AD Report recommended an additional computational fluid dynamics (CFD) analysis to account for terrain changes and windbreaks along the pipeline. The CFD analysis showed that terrain along the proposed project did not significantly affect the impact distance of a potential CO₂ rupture. However, windbreaks did significantly decrease the impact distance. The analysis also showed that the total time for release and dispersion would be less than 7 minutes in a worst-case scenario. See the full CFD Report in **Appendix G** for details.

Results of Sensitivity Analysis

A sensitivity analysis was conducted to determine which variables would impact the dispersion of CO₂ after a pipeline rupture. The sensitivity analysis model included five variables: wind speed, air and ground surface temperature, pipeline pressure, volume of CO₂, and relative humidity.

The analysis demonstrates that wind speed has the biggest impact on a potential CO₂ rupture for the proposed project, followed by pipeline pressure, volume, air and ground temperature, and humidity. The full sensitivity analysis report (SA Report) is included in **Appendix G**. As indicated by these reports, the results of the AD Report, SA Report, and CFD Report must be interpreted in conjunction with each other as described above.

Supplemental CFD Modeling

In response to comments on the draft EIS, supplemental CFD modeling was conducted, and the results are provided in **Appendix G**. The supplemental modeling evaluated seven additional scenarios to analyze the effects of differing wind speeds (between 1 and 4 mph) and of delayed increases in wind speed. The supplemental scenarios also assumed no windbreak was present and that the surface roughness was similar to an ice-skating rink rather than the industry standard of short-cut grass, which was used in the original modeling. The new scenarios and the results of the modeling are summarized in **Table 8-4**; detailed information is provided in the CFD Report in **Appendix G**.

The maximum impact distance in the original modeling was 711 feet. The maximum impact distance under the low wind and low surface roughness exceptions of the supplemental modeling was 769 feet. Note that the 769-foot maximum impact distance above uses the ice-skating rink surface roughness in this supplemental CFD modeling (see table 8-4), which has near-zero friction and does not normally occur in nature. This surface roughness is unrealistic for the proposed routes because it does not take

snow, vegetation, and other environmental conditions into consideration. However, this surface roughness was modeled to provide an upper limit for the modeled potential impact distance of a 30,000 ppm CO₂ cloud.

Table 8-4 Supplemental CFD Modeling

Supplemental Scenarios	Results
Wind speed (4 scenarios) was varied between 1 mph and 4 mph to address the concern that the model should take into consideration wind speeds less than 4 mph	<p>As shown in Table 5 in the CFD report in Appendix G, a wind speed of 1 mph results in an impact distance of 671 feet and the concentration falls below 30,000 ppm in 4.6 seconds.</p> <p>A wind speed of 4 mph results in an increased impact distance of 769 feet and the concentration falls below 30,000 ppm in less time (3.9 seconds).</p>
Delayed wind (3 scenarios): CO ₂ gas is released during a potential rupture with zero wind initially influencing the dispersion cloud and then, after a time, the wind picks up and carries the dispersion downwind	As shown in Table 4 in the CFD report in Appendix G, a constant wind speed of 1 mph is applied at 0 seconds, 10 seconds, and 95 seconds after the rupture. These scenarios resulted in decreased impact distances. The original modeling (0 seconds) was determined to be most conservative.

Note: All supplemental scenarios used the assumption that no windbreak was present. The supplemental scenarios also used the assumption that the surface roughness was similar to an ice-skating rink rather than the industry standard of short-cut grass, which was used in the original modeling.

8.3.1.5 Public Infrastructure

Leaks would not affect public infrastructure. If a pipeline rupture occurs at a location that is near a road or railroad, this could require road or rail closures to ensure the health and safety of travelers and residents. Closures and an increase in traffic could also occur for the initial emergency response and investigation of the incident. However, CO₂ at dangerous levels would dissipate within minutes, so closures resulting from nearby ruptures that do not damage infrastructure would be short-term.

Because the project facilities would be located in Otter Tail and Wilkin Counties and are near the city of Breckenridge and the city of Fergus Falls, these local governmental EMS services and personnel would likely be the first responders called upon in the event of an unanticipated release associated with the project. Tribal reservations and lands are not located near the project, and Tribal EMS staff would not likely be called to respond to an unanticipated release.

A pipeline rupture within a road or rail ROW would create longer closures for repairs. Ruptures near roads and train tracks could also result in the presence of debris and soil displacement that would need to be removed before road or tracks could re-open, as was experienced in the Satartia rupture.⁸¹ Repairs to public infrastructure could result in additional traffic delays for crews to stage and conduct repairs. These closures would likely be intermittent and temporary, resulting in moderate short-term impacts.

Because the pipeline would not cross the Fergus Falls airport property, a pipeline rupture would cause no or minimal damage to the infrastructure of the airport.

8.3.1.6 Noise

A slight hissing noise could indicate the presence of a leak. A pipeline rupture would result in an extremely loud sound as pressurized CO₂ was released into the air and transitioned from a supercritical liquid into a gas or solid. After the immediate rupture event, the gas would make an audible hiss as it emptied from the pipeline. The sound of the CO₂ release would also serve as an alert to anyone nearby. If a rupture occurred, initial emergency response, investigation, and repair of the pipeline would also result in a temporary increase in noise similar to that of when the pipeline was initially constructed.

8.3.1.7 Recreation

Leaks would not affect recreation. A pipeline rupture below a waterway would result in a temporary increase in the CO₂ concentration in the water, which could result in localized reductions in aquatic wildlife, as discussed in Section 8.3.4. This reduction, or activities associated with clean-up and repairs following a rupture, could temporarily impact recreational use of the waterways for activities such as fishing, but impacts would be minimal and short-term. Potential impacts on tourism economies are discussed in Section 8.3.2.

8.3.2 Economies

8.3.2.1 Agriculture

Economies based on agricultural production such as crop and livestock raising could face impacts from an accidental release of CO₂.

The effect of CO₂ leaks would depend on the amount of CO₂ released and the duration of the leak. Studies have shown that higher concentrations of atmospheric CO₂ have beneficial effects on crops. Elevated CO₂ levels increase crop yields by increasing the rate of photosynthesis, which spurs growth, and they reduce the amount of water that crops lose through transpiration.⁸² Conversely, increased CO₂ concentrations in soil result in negative effects on root water absorption, chlorophyll, starch content, and total biomass.⁸³ Localized impacts on crop production could be greater from a long-term leak than a singular rupture event.⁸⁴

The effect of a rupture, as described in Section 8.3.4, would be to damage vegetation and soil in the immediate area of a rupture, with the roots and aboveground portions of plants frozen and soil pH reduced (becoming more acidic). Soil microbes and soil structure would be killed and destroyed in the immediate area. These impacts could lead to an immediate economic loss of crops that are frozen, as well as future losses to the ability to cultivate crops in the more acidic soil. Effects on vegetation that are not frozen in the initial release of CO₂ would be temporary and localized, and related to an increase in CO₂ in the soil.⁸⁵

Livestock in the area of a release would face similar physiological effects as described in Sections 8.3.1 and 8.3.4 for humans, which could result in the deaths of livestock if they were in the immediate area of the rupture or unable to escape a concentrated gas plume. Loss of livestock would have an associated economic loss. As described in Section 8.5.3, EERA staff recommends as a special permit condition that the applicant provide an accidental release plan that must identify how the applicant would pay for costs of any repair to public infrastructure or private property (including crops and livestock) that could occur during an accidental release.

8.3.2.2 Tourism

CO₂ leaks would not affect tourism. Tourism economies based on recreational facilities could be adversely impacted by a rupture (see Section 8.3.1 and Section 5.4.10). A closure of the King of Trails

Scenic Byway could negatively impact the tourism economies of communities on either side of the closure because travelers could not drive all the way through. A rupture near the scenic byway would likely result in minimal short-term impacts until the area was restored and any damage to the highway was repaired.

8.3.3 *Archaeological and Historic Resources*

Because the project would avoid construction through or near identified archaeological and historic resources, minor leaks of CO₂ from the pipeline would have no impacts on identified archaeological and historic resources. A rupture of the pipeline could create physical blast effects associated with a rapid depressurization of CO₂ that have the potential to damage previously unidentified buried archaeological sites if any are adjacent to the area where the rupture occurred. These sites could have cultural significance.

8.3.4 *Natural Environment*

This section discusses the potential impacts of a CO₂ pipeline rupture on terrestrial and aquatic fauna, including both common and sensitive and/or listed species, as well as on upland and wetland vegetation.

As described in Section 8.3.1, low concentrations of CO₂ typically have limited effects, but extreme CO₂ concentrations can lead to death by asphyxiation. Because CO₂ is denser than air, upon a large release it would form a cloud or fog that would settle into lower-lying areas, displacing oxygen. Such an event would have varying degrees of impact on natural resources, from individual lifeforms to natural systems.

Limited information is available pertaining to the potential impact of CO₂ on wildlife or organisms, specifically in the region of this project. Animals exposed to elevated CO₂ concentrations would likely experience similar effects as humans, such as hypercapnia (buildup of CO₂ in the bloodstream) and asphyxiation resulting in respiratory distress, impaired consciousness, and mortality.⁸⁶ The impacts would be different across species and would depend on behavior, such as ability to evacuate the area or state of hibernation.

In a recent study investigating CO₂ tolerability and toxicity in rats and humans, van der Schrier et al. (2022) concluded that rats were able to tolerate concentrations of 30 percent and higher, but these concentrations were associated with CO₂ narcosis, epilepsy, poor oxygenation, and at 50 percent CO₂, spontaneous death.⁸⁷ Lung hemorrhage and edema were observed in the rats at inhaled concentrations of 30 percent and higher. Euthanasia using CO₂ has been studied in feral swine (18 percent chamber volume per minute for 5 minutes),⁸⁸ rabbits (30 to 60 percent, but typically 45 percent for at least 1 hour),⁸⁹ and birds (percent CO₂ not measured),⁹⁰ thus underpinning the fact that when exposed to high concentrations of CO₂, some mortality among these species would be expected. In the 1986 Lake Nyos incident described in Section 8.2.1, fatalities were noted to have included mammals, birds, amphibians, and reptiles.⁹¹

Studies of long-term leaks of CO₂ are mainly focused on migration of CO₂ from long-term underground storage sites.⁹² Impacts of a leak from a pipeline are less studied; however, a study from a natural CO₂ vent in Italy found greatly decreased vegetation and lower pH within an approximately 10-foot radius around the point where the leak broke the soil surface.⁹³ Nevertheless, most current research on CO₂ leakage into near-surface environments is limited, especially with respect to pipelines. The potential effects of slow, persistent leakage of CO₂ from pipelines are discussed further below within specific natural resource topics.

8.3.4.1 Water Resources and Wetlands

Leaks of CO₂ into water would increase the water's acidity. When CO₂ dissolves in water, about 1 percent of it forms carbonic acid (H₂CO₃), which almost immediately dissociates to bicarbonate anions (HCO₃⁻) and protons (H⁺). Because surface waters are in equilibrium with atmospheric CO₂, there is a constant concentration of carbonic acid in the water. The impact of a leak into surface waters above the point of the leak would be negligible. This is because the small amount of additional CO₂ leaked, relative to the volume of water above the leak, would result in a negligible change in the concentration of carbonic acid in surface waters above the leak. The impact of a leak of CO₂ into other water resources and wetlands would not be significant for the same reasons described above. Carbonic acid potentially formed by a leak or after a rupture would be buffered by the naturally basic surroundings.⁹⁴ Any CO₂ leakage from the pipeline would be insufficient to measurably alter water quality in either shallow or deep aquifers. Any formation of carbonic acid from the reaction between CO₂ and water would be insufficient to contaminate groundwater and would be buffered and neutralized by the local soils and geology.

At crossings of large rivers and wetland systems, the pipeline would be installed by HDD, and the pipeline would be at a minimum of 25 feet below the lowest point of the river (see **Table 2-2** in Chapter 2). Leaks from the pipeline under the Pelican, Otter Tail, and Bois de Sioux or Red Rivers would not be likely to reach the water in these perennial rivers, and the effects of a pipeline rupture would have to travel through a minimum of 25 feet of rock and soil before potentially reaching the water. In the event of a rupture of CO₂ from the pipeline into a waterbody, the CO₂ would seek equilibrium and move to lower pressure, resulting in the majority of the gas passing through the water column and into the atmosphere.⁹⁵ In the event of a pipeline rupture that caused CO₂ to be trapped by ice covering a waterbody, CO₂ could remain in contact with the water for more time as it travels laterally under the ice, and the concentration of carbonic acid could be increased. Because the pH of soils, rocks, and water in this part of Minnesota are naturally basic,⁹⁶ the carbonic acid formed after a rupture would be buffered and would quickly revert to CO₂ and water in the abundance of the surrounding water column or in the presence of water in a wetland. Effects from a pipeline rupture would be short-term.

8.3.4.2 Wildlife

Impacts on wildlife populations from leaks of CO₂ would be negligible. Forage vegetation in the vicinity of a leak would not be impacted to a level that would affect wildlife.

Any terrestrial wildlife species—mammal, reptile, bird, or insect—regardless of size, would be at risk of injury or death due to blast injury if present in the immediate proximity of a pipeline rupture. Blast injury is a complex type of physical trauma resulting from direct or indirect exposure to an explosion. Blast injuries range from internal organ injuries, including lung and traumatic brain injury, to extremity, hearing, and vision injuries.⁹⁷

After the initial explosive release, the risk to wildlife would come from the CO₂ plume. Individual animals would be subject to the respiratory, cardiac, and impaired consciousness effects described above⁹⁸ and potentially to death by asphyxiation. The degree of risk and potential effects on wildlife would vary depending on the class of wildlife affected; wildlife are described by class below.

Mammals

CO₂ leaks would not affect mammals. In the case of a pipeline rupture, large mammals with a high degree of mobility and range would most likely be able to avoid the plume of CO₂ if they were not too close to the point of rupture. Smaller mammals, including both those with limited mobility and range

such as mice, voles, and shrews and those with moderate mobility and range such as groundhogs and skunks, would be less likely to escape and, depending on the intensity of the release, might die or suffer respiratory and/or cardiac distress. Similarly, mammals in burrows might be unable to avoid the CO₂ release because the CO₂ cloud would likely settle into and fill burrows.

Time of day would also influence potential impacts, regardless of the animal's mobility. If a rupture were to occur at night, when many mammals are inactive or bedded down, the CO₂ plume could envelop some individuals before they could react and move away, regardless of their mobility. Bat species would be more likely to survive a large CO₂ release because they are able to fly, they carry their newborn young with them, and their daytime roosts are off the ground. Young bats (3 to 10 weeks in age) can frequently be left at drop-off points within about 1 mile of maternity roost trees while mothers feed further away,⁹⁹ leaving them vulnerable at the time of a release. However, these drop-off points are usually well above the ground. Combined, these factors make it less likely that bats would be injured or killed by a CO₂ release.

Birds

Birds would not be impacted by a leak.

While all North American birds have some degree of flight capability, individual species vary in their flight behavior and habitat preferences. In the event of a rupture, most mature or fledged perching birds (birds who fly frequently and visit numerous locations, normally well above the ground) would be able to avoid a CO₂ plume and would likely flee the area or would roost well above the CO₂ plume.

Ground-nesting species with low to high flight capability might be more vulnerable to a CO₂ plume. If the rupture were to occur outside of a species' nesting season, ground-nesting species would be more likely to survive a release because they would tend to flee the area. When eggs or newborns are present in a nest, adult ground-nesting birds might have higher rates of injury or death from a CO₂ plume. This is because the adult on the nest would be expected to remain and protect the eggs or young. The effect of elevated CO₂ on eggs is uncertain and would depend on the size and duration of the CO₂ plume on the eggs.¹⁰⁰

Aquatic birds and wading birds typically have very good flight capabilities and could avoid a CO₂ plume. However, there are two additional factors to consider: time of day and landscape position of aquatic features. The time of day of a release would affect the survival and injury rates of aquatic birds. This is because at night, ducks mostly sleep floating on water or in near-shore vegetation. Water features and adjacent vegetation occur in lower elevations in the landscape, where a CO₂ plume is more likely to settle and displace oxygen. Therefore, a nighttime CO₂ release would likely have a greater impact on aquatic bird populations than a daytime release.

Reptiles and Amphibians

CO₂ leaks would not affect reptiles and amphibians. However, due to their generally small size, limited speed, and body statures close to the ground, reptiles overcome by a CO₂ cloud would likely die or experience respiratory trauma and disorientation. Reptiles are cold-blooded. Therefore, the lower temperatures in a CO₂ cloud could also slow reptile metabolism and their ability to escape the area.

As with reptiles, amphibians are generally small, with limited speed and body statures close to the ground. However, amphibians tend to live in or adjacent to water sources and would be better able to initially escape a CO₂ plume by temporarily submerging. However, waterbodies and wet habitats are found in lower elevations, where a CO₂ plume would be more likely to settle. As a result, some

individuals from amphibian species might eventually be overcome by a large CO₂ plume and would likely die or experience respiratory trauma and disorientation.

Insects

CO₂ leaks would not impact insects. Flight-capable insects would be best suited to survive a large CO₂ rupture. Slower moving insects, as well as those species whose habitat preferences are in aquatic, wetland, or other low-lying areas, would be most susceptible to the effects of a CO₂ plume. Regardless of mobility, all insects would be sensitive to the lower, initially near-freezing temperatures of a CO₂ plume. Insects are cold-blooded animals whose metabolic functions slow rapidly in cold temperatures. As a result, the ability of insects to escape a CO₂ plume would be related to the size and extent of the plume. Insects present in the immediate vicinity at the time of a CO₂ pipeline rupture would likely die due to the sudden release of near-freezing air and ice solids.

The ability of aquatic insects to survive near a CO₂ release depends on the size and location of the release. Like other animals, insects breathe in oxygen and respire CO₂. Aquatic insects can have gills like fish or will breathe through snorkel-like tubes. If a CO₂ plume were to settle over a pond or other low-lying aquatic site, aquatic insects present would experience oxygen depletion for the duration of the plume's presence. Therefore, aquatic insects are potentially susceptible to an oxygen-depleted atmosphere.

Fish and Freshwater Mussels

CO₂ leaks would be unlikely to impact fish and freshwater mussels. As described above, an increase in water acidity from a CO₂ leak would be negligible due to the small volume of CO₂ released relative to the water volume. Fish appear to be less sensitive to the physiological impacts of acidification than invertebrates with carbonate shells, and adult fish are less sensitive than eggs and juvenile fish. Additionally, fish are mobile and could avoid the bubble stream from a leak. Increased CO₂ concentrations from a leak beneath a waterbody that continues over a long period might result in localized adverse impacts on freshwater mussels because of their inability to change locations.

The impact of a CO₂ rupture on fish and freshwater mussels would vary depending on the location and duration of the rupture. A rupture below or adjacent to a stream would kill fish and freshwater mussels in the immediate area through the force of the blast. The escaping CO₂ could be at or below a temperature of -108°F, which would lower water temperatures rapidly. This could cause death or tissue damage to fish and mussels due to exposure to extremely cold water.

The most probable adverse effect of a CO₂ rupture into a flowing stream is a lowering of pH and direct toxicity effects. A temporary oversaturation could occur adjacent to a rupture site, with CO₂ concentrations potentially reaching toxic levels. CO₂ concentrations at high levels would be toxic to fish and result in morbidity or mortality for fish in the immediate area. Mobile adult fish unaffected by the force of a rupture would likely move away from the release.¹⁰¹ Toxic levels of CO₂ concentrations near the source would result in morbidity or mortality for immobile invertebrates. Most impacts on surviving fish would be short-term, improving soon after the rupture is stopped. Re-colonization by invertebrates could take 1 year or longer.

Fish and freshwater mussels in streams or lakes outside of the immediate area of a rupture would not be affected. A plume reaching a stream or lake from a rupture occurring at a location away from the waterbody would no longer be at extremely cold temperatures and would not notably acidify the waters.

8.3.4.3 Vegetation and Wildlife Habitat

Undetected leaks of CO₂ into soil would slow plant growth. Although higher levels of CO₂ in the atmosphere may stimulate plant photosynthesis, high soil concentrations are usually detrimental. New CO₂ releases into vegetated areas cause noticeable die-off,¹⁰² and pipeline inspections typically look for dead vegetation as an indicator of a potential leak.¹⁰³ A study of CO₂ leakage from deep storage sites found damage, including reduced root and shoot growth and seed yield, in vegetation above the leakage.¹⁰⁴ Leaks from the project would be smaller in volume than leakage from the long-term, deep-storage site studied.

Impacts on vegetation and habitat from a CO₂ leak would be largely localized above the pipeline and might result in a reduction of local plant growth.¹⁰⁵ In one study, measurements made after treating plants with CO₂ gas indicated that recovery of vegetation was close to complete after 12 months.¹⁰⁶

RA-South would cross one waterfowl production area (WPA) and would abut other waterfowl protection areas, including the Orwell 9 Unit and Ridgeway WPA in Otter Tail County. If a leak or rupture occurred within a WPA, quality wildlife habitat could be affected in the same way as described above. The Orwell 9 Unit and Ridgeway WPAs abut, but are not crossed by, the RA-South corridor. As a result, the potential effects of a rupture on those WPAs would be diminished by the distance between any potential point of release and the WPA boundary.

RA-North and RA-Hybrid are also crossed by one WPA, but do not cross and do not abut any other WPAs.

In the event of rupture, impacts on vegetation and specific habitat types would be limited to the immediate area of the rupture. Soils around the rupture site would be instantly frozen due to the thermodynamics of sudden loss of pressure in a pressurized gas and the ensuing formation of dry ice solids. This phenomenon can be seen in **Figure 8-1**, which shows a 30-foot-wide crater with ground that is frozen and covered in white ice solids.¹⁰⁷ The sudden freezing of soils would instantly kill all herbaceous ground vegetation. Local soil microbes, mycorrhizae, and soil animals such as worms, arachnids, and insects in the immediate vicinity of the rupture would also die; however, these species would re-colonize after the area is restored. There would be no long-term effects on soils or vegetation from freezing. Any long-term impact on soils and vegetation from freezing would be similar to the effects on soils and vegetation from frost heave that occurs seasonally in the project area. Young woody species (trees and shrubs) in the immediate vicinity of the rupture may be damaged or killed by freezing; however, larger, mature woody species near a rupture would be capable of withstanding freezing temperatures.

Potential long-term impacts on soils and vegetation from a rupture would be related to the physical force of the rupture and extreme cold temperatures associated with the depressurization of the CO₂ from a supercritical state to a gas. Impacts on soils would vary. Soil structure would be destroyed at the rupture site. Repair and regrading of the rupture site to pre-rupture soil contours would occur, likely with the original soils from the site. Any soil microbes and other soil microfauna killed by the extreme cold would be replaced by similar microfauna originating from outside of the immediate vicinity of the rupture. Herbaceous vegetation would similarly be replaced by surviving nearby individuals expanding into the rupture area, either within the same growing season or early in the following season, depending on the seasonality of the rupture. Proper vegetation restoration and management of the repaired rupture area would reduce the probability of non-native weedy species colonizing the site.

Long-term damage to trees would be limited to those nearest the rupture. These trees may be wholly or partially upturned by the rupture and would be removed as a result. Some trees outside of the immediate area of the rupture could experience loss of leaves on the portions of their crowns due to short-term extreme cold. However, trees that retain a majority of their leaf canopy would likely survive.

8.4 What steps would be taken in the event of an accidental release?

In the case of a rupture, the applicant would follow the steps in its Emergency Response Plan mandated by PHMSA. The network of local emergency services providers would respond along with applicant personnel. The National Incident Management System (NIMS) provides a framework for responding to emergencies, and EPA's National Response Center provides support in case of an emergency related to a release of hazardous substances when requested or when state and local first responder capabilities have been exceeded.

PHMSA regulates the safety of pipelines that transport hazardous liquids, including CO₂, in accordance with the regulations in 49 CFR Part 195. It develops safety regulations and other approaches to risk management to ensure safety for emergency response associated with a leak or rupture of pipeline facilities. This work is shared with state agency partners and others at the federal, state, and local levels.

Homeland Security Presidential Directive 5, Management of Domestic Incidents, directed the development and administration of NIMS. NIMS provides a consistent nationwide template to enable federal, state, local, and Tribal governments; non-governmental organizations; and the private sector to work together in case of an incident such as an accidental pipeline release. The NIMS template provides measures to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity. NIMS includes:

- a unified approach to incident management called the Incident Command System;
- standard command and management structures; and
- an emphasis on preparedness, mutual aid, and resource management.¹⁰⁸

As required by PHMSA and noted in Section 8.5.1, the applicant must develop a plan to respond to an accidental release of CO₂ that follows federal guidelines. The applicant's draft Emergency Response Plan is included as **Appendix N**. The Emergency Response Plan would detail the steps for using the federal NIMS Incident Command System to respond to any emergency on the pipeline, including a rupture.¹⁰⁹ This includes the designation of a Company Qualified Individual who would be available 24 hours per day, 7 days per week and would have the expertise and authority to respond to a release and begin the Incident Command System process, including ensuring that EPA's National Response Center receives the mandated report.¹¹⁰ Additionally, the first company employee on the site of the release would initially act as the person-in-charge and Incident Commander until relieved by an authorized person. The Incident Commander, as part of a local response team would initially manage the incident with support from the Company Support Team as needed. The Company Support Team would be equipped to coordinate all aspects of the response to a release in the long-term.¹¹¹

According to the applicant's draft Emergency Response Plan (see **Appendix N**), the applicant's planned response to any incident involving the accidental release of CO₂ would consist of the following actions:

- Employees initially on site would call 911 if appropriate, and the control center would contact relevant emergency services and other agencies.

- The pipeline segment involved would be shut down immediately. On-site employees would communicate with the control center to ensure that the proper MLV is closed either manually or remotely to limit the CO₂ released.
- Identification of the location of the release would involve the identification of evidence of CO₂ release by company personnel as well as area emergency services and aerial patrol.¹¹²
- The control center would determine the need for notification of external parties, including those located downwind of the incident, and law enforcement and fire departments to assist with evacuation and any roadblocks.
- A Company Response Crew would be sent by the control center to investigate the incident, conduct an initial response to the release, and make a risk assessment, leading to the formation of a Local Response Team based on specific needs of the incident.
- The applicant would notify the railroad dispatcher if the release is near active railroad tracks.
- The Company Qualified Individual or Incident Commander would work with local emergency response agencies including 911 dispatchers and county emergency managers instead of coordinating with each individual emergency service department.
- Based on the specific incident and local capabilities, a Company Support Team could be activated.

As noted in Chapter 2, the applicant has stated that it would be responsible for 100 percent of costs in case of an accident (see the response to Supplemental Information Inquiry #13 in **Appendix I**), including costs for clean-up and damages in the event of a CO₂ release.

8.5 What steps would be taken to prevent an accidental release?

PHMSA sets pipeline safety standards to reduce the possibility of an accidental release. The applicant proposes the additional measures below to further reduce the potential for an accidental release. Additional mitigation measures are provided in this section to protect against an accidental release and to limit impacts if one should occur. PHMSA's role in regulating CO₂ pipeline safety is discussed in Chapter 3, Section 3.6, and in Appendix G.

8.5.1 Applicant Measures

The applicant would take measures to prevent unexpected and abnormal conditions that could result in an accidental release of CO₂ through the methods discussed below. The applicant would also train and coordinate with emergency managers and educate the public on the dangers of a pipeline rupture and what residents should do if one occurs.

8.5.1.1 Design, Construction, and Operation Measures that Exceed PHMSA Regulations

The applicant has proposed measures related to the design, construction, operation, and maintenance of the pipeline that would mitigate safety hazards, as described in Chapter 2.

As described in Section 2.3.2.1, the applicant would install five MLVs along the pipeline to isolate segments of the pipeline to contain the CO₂ during normal operations and maintenance. In the event of a release, closing an MLV would limit the amount of CO₂ released. The applicant would be able to operate MLVs manually or remotely.

Ductile fractures can run hundreds of feet and result in a pipeline rupture. The applicant has committed to designing and building the entire project in a manner that would arrest crack propagation so that

fracture arrestors are not needed (see the response to Supplemental Information Inquiry #13 in **Appendix I**).

The applicant's maintenance and inspection program would be designed to detect internal and external anomalies in the pipe, such as corrosion, dents, and other irregularities, and to clean the pipeline. As described in Section 2.6.1, the applicant would monitor operation of the project continuously from its control center. The applicant would also use a leak detection system, incorporating a real-time hydraulic model of the pipeline system that would run in parallel with monitoring pressure and volume with system instruments.

In its response to Supplemental Information Inquiry #9 (see **Appendix I**), the applicant committed to the following measures during the design, construction, and operation of the project that would exceed PHMSA safety standards:

- “Exceed the requirements of 49 CFR 195.234 by requiring 100 percent of all girth welds to be nondestructively tested and incorporating auditing of nondestructively test results, records, and procedures.”
- “Exceed the requirements of 49 CFR 195.214 by incorporating additional mechanical testing in excess of API 1104 Section 5 and 12 by conducting Charpy V-Notch Testing, Vickers Hardness Testing and Cross Weld Reduced Section Tensile.”
- “Exceed the requirements of 49 CFR 195.304 hydrotesting requirements by testing all pipe systems for (8) hours at 125 [percent] maximum operating pressure (MOP) prior to operations.”
- “Exceed the requirements of 49 CFR 195.112. [The applicant's] pipelines will be specified to API 5L, PSL-2 standards which mandates the additional metallurgical requirements, inspections, and record retention. In addition, all pipelines will be manufactured in accordance with SCS developed Line Pipe Specification with considerations to more stringent requirements for mechanical properties for fracture control design, stringent dimensional requirements where applicable for improved constructability and stringent inspection and testing criteria to include non-destructive evaluation of the welded pipes.”
- “Exceed the requirements of 49 CFR 195.111 by engaging the services of ITI and Microalloy to assist with an extensive fracture propagation and ductility analysis to determine the required metallurgical properties for the proposed pipeline system as well as utilizing crack arrestors.”
- “Exceed the requirements of 49 CFR 195.250 by utilizing a 24-inch clearance between the outside of the pipe and the extremity of any underground structure, including drain tiles, where feasible. In the event a 24-inch clearance cannot be achieved, [the applicant] will meet the minimum requirements stated in 49 CFR 195.”
- “Exceed the requirements of 49 CFR 195.406 by implementing redundant pressure indicator (transmitter or PIT) on pump discharge, overlapping over pressure protection control logic, soft high pressure alarms well below MOP, and pump shutdown control logic below MOP. Additionally, [the applicant] performed a comprehensive surge study that showed anticipated surge pressures to be well within regulation even when only local controls were considered.”
- “Exceed the requirements of 49 CFR 195.407 by implementing a system wide dual communication path to all pump stations, mainline valve sites, PLR sites, and capture sites.”
- “[Perform] inspections on all phases of the pipe manufacturing process at each pipe mill to ensure full compliance with all QC measures.”

- “Perform a factory acceptance test for each premanufactured component for facilities (pumps, compressors, dehydration units).”
- “[Place] interior and exterior infrared cameras...at the capture facility to detect a potential carbon dioxide leak.”
- “[Place] interior carbon dioxide and oxygen detectors...at pump facilities to detect both the presence of hazardous vapors and confirm that there is sufficient oxygen for a safe environment.”
- “Conduct aerial patrols along the pipeline system to monitor and identify surrounding environmental conditions.”

The applicant states it has consulted with two separate engineering consultants to review valve soft composite material compatibility with the applicant’s product composition standards. In addition, all PHMSA-regulated facilities are designed to be “piggable” with inline inspection tools.

8.5.1.2 Emergency Response Plan

PHMSA’s minimum standards for operating and maintaining pipeline facilities include the requirement to establish a written plan governing these activities. Each pipeline operator is required under 49 CFR Section 195.402 to establish an emergency plan that includes procedures to minimize the hazards of a hazardous liquid pipeline emergency. The plan must include procedures for:

- receiving, identifying, and classifying emergency events, accidental release of CO₂, operational failure, or natural disaster;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- emergency system shut-down and control of released CO₂ at an accident scene;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- minimizing harm to the public by assisting with the evacuation of residents and assisting with traffic control, or other appropriate actions.¹¹³

For accidents that could occur during operation of the project, the applicant has developed a draft Emergency Response Plan, provided as **Appendix N**, that describes the actions the applicant and local first responders would take to minimize human health and safety impacts in the event of release of CO₂ from the project. This plan was described in Section 8.4.

8.5.1.3 Coordination with Emergency Managers and Responders

PHMSA requires that each operator establish and maintain a liaison with appropriate fire, police, and other public officials who might respond to a CO₂ pipeline emergency and to coordinate mutual assistance. Operators must also establish a continuing education program to enable emergency response personnel to recognize a CO₂ pipeline emergency and handle it appropriately.

The applicant would work with the local police departments, ambulance districts, and local and rural fire departments to develop response plans in case of a rupture. These plans would be based on the estimated volume of a release, topography, proximity of habitable structures, and weather conditions and include site maps, haul routes, schedules, contact numbers, training, and plans for orderly evacuation of the public in the event of a release. The applicant indicates that its employees, contractors, and agency responders would be equipped with tools, supplies, and equipment available to be used in cases of emergency conditions existing on or near the pipeline system. Self-contained

breathing apparatus might be required pending results from site-specific hazards and monitoring results. Emergency response organizations would be notified to help control traffic, establish danger zones to control sightseers, and determine if roadblocks are necessary for pedestrian, automotive, or train traffic.

The applicant met with the Otter Tail and Wilkin County Commissioners and Emergency Managers to discuss planning for emergencies and scheduling training of first responders in their respective areas. These meetings occurred on September 12, 2023, for Wilkin County and September 25, 2023, for Otter Tail County.

8.5.1.4 Public Education

The applicant hosted several public open houses during the application development process to introduce the surrounding communities and agencies to the project and educate them on the potential safety risks associated with the unlikely event of an accidental CO₂ pipeline rupture. The applicant also sent out direct mail communications to landowners, Tribal leaders, agencies, local units of government, and elected and public officials to explain the project.

The applicant would implement a damage prevention and public awareness program to educate the public, first responders, and other stakeholders; help protect the pipeline from damage from third parties; and help prevent or mitigate effects on public health and the environment.

8.5.1.5 Training and Equipment Reimbursement

The applicant would train workers in roadway safety, and certain workers would also be trained in first aid and safety to provide an immediate response.

The applicant has committed to provide CO₂ air monitoring equipment to first responders and to pay all costs associated with CO₂ response training and air monitoring equipment. The applicant states that the “distance to which the equipment, training, and reimbursement would be provided will be discussed and decided with Emergency Managers and first responders during preparedness training, based on the location of nearest residents and the capabilities of the first responders” (see **Appendix N**). Minnesota has recently formed a task force to address difficulties in staffing emergency medical services positions in rural areas;¹¹⁴ these staffing issues are due primarily to a lack of funding and low wages.¹¹⁵ The applicant has committed to reimbursing all CO₂ release-related trainings and equipment. Therefore, the applicant’s contribution would not exacerbate the state’s funding issues.

The applicant has committed to work with county emergency managers to plan for training of first responders prior to and during construction so that emergency responders would be prepared once the project goes into operation. Training would include discussions of CO₂ pipeline operations and initial response tactics in case of an emergency. The training would also cover the use of CO₂ and oxygen monitoring equipment and potential response actions, and would incorporate tabletop exercises and drills. Handheld CO₂ and oxygen monitors would be provided by the applicant to first responders. The applicant states that additional needs for each county would be discussed on a case-by-case basis.

8.5.2 Mitigation Proposed During Comment Periods

Many commenters suggested that the applicant provide emergency preparedness education to the public and pay for emergency response training, safety equipment, and emergency vehicles with non-internal combustion engines for use in the event of a pipeline rupture. One individual recommended adding an MLV at the Pelican River crossing to protect nearby populations, and another recommended valves at every stream crossing. Another commenter recommended that the applicant provide

education, pipeline markers, and instructions in case of rupture to landowners along the pipeline. Another individual recommended that the applicant be required to obtain adequate insurance to cover all costs of a potential pipeline rupture.

Several commenters requested that the pipeline be routed more than 50 feet from residences to mitigate risks from a potential pipeline rupture. This mitigation would not be consistent with PHMSA regulations, which set out standards for the design and safety of liquid and gas pipelines but do not specify any setback or minimum distance between the pipeline and a residence.

Many commenters recommended that the pipeline be buried deeper than the proposed 54 inches so that frost would not over time cause premature failure of the pipeline.

During scoping, comments were received about possibly adding an odorant to the pipeline. Odorants are required by PHMSA in certain natural gas pipelines,¹¹⁶ such as distribution lines and some transmission lines in high population areas, so that the combustible gas is readily detectable by a person with a normal sense of smell. The regulations do not specify what odorant is to be used, but natural gas utilities typically use various organosulfur compounds because of their strong and distinct odor, high degree of chemical stability to persist in the natural gas system and the environment, high vapor pressure to avoid condensation, and low freezing point. There are no PHMSA regulations that require use of odorants in CO₂ pipelines or in other hazardous liquid pipelines, and the applicant does not propose to add an odorant (see **Appendix I**).

CO₂ is odorless at low concentrations but has a sharp, acidic odor at very high concentrations,¹¹⁷ such as would occur in the event of a rupture. The applicant states that addition of an odorant would require multiple injection facilities and would introduce additional logistic and design changes needed for the safe storage and overland transport of the odorant, and that it does not know of any CO₂ pipeline that has used an odorant (see **Appendix I**). Staff did not verify these statements. Adding an odorant would fall under safety standards. The Commission cannot set safety standards for pipeline construction or operation.

The Pipeline Safety Trust commented that PHMSA should prescribe the maximum concentration of water, hydrogen sulfide, and other impurities allowed in CO₂ pipelines. The Commission cannot set safety standards, including impurities allowed in CO₂ pipelines. Another commenter recommended redundant monitoring of water before the CO₂ is placed into the pipeline.

Commenters recommended that the Commission require a detailed safety plan from the applicant and detailed plans on the type of system to be used to detect leaks.

8.5.3 Mitigation Recommended by EERA Staff

EERA staff believes that applicant-provided indoor CO₂ detectors for residences within 1,000 feet of the project is a reasonable mitigation measure. This distance was chosen based on the area that could reach a concentration of 15,000 ppm CO₂, as described in **Appendix G**.

EERA staff believes that applicant-provided outdoor CO₂ detectors for residences within 1,000 feet of the project is a reasonable mitigation measure. This distance was chosen based on the area that could reach a concentration of 15,000 ppm CO₂, as described in **Appendix G**.

EERA staff believes that a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission is reasonable.

EERA staff believes that a special permit condition requiring the applicant to file the following information, developed in coordination with local emergency responders, for Commission review 30 days prior to submittal of the Plan and Profile is reasonable:

- Specific equipment, training, and reimbursement to be provided to emergency managers
- List of the names of the emergency responders and a provision to update contact information as needed
- Discussion on the feasibility of a “reverse 911” notice or other electronic notification system, such as Send Word Now, that goes out to landowners’ telephones in the event of an emergency shutdown or rupture
- Identification of how the applicant would pay for costs of any repair to public infrastructure or private property (including crops and livestock) that might occur during an accidental release.

EERA staff believes a special permit condition requiring the applicant to provide its public education plan for Commission review 30 days prior to submittal of the Plan and Profile is reasonable. The public education plan could include specific safety information for neighboring landowners (residences within a minimum 1,000 feet of the project), including what to do in case of a rupture.

EERA staff believes that a special permit condition requiring the applicant to prepare a monitoring protocol to identify potential impacts to fish and wildlife, water resources, and other environmental resources should an accidental release (leak or rupture) of CO₂ occur is reasonable. This protocol should be developed in coordination with the DNR.

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Chapter 9 Unavoidable Impacts and Irreversible and Irretrievable Commitments of Resources

This chapter describes unavoidable project impacts and irreversible and irretrievable commitments of resources.

9.1 Unavoidable Impacts

Resource impacts are unavoidable when an impact cannot be avoided even with mitigation strategies.

Pipelines are infrastructure projects that have unavoidable adverse human and environmental impacts. These impacts and measures to mitigate them are discussed in Chapter 5. However, even with mitigation strategies, certain impacts cannot be completely avoided.

9.1.1 Construction

Unavoidable adverse impacts associated with construction of the project include minor traffic delays due to construction equipment or material hauling. In addition, some fugitive dust could be generated during dry conditions at unpaved travel surfaces and soil stockpiles. Conversely, very wet conditions could result in soil erosion impacts. Soil compaction would be unavoidable in unpaved areas of equipment and vehicle operation. Soils would be decompacted during restoration, but some compacted soils could remain.

Cultivated land within the construction workspace would be taken out of production for a growing season. Crop production could be reduced in areas disturbed by construction, including long-term impacts from disturbance to soils.

Except for areas between the HDD entry and exit points, vegetation and wildlife habitat in both upland areas and wetlands would be cleared in the construction workspace, resulting in unavoidable minor vegetation and habitat loss. Vegetation loss generally would be short term, lasting until the area is restored, but impacts in wooded areas would be long term. The cleared vegetation could also result in minor temporary to long-term aesthetic impacts.

Temporary construction noise from vehicles and equipment would be unavoidable. Additionally, construction activities would be visible to nearby residents and travelers of adjacent roadways.

Intermittent waterbodies such as drainage ditches would experience temporary and unavoidable increases in turbidity during open cut construction. Wildlife could experience temporary disturbance from noise and displacement during construction. Individuals of small, less mobile species could be inadvertently crushed or buried.

Finally, emissions, including GHGs from internal combustion engines used for construction, would be unavoidable.

9.1.2 Operations

Unavoidable impacts during operations include emissions, including GHGs, from the capture facility and operation of mowers or other equipment used for maintenance of the pipeline. The operational easement would entail some restrictions for landowners. For example, trees could not be grown over the pipeline, and structures would not be allowed. The MLVs along the pipeline route and the capture

facility would be visible. The capture facility would contribute additional noise to the area of the ethanol plant.

9.2 Irreversible and Irretrievable Commitments of Resources

Resource commitments are irreversible when it is impossible or very difficult to redirect that resource to a different future use; an irretrievable commitment of resources means the resource is not recoverable for later use by future generations.

Irreversible impacts include establishment of the operational pipeline ROW. While it is possible that the pipeline could be abandoned and the operational ROW restored to previous conditions and the easement vacated, this is unlikely to happen in the reasonably foreseeable future. Conversion of forested wetlands within the operational ROW could be considered irreversible because replacing these wetlands would take a significant amount of time after the pipeline is abandoned and the operational ROW is no longer maintained.

For project construction, irretrievable commitments of resources include the use of fuel, water, aggregate, steel, concrete, electricity, and other consumable resources. The commitment of labor and fiscal resources is also considered irretrievable. During operations, irretrievable resources would include energy and groundwater use by the capture facility and the fuels used in equipment and vehicles for maintaining the capture facility and pipeline.

Chapter 10 Cumulative Potential Effects

Chapter 10 summarizes the cumulative potential effects of the project and other projects.

10.1 Cumulative Impacts

Consideration of cumulative potential effects is intended to aid decision-makers so that they do not make decisions about a specific project in a vacuum. Effects that might be minimal in the context of a single project might accumulate and increase when all projects are considered.

Cumulative potential effects are impacts on the environment that result from “the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects.”¹ The environmentally relevant area includes locations where the potential effects of the project coincide with the potential effects of other projects to impact the elements studied in this EIS. Generally, this area includes the ROIs for the different resource elements, as defined in Chapter 5.

Cumulative effects are discussed here for projects that are foreseeable in the next 5 years. The applicant proposes to construct the pipeline from March to July 2025 and to construct the capture facility from May to August 2025. Therefore, construction impacts could be cumulative with other projects being constructed during that same time frame, depending on the proximity of the projects and resource being considered.

The following websites were searched for current or upcoming projects:

- City of Fergus Falls, Minnesota
- City of Breckenridge, Minnesota
- City of Wahpeton, North Dakota
- Otter Tail County, Minnesota
- Wilkin County, Minnesota
- Richland County, North Dakota
- Minnesota EQB Interactive Database/Map
- *EQB Monitor* (recent issues)
- MnDOT State Transportation Improvement Program 2024–2027
- MnDOT 10-Year Capital Highway Investment Plan 2024–2033
- North Dakota Department of Transportation
- Bureau of Land Management National NEPA Register

No relevant projects were found in the EQB interactive project database. Funding recipient lists of various USACE, DNR, EERA, and MPCA programs were reviewed, and a general internet search was conducted. DNR recommended inclusion of one project during review of the draft EIS, the Fargo-Moorhead Area Diversion Project, which has been added to the analysis.

Current and reasonably foreseeable future projects are summarized in **Table 10-1** and shown in **Figure 10-1**. Most of these projects are infrastructure related. Several support recreational opportunities and would benefit surrounding lakes, watercourses, and natural areas.

Table 10-1 Current and Reasonably Foreseeable Future Projects

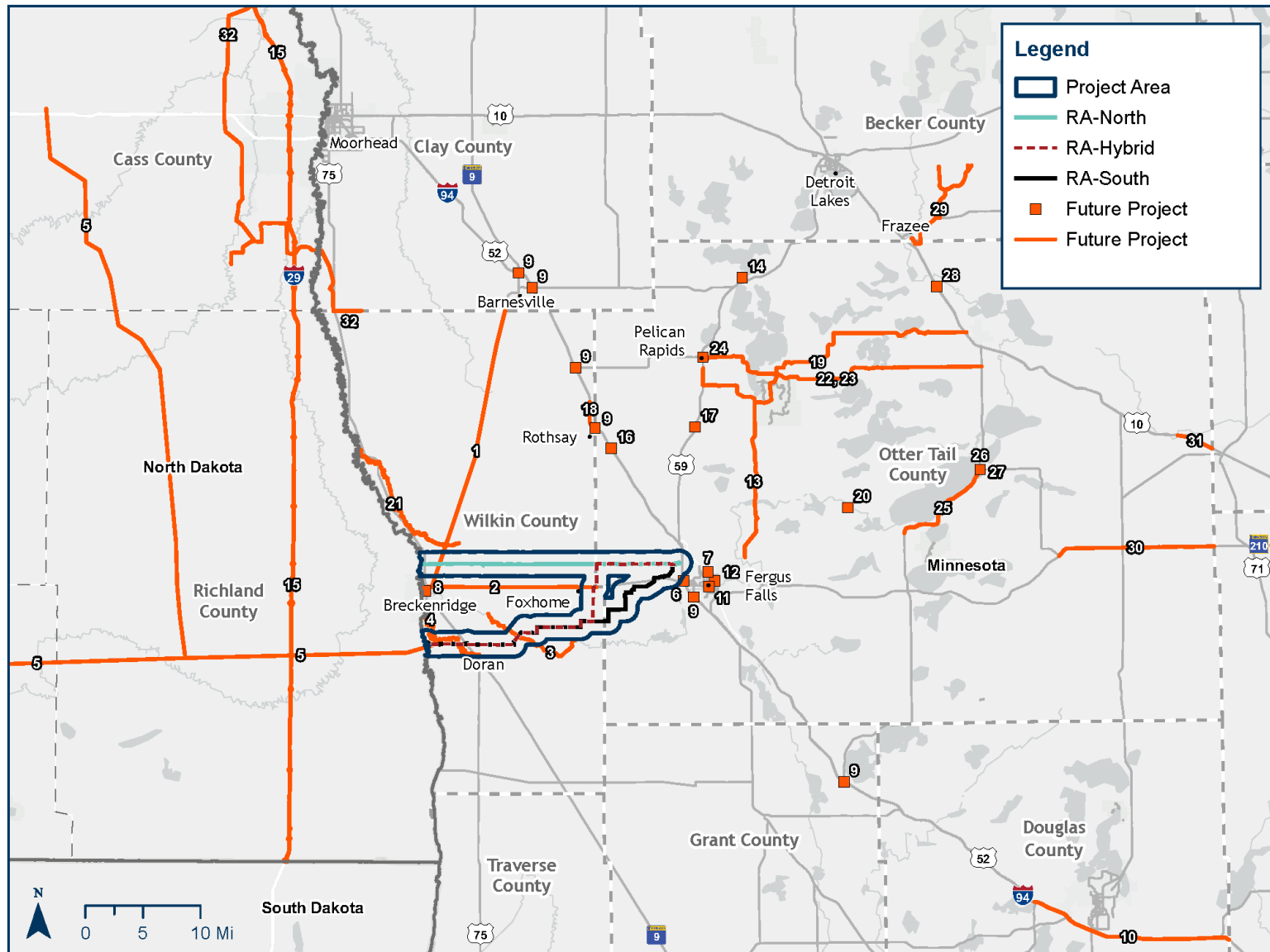
Project Number and Name	Location	Anticipated Construction Schedule	Description
1 – Resurface MN 9 ²	Wilkin County, MN	2028	Resurface MN 9 from Highway 210 to 6th Street in Barnesville
2 – Resurface MN 210 ³	Wilkin County, MN	2029	Resurface MN 210 from Highway 75 to 110th Avenue
3 – Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River, Wilkin County, Minnesota (USACE) ⁴	Wilkin County, MN	Construction Q1 2024 – Q4 2025; Project Partnership Agreement with non-federal sponsor anticipated to be signed in spring 2024	Ecosystem restoration project along the Lower Otter Tail River that will implement overflow structures, rock riffles, toe wood sod mats, and channel excavation. The project will reestablish and stabilize the river to a more natural condition.
4 – Doran Creek Stream Rehabilitation Project ⁵	Wilkin County, MN	Construction anticipated 2024–2025 ⁶	Rehabilitation of 15 miles of Doran Creek to improve function of the riparian corridor
5 – Midwest Carbon Express (MCE) Project ⁷	Richland County, ND	Currently in planning and permitting phase	System of pipelines to capture and sequester CO ₂ across Minnesota, North Dakota, South Dakota, Iowa, and Nebraska. The project is part of this system.
6 – Highway 210 Bridge Reconstructions ⁸	Otter Tail County, MN	2026	Reconstruct and replace bridges from Hwy 210 from west of Hwy 94 to Junction Hwy 94
7 – Union Avenue Mill and Overlay and Pedestrian Improvements ⁹	City of Fergus Falls, MN	Completed September 2023	Continued improvements to market structure, street, sidewalks, and parking lot along N Union Avenue
8 – Electrical Distribution System Upgrade ¹⁰	City of Breckenridge, MN	Phase 2 – 2022 to 2024 Phase 3 – 2025 to 2028	Construction of two new substations adjacent to existing substations, and increase distribution voltage
9 – I-94 Interchange Lighting Replacement ¹¹	Otter Tail and Wilkin Counties, MN	2024	Replacement of I-94 interchange lighting at Exits 22 and 24

Project Number and Name	Location	Anticipated Construction Schedule	Description
10 – Resurface I-94 ¹²	Otter Tail County, MN	2025	Concrete resurface eastbound lanes from west of CR 11 to Hwy 59
11 – Downtown Riverfront Improvement Project: Phase 2 ¹³	City of Fergus Falls, MN	Began in May 2023, expected to finish late spring or early summer 2024	Parking lot reconstruction, improvements to concrete areas, and construction of a splash pad along the Otter Tail River
12 – Aquatic Center ¹⁴	City of Fergus Falls, MN	Contractor selected in August 2023, timeline being developed	Construction of an aquatic park including a 4-lane lap pool, leisure pool, bath house, and concessions area
13 – Glacial Edge Trail Extension ¹⁵	Otter Tail County, MN	Master plan finalized in 2021, state legislature passed bonding bill summer 2023 ¹⁶	Construction of a 10-foot-wide, 14-mile extension to Glacial Edge Trail
14 – Echo Bay Regional Park ¹⁷	Otter Tail County, MN	In planning phase – no master plan made public or announcement of contractor bidding yet	Development of a new, 165-acre park along Fish Lake and the Pelican River
15 – I-29 SMART Corridor ¹⁸	Richland County, ND	Recommendations will be provided in 2024, with implementation over a 5- or 10-year period	A program to increase the safety of I-29 by managing the network of devices and sensors; expand roadway monitoring and condition reporting to an around the clock, year-long schedule; and streamline the deployment of advanced technologies
16 – Westbound I-94 Repair ¹⁹	Otter Tail County, MN	2024	Westbound I-94 emergency repair near the county line
17 – Resurface US 59 ²⁰	Otter Tail County, MN	2027	Resurface US 59 from I-94 to south of 5th Avenue in Pelican Rapids; bridge replacement
18 – Snow Fence Installation ²¹	Otter Tail and Wilkin Counties, MN	2025	Snow fence installation near Rothsay
19 – Heart of the Lakes Trail ²²	Otter Tail County, MN	September 2022 – September 2023 ²³	Construction of 6.83-mile-long, 10-foot-wide trail addition to Perham to Pelican Rapids Regional Trail

Project Number and Name	Location	Anticipated Construction Schedule	Description
20 – Phelps Mill County Park Improvements ²⁴	Otter Tail County, MN	Funding provided late 2022 for fiscal year 2024 ²⁵	Improve and increase trails, boardwalks, water access, parking, and recreation areas within Phelps Mill County Park
21 – Whiskey Creek Restoration Project: Phase 3 ²⁶	Wilkin County, MN	Active construction as of summer 2023 ²⁷	Sediment removal project and creation of a water management district along Whiskey Creek
22 – Highway 108 Sign Replacements ²⁸	Otter Tail County, MN	2024	Sign replacement on Hwy 108 from Pelican Rapids to Hwy 78
23 – MN 108 Reconstruction ²⁹	Otter Tail County, MN	2024–2026	Reconstruction of MN 108 from 4th Street in Henning to Junction of Hwy 210
24 – Pelican Rapids Street Reconstruction ³⁰	Pelican Rapids, MN	2024	Complete street reconstruction in Pelican Rapids; resurface bridge
25 – Resurface MN 78 ³¹	Otter Tail County, MN	2030	Resurface MN 78 from Wagon Trail to County Road 54
26 – Otter Tail Sidewalk and Pedestrian Improvements ³²	Otter Tail, MN	2024	Sidewalk and pedestrian improvements along TH 78 in Otter Tail
27 – Railroad Signal Replacements ³³	Otter Tail County, MN	2026	Replace existing signal system at Soo Railroad and MN 78
28 – US 10 - County Road 60 Intersection Revision ³⁴	Otter Tail County, MN	2024	Revise intersection between US 10 and County Road 60
29 – Frazee to Erie Transmission Line ³⁵	Otter Tail County, MN	Substation construction complete; Construction will resume in 2024 and is anticipated to conclude in spring or summer 2024	Construction of new 230/115 kV Erie Substation, 9.4 miles of new 115 kV transmission line, and 1.7 miles of transmission line conductor added to existing structures
30 – Resurface Hwy 210 ³⁶	Otter Tail County, MN	2025–2027	Resurface Hwy 210 from Hwy 29 to west of Hwy 71 near Hewitt, then New York Mills to Bluffton
31 – US 10 Road Reconstruction ³⁷	Otter Tail County, MN	2025	Road reconstruction on US 10 from 1.3 miles west of CSAH 75 into Wadena County

Project Number and Name	Location	Anticipated Construction Schedule	Description
32 – Fargo-Moorhead Area Diversion ³⁸	Wilkin County, MN	In progress – expected to be completed by 2027 ³⁹	A system comprised of a diversion channel, a southern embankment, and in-town levees designed to manage flood waters in the cities of Fargo and Moorhead as well as the surrounding areas

Figure 10-1 Current and Reasonably Foreseeable Future Projects in Otter Tail and Wilkin Counties, Minnesota, and Richland County, North Dakota



10.1.1 Impacts Anticipated to be Negligible

The project would have no or negligible impacts on commercial economies, forestry, or mining (see Section 5.3).

10.1.2 Human Settlement

10.1.2.1 Aesthetics

Potential Effects of Project on Aesthetics

Potential impacts on aesthetics are expected to be minimal to moderate, with the greatest impacts occurring during construction of the pipeline. Construction impacts would mainly consist of visible trenching, dirt piles, equipment laydown areas, and increased traffic and presence of construction vehicles, machinery, and equipment. Vegetation removal would likely increase the visibility of construction to some residences along the routes; however, aerial imagery indicates that these residences already have a view of the potential routes. Aesthetics impacts from operation of the pipeline would be minimal because the majority of the pipeline would be underground, where it is not visible. The capture facility is located at the existing ethanol plant, where the aesthetics of the area are already impacted (see Section 5.4.1).

Cumulative Effects of Project on Aesthetics

Five projects listed in **Table 10-1** are in the local vicinity of the project (an area within 1,600 feet of the route width). The Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River, are stream restoration projects that would improve aesthetics of the local vicinity once completed. The resurfacing projects for MN 9 and MN 210 would not have a cumulative impact on aesthetics with the project because their construction schedules would not overlap with the project's schedule. A portion of the MCE Project in North Dakota is also within the local vicinity and would have visual impacts similar to the proposed project. The cumulative effects of the project on aesthetics, when considered with the projects listed in **Table 10-1**, would be short term and minimal.

10.1.2.2 Cultural Resources

Potential Effects of Project on Cultural Resources

Potential impacts on cultural resources are expected to be minimal. Construction impacts on cultural resources, such as plants and wildlife of Tribal cultural interest, would be temporarily affected during the construction of the project until reclamation is complete. The project is not anticipated to impact or alter the work and leisure pursuits or land use of residents within the project area (area within 1 mile of the route width) of each route alternative in such a way as to impact the current underlying culture of the area. No impacts on cultural resources are expected from operation of the project, since the majority of the pipeline would cross agricultural land that could be returned to agricultural use following construction. The capture facility would be at the ethanol plant (see Section 5.4.2).

Cumulative Effects of Project on Cultural Resources

There are five projects within the project area: Resurface MN 9; Resurface MN 210; Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River, Wilkin County, Minnesota; Doran Creek Stream Rehabilitation Project; and the MCE Project. Two of these projects, the Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River, would improve leisure pursuits, land use, and Tribal-identified plants and fauna in the local vicinity once completed. These projects would therefore not contribute to adverse cumulative impacts.

If construction is occurring on the project while road resurfacing is occurring for MN 9 and MN 210, residents could have limited access to cultural resources, such as work and leisure pursuits and land use. This could result in cultural resource impacts. However, these effects would be temporary and would end once the projects and restoration are complete.

A portion of the MCE Project in North Dakota is also within the local vicinity and would have short-term and minimal effects on land use, work and leisure pursuits, and to Tribal cultural resources and Tribally important plants and wildlife. The cumulative effects of the project on cultural resources would be short term and minimal.

10.1.2.3 Environmental Justice

Potential Effects of Project on Environmental Justice

Potential impacts on environmental justice are expected to be minimal to moderate and short term. All three route alternatives cross only one census tract that has been identified as an EJ area of concern, Census Tract 9609. Factors that could affect this EJ area of concern include increased traffic during construction, noise, and air impacts from construction and operation. Traffic impacts are expected to be minimal since the local roadways can support the required number of construction vehicles, and because the applicant would cross all roadways by HDD or boring techniques. Noise impacts would be minimal along most areas of the project, as the work would primarily occur in rural agricultural areas and during daylight hours. The census tracts crossed by the route alternatives have air quality indexes below health benchmarks (meaning the air quality is good), and construction emissions are not expected to result in significant impacts on air quality during construction or operation of the project (see Section 5.4.3).

Cumulative Effects of Project on Environmental Justice

Census Tract 9609 overlaps five projects: the Aquatic Center, the Downtown Riverfront Improvement Project: Phase 2, the I-94 Interchange Lighting Replacement, the Highway 210 Bridge Reconstruction, and the Union Avenue Mill and Overlay and Pedestrian Improvements. Because the construction phase of the Union Avenue Mill and Overlay and Pedestrian Improvements has already been completed, this project would not contribute to cumulative impacts. The Aquatic Center and the Downtown Riverfront Improvement Project would both benefit Census Tract 9609 by providing more aesthetic improvements and recreational opportunities. Neither the Highway 210 bridge reconstruction project nor the I-94 Interchange Lighting Replacement project would have cumulative impacts with the project because their anticipated construction schedules do not overlap. Cumulative effects of the project on environmental justice are expected to be minimal.

10.1.2.4 Land Use and Zoning

Potential Effects of Project on Land Use and Zoning

Potential impacts on land use are expected to be minimal to moderate during construction. Minimal impacts would occur during operation of the project. The land use for the majority of all three route alternatives is agricultural. The effects of construction would be moderate on agricultural land use, as the land would be taken out of production during construction. However, the land would revert to agricultural use following construction, so long-term impacts on land use would be minimal. The project would not affect zoning (see Section 5.4.4).

Cumulative Effects of Project on Land Use and Zoning

Four projects intersect the route width one or more of the alternative routes. Of these projects, two are the resurfacing projects on MN 9 and MN 210. The resurfacing projects would not affect land use or

zoning of those areas because the roads already exist. The other two projects are the Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects, which aim to maintain and improve current land use. Cumulative effects of the project on land use and zoning are expected to remain moderate in the short term and minimal in the long term.

10.1.2.5 Noise

Potential Effects of Project on Noise

Potential impacts on noise are expected to be minimal for most portions of the three route alternatives. Construction of the pipeline would occur in primarily rural agricultural areas, creating distance between NSRs and noise-generating construction equipment. Most construction noise impacts would occur near HDD areas, which are primarily rural but do contain some NSRs within 0.5 mile. Impacts would be minimal during operation of the project because the capture facility would not result in a perceptible noise increase from the existing ethanol plant, and the pipeline, MLVs, launcher, and cathodic protection system would not generate noticeable noise (see Section 5.4.5).

Cumulative Effects of Project on Noise

There are five projects within the local vicinity of the project. Two of the projects are the resurfacing projects on MN 9 and MN 210. These projects would not be constructed at the same time as the project, so they would not contribute to cumulative construction noise impacts, and they would not have long-term noise impacts. The other two projects are the Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects, which would occur in rural areas where noise increases would not be near NSRs. A portion of the MCE Project in North Dakota is also within the local vicinity and would have noise impacts similar to the proposed project. Once the projects are completed, there would be no cumulative impacts as noise would return to pre-construction levels. The cumulative effects of the project on noise would be short term and minimal.

10.1.2.6 Populated Areas

Potential Effects of Project on Populated Areas

There would be no impacts on populated areas because no populated areas, as defined in this EIS, are within the local vicinity of any of the three route alternatives (see Section 5.4.6).

Cumulative Effects of Project on Populated Areas

Because the project would not affect populated areas, it would not have cumulative effects when considered with other reasonably foreseeable projects.

10.1.2.7 Property Values

Potential Effects of Project on Property Values

Potential impacts on property values are anticipated to be minimal, but impacts on individual properties can vary. While there are no studies on the relationship between property values and CO₂ pipelines, studies reviewed in the EIS do not indicate a conclusive, quantitative relationship between property values and proximity to natural gas pipelines. Specific changes to a property's value are difficult to predict, but the existence of a pipeline easement can generally be compatible with future landowner desires to continue activities on their property (see Section 5.4.7).

Cumulative Effects of Project on Property Values

Five projects are in the local vicinity of the route alternatives. Two projects, the Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River

projects, are stream and ecosystem restoration projects, which would not impact property values. Any impacts, if they occur, would be beneficial. Two other projects are the road resurfacing projects on MN 9 and MN 210, which would have no impacts on property values. Finally, a portion of the MCE Project in North Dakota is also within the local vicinity and would have property value impacts similar to the proposed project. The cumulative effects of the project on property values would be minimal.

10.1.2.8 Public Health and Safety

Potential Effects of Project on Public Health and Safety

The potential impacts of project construction and normal operation on public health and safety are expected to be minimal. Local healthcare facilities should be able to manage minor increases to healthcare needs during construction. Most health and safety impacts would occur during unexpected and abnormal operating conditions associated with an unplanned release of CO₂. Impacts of an accidental release of CO₂ could range from negligible, in the case of a small leak, to significant, in the case of a large CO₂ rupture (see Section 5.4.8 and Chapter 8).

Cumulative Effects of Project on Public Health and Safety

Of the projects listed in **Table 10-1**, it is expected that the MCE Project and the Fargo-Moorhead Area Diversion project would require a relatively large number of workers. If the MCE project, the Fargo-Moorhead Area Diversion project, and this project are constructed sequentially, there would be a negligible cumulative impact. Health and safety incidents during construction and normal operation of the project would be handled by services in Otter Tail and Wilkins Counties, and incidents on the portion of the MCE Project in North Dakota would be handled by services in Richland County. The majority of the Fargo-Moorhead Area Diversion project is located in Clay County, Minnesota, and Cass County, North Dakota, and it is expected that those counties would handle the vast majority of health and safety incidents if any should occur.

None of the other anticipated projects would require a significant workforce, and most of the anticipated construction time frames do not overlap with this project. Impacts on local facilities and emergency services from the construction of these projects would be spread out over a period of years, limiting the cumulative effects felt by local health facilities, law enforcement, and fire services. Therefore, cumulative effects from construction and normal operation of the project on public health and safety would be short term and minimal.

The largest potential impact on public health and safety would occur in the event of a pipeline rupture. Significant effects could occur if a rupture occurs within the same time frame as an accident on another project. The extent of the effect would vary depending on the size and the location of the rupture and the nature of the accident on the other project.

10.1.2.9 Public Services and Infrastructure

Potential Effects of Project on Public Services and Infrastructure

Potential impacts on public services and infrastructure are expected to be negligible to minor. Impacts on paved roads and railroads would be minimal as the applicant proposes to cross these features using the HDD or bore method. The existing road network is anticipated to be able to accommodate construction vehicles and operational traffic. The existing water and sewer capacity would be sufficient for the influx of temporary workers (see Section 5.4.9).

Cumulative Effects of Project on Public Services and Infrastructure

Five reasonably foreseeable projects would occur within the local vicinity of the project. The Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects, would use small, specialized crews that would have minimal to no impacts on public services and infrastructure. Two projects are the road resurfacing projects on MN 9 and MN 210, which would require larger crews that might create minimal to moderate temporary impacts on existing traffic patterns and health services. These road resurfacing projects would create long-term, beneficial impacts on public services. A portion of the MCE Project in North Dakota is also within the local vicinity and would have public services and infrastructure impacts like the project. The cumulative effects of the project on public services and infrastructure would be minimal to moderate and temporary. Long-term impacts would be beneficial.

10.1.2.10 Recreation

Potential Effects of Project on Recreation

The project would have minimal to moderate impacts on recreational resources during construction. The impacts would vary depending on the route selected. Impacts would result from the presence of construction equipment in the viewshed and increased noise while equipment is operating. The removal of vegetation in construction workspaces and placement of construction vehicles and equipment would alter the viewshed temporarily. Operation of the project would not impact recreation (see Section 5.4.10).

Cumulative Effects of Project on Recreation

There are five projects in the local vicinity of the project. Two projects, the road resurfacing projects on MN 9 and MN 210, could have minimal to moderate temporary impacts on recreation if recreational traffic is affected. The Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects could cause additional minimal to moderate cumulative effects on recreation as vegetation would be removed during the construction of either project. The size of the effect on recreation would vary, with a larger impact occurring if restoration was occurring in the same location as construction on the project and within the same time frame. A portion of the MCE Project in North Dakota is also within the local vicinity and would have recreational impacts similar to the proposed project. There are no recreational resources in North Dakota within the local vicinity of the proposed project. Cumulative impacts of the project on recreation are expected to be minimal to moderate and short term.

10.1.2.11 Socioeconomics

Potential Effects of Project on Socioeconomics

The project would have moderate short-term and negligible to minimal long-term beneficial impacts on socioeconomic resources. Half of the workforce needed for the project would come from local unions, and the applicant and its contractors would purchase some goods and services locally. The project would also increase tax revenues over the long term, benefitting Otter Tail and Wilkin Counties (see Section 5.4).

Cumulative Effects of Project on Socioeconomics

The projects listed are expected to create local jobs in both North Dakota and Minnesota. Non-local workers could require lodging, goods, services, and fuel that would bring money into the local economies. It is expected that local union labor would be used for the MCE Project, which would benefit local labor unions. Other projects might also use union labor. These beneficial impacts would diminish as

projects are completed. The cumulative effect of the project on socioeconomics would be minimal to moderate and beneficial.

10.1.2.12 Tribal Treaty Rights

Potential Effects of Project on Tribal Treaty Rights

The project would not impact Tribal treaty rights. There are no government-recognized usufructuary hunting or gathering rights within the lands the project proposes to cross that were ceded by treaty (see Section 5.4.12).

Cumulative Effects of Tribal Treaty Rights

Because the project would not affect Tribal treaty rights, it would not have cumulative effects when considered with other reasonably foreseeable projects.

10.1.3 Economies

10.1.3.1 Agriculture

Potential Effects of Project on Agriculture Economies

Potential impacts on agriculture would be primarily limited to the 6-month construction period and would be minimal. During that time frame, construction would be using agricultural land as a temporary workspace, and the land would be unavailable for crops. Short-term impacts would typically extend for 2 to 3 years but could take up to 5 years, depending on impacts to soils from the construction disturbance. Impacts would be mitigated through easement payments. Impacts during operation would be negligible (see Section 5.5.1).

Cumulative Effects of Project on Agriculture Economies

There are five projects in the local vicinity of the project. The Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects would not occur on agricultural land and would not contribute to any cumulative effects. The road resurfacing projects on MN 9 and MN 210 would also not have any effects on agricultural land, although agriculture-related traffic might experience delays in the short term. The long-term impacts of road improvements would be beneficial. A portion of the MCE Project in North Dakota is also within the local vicinity and would have similar agricultural impacts as the proposed project. There would be minimal short-term and negligible long-term cumulative effects on agriculture economies.

10.1.3.2 Industrial

Potential Effects of Project on Industrial Economies

Potential effects of the project on industrial economies would be negligible. Temporary increases in traffic and short-term, localized traffic delays during construction could have minimal temporary impacts on industrial facilities. The construction of the capture facility and the operational pipeline easement would preclude construction of new industrial properties in those locations (see Section 5.5.4).

Cumulative Effects of Project on Industrial Economies

There are five projects in the local vicinity of the project: road resurfacing projects on MN 9 and MN 210; the Doran Creek Stream Rehabilitation Project; the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects; and a portion of the MCE project. There would be no cumulative impacts from the road resurfacing projects because the construction timelines do not overlap with the proposed project's schedule.

Temporary traffic impacts from construction of the restoration projects would be negligible given the small size of the work crews. A portion of the MCE Project in North Dakota is also within the local vicinity. Industrial facilities were not identified within the local vicinity of the project in North Dakota. The cumulative effects of the project on industrial economies would be short term and negligible.

10.1.3.3 Tourism

Potential Effects of Project on Tourism Economies

Potential impacts of the project on tourism would be minimal to moderate during construction and negligible during operation. During construction, the project would result in short-term, minimal visual and noise impacts on recreational facilities. The project would not cause any impacts on noise levels or the surrounding viewshed at recreational facilities or other tourist attractions during operation (see Section 5.5.6).

Cumulative Effects of Project on Tourism Economies

Five projects—road resurfacing on MN 9 and MN 210, the Doran Creek Stream Rehabilitation Project, and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects, and a portion of the MCE project in North Dakota—are in the local vicinity of at least one route alternative. None of the projects overlap with locations identified as places of interest for tourism. There might be minimal impacts created by temporary increases in traffic; however, there would be no effects at the locations themselves. The cumulative effects of the project on tourism would be short term and minimal to none.

10.1.4 Archaeological and Historic Resources

Potential Effects of Project on Archaeological and Historic Resources

The potential effects of the project on archaeological and historical resources are expected to be minimal; however, not all sites within the route widths have been evaluated for NRHP eligibility. Of the sites that have been evaluated, none are eligible for or listed in the NRHP, so impacts on those sites would be minimal. If any of the sites are determined to be eligible, the project would result in permanent, moderate impacts on the resources. None of the three route alternatives have been surveyed entirely, so unknown archaeological resources could be discovered and potentially impacted. Historic architectural resources are within the route widths of all three route alternatives; however, none have been determined to be eligible for the NRHP, so impacts would be minimal. Because not all of the three route widths have been surveyed for historic architectural resources, the potential exists for unknown resources to occur within all three route alternatives (see Section 5.6.3).

Cumulative Effects of Project on Archaeological and Historic Resources

There are five projects in the project area: Resurface MN 9; Resurface MN 210; Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River, Wilkin County, Minnesota; Doran Creek Stream Rehabilitation Project; and the MCE Project. The two road resurfacing projects would be unlikely to affect archaeological and historic resources, other than temporary minimal visual impacts. The other three projects could directly impact previously identified and unknown, buried resources during ground disturbing activities; however, these projects would likely have survey requirements and inadvertent discovery protocols to minimize potential adverse impacts on archaeological and historic resources. Because these projects are unlikely to introduce new, permanent aboveground facilities, visual impacts would be none to minimal. Therefore, these projects would not contribute adverse cumulative impacts on NRHP-listed and NRHP-eligible archaeological and historic resources where NRHP integrity of setting is important. The cumulative effects of the project on known archaeological and historic resources would be short term and minimal.

10.1.5 Natural Environment

10.1.5.1 Air Quality

Potential Effects of Project on Air Quality and Greenhouse Gas Emissions

Construction of the project would result in temporary and intermittent air quality and GHG impacts. Operation of the project would include GHG emissions while capturing and processing CO₂ from the ethanol plant at the capture facility, dust and exhaust emissions from occasional work vehicles, and fugitive leaks from the pipeline. The project would provide a net benefit to GHG emissions because the emissions sequestered from ongoing annual operations would outweigh construction and operation emissions (see Section 5.7.1).

Cumulative Effects of Project on Air Quality

Of the listed projects in **Table 10-1**, many, such as the Fergus Falls Aquatic Center, would have minimal air quality impacts due to the small project footprints. The road reconstruction and resurfacing projects would have the largest air quality impacts due to the use of construction equipment and the creation of dust and exhaust emissions. All projects involving construction vehicles and equipment would contribute, along with the proposed project, to cumulative air quality impacts. Because air quality in these counties is good, and the projects would not all occur at the same time, impacts would be negligible to minimal. The cumulative impacts of the project construction on air quality are anticipated to be short term and negligible to minimal.

10.1.5.2 Climate Change

Potential Effects of Project on Climate Change

Climate change might result in increasing temperatures and a greater frequency and intensity of extreme weather events. In Minnesota, climate models have identified the potential for increased rainfall, heat, localized flooding, and persisting drought conditions. The project is expected to have a net beneficial effect on climate change because it would capture and store CO₂ emissions from the ethanol plant (see Section 5.7.2). All three route alternatives would have similar impacts regarding climate change.

Cumulative Effects of Project on Climate Change

The portion of the MCE Project in Richland County would also contribute toward a beneficial effect on climate change because it would continue to carry CO₂ from the ethanol plant to the sequestration site in North Dakota.

10.1.5.3 Geology and Topography

Potential Effects of Project on Geology and Topography

Potential effects of the project on geology are expected to be minimal and related to topography. Construction of the pipeline and capture facilities would result in minimal and temporary impacts on topography due to grading and excavation. Disturbed areas would be regraded to original surface contours and revegetated (see Section 5.7.3).

Cumulative Effects of Project on Geology and Topography

There are four projects in the construction workspace of the project. Of those four projects, two are the resurfacing projects on MN 9 and MN 210, which would not have any impact on geologic features or topography. The other two projects are the Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects. These projects would require grading and excavation to return the areas to their original contours and stream beds. This work would

have a long-term beneficial impact on geology and topography. The cumulative effects of the project on geology, specifically topography, would be minimal and short to long term.

10.1.5.4 Public and Designated Lands

Potential Effects of Project on Public and Designated Lands

Potential impacts on public and designated lands are expected to be minimal. All three route alternatives cross at least one WPA, where conservation easements are limited to the wetland areas of the crossed parcels. However, construction would avoid all wetland areas in the WPAs, creating minimal to no impacts. The three route alternatives do not cross any other public and designated lands (see Section 5.7.4).

Cumulative Effects of Project on Public and Designated Lands

Four projects—the road resurfacing projects on MN 9 and MN 210, the Doran Creek Stream Rehabilitation Project, and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects—are within the route width of one or more of the alternative routes. However, none of the projects would cross the project at locations that are public and designated lands, limiting any cumulative effects that could occur. The cumulative effects of the project on public and designated lands would be negligible.

10.1.5.5 Rare and Unique Resources

Potential Effects of Project on Rare and Unique Resources

Potential impacts on rare and unique resources would be localized and would vary by habitat, time of year, and type of species. Project activities within the route alternatives would not have a significant direct impact on state and federally listed species but could result in indirect impacts due to habitat and resource loss when vegetation is cleared during construction (see Section 5.7.5).

Cumulative Effects of Project on Rare and Unique Resources

There are five projects in the project area. Of those five projects, two are resurfacing projects on MN 9 and MN 210, which would have minimal impact on rare and unique resources. Two other projects are the Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects. There could be cumulative indirect impacts on federal species as vegetation is removed for the projects. There could also be cumulative direct impacts on state-listed species due to incidental take, which could occur during any of the projects. However, the long-term cumulative impacts would be beneficial as the stream and ecosystem restorations would provide enhanced habitat. This could offset impacts in areas not allowed to fully revegetate (wooded areas). A portion of the MCE Project in North Dakota is also within the project area and would have rare and unique resource impacts similar to the proposed project. The cumulative effects of the project on rare and unique resources would be short term and moderate to long term and minimal.

10.1.5.6 Soils

Potential Effects of Project on Soils

Potential impacts of the project on soils are expected to be minimal and short term during construction, depending on the route alternative selected. Soils could be lost through wind and water erosion, or backfilling could alter biological and chemical properties. Impacts on soils during construction would be minimized through BMPs, including erosion prevention and sediment control practices. Negligible impacts on soils are anticipated during the operational phase of the project (see Section 5.7.6).

Cumulative Effects of Project on Soils

There are four projects that intersect with the construction workspace of the project. Of those four projects, two are resurfacing projects on MN 9 and MN 210, which would have minimal impact on soils and would not occur at the same time as the proposed project. The other two projects are the Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects. These projects would require grading and excavation to return the areas to their original contours and stream beds, increasing the potential for soil loss through runoff and erosion. This could create moderate cumulative effects on soils when combined with impacts of the project construction. These effects would be temporary and would decrease as construction was completed and the areas were recontoured and revegetated. The cumulative effects of the project on soils would be short term and minimal to moderate.

10.1.5.7 Vegetation

Potential Effects of Project on Vegetation

Potential direct impacts on vegetation would occur primarily during the clearing of grain and seed crops during site preparation and construction. All vegetated areas within the construction workspace would be exposed to localized, short-term crushing or matting of plants under construction equipment. This would be a short-term, seasonal, negligible direct impact during construction and a long-term minimal impact during operation of the project. Direct impacts from the removal of existing vegetation would occur in forested areas, non-agricultural open areas, and wetlands; however, the impacts would be minimal due to the small acreage impacted. Routine maintenance and operation of the pipeline would result in long-term, localized, minimal to moderate impacts on vegetation (see Section 5.7.7).

Cumulative Effects of Project on Vegetation

There are four projects in the construction workspace of the project. Of those four projects, two are resurfacing projects on MN 9 and MN 210, which would have minimal impact on vegetation. The other two projects are the Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects. The stream and ecosystem restoration projects would require some vegetation to be cleared, crushed, and temporarily removed as the work is completed, which could have minor cumulative impacts in combination with the vegetation that would be cleared and crushed as part of the work on the project. However, these cumulative impacts would be temporary because the areas would be restored. The cumulative effects of the project on vegetation would be short term and minimal.

10.1.5.8 Water Resources

Potential Effects of Project on Water Resources

Potential impacts on surface water could occur during construction activities. These impacts would be temporary and short term, occurring only during construction. Once in operation, the project would have minimal impacts on waterbodies. Impacts associated with maintenance and repair would be rare and infrequent. Operational impacts on surface waters could occur during the first few years of operation as vegetation and restoration methods establish (see Section 5.7.8).

Cumulative Effects of Project on Water Resources

Five reasonably foreseeable projects are within the project area. Two of those projects are the resurfacing projects on MN 9 and MN 210, which are not anticipated to have any effects on water resources. Two other projects are the Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects. These projects could have a

cumulative impact with the project on surface waterbodies, as all three projects would include work such as clearing and grading of stream banks, topsoil disturbance, and in-stream trenching. Any cumulative effects would be temporary, as there would be no effects of the project on water resources during operation, and the stream and ecosystem restoration projects would improve water resources in the project area where restoration had occurred. A portion of the MCE Project in North Dakota is also within the project area and would have water resource impacts similar to the proposed project. The cumulative effects of the project on water resources would be short term and minimal.

10.1.5.9 Wetlands

Potential Effects of Project on Wetlands

Potential impacts of the project on wetlands would be minimal and mostly short term. Construction in wetlands would result in minimal short-term impacts and minor changes in plant species composition in emergent wetlands. Construction activities would convert about 0.2 acre of forested wetlands to emergent wetlands, a long-term, moderate impact. The amount of wetlands that would be impacted by any of the three route alternatives is minimal, and the routes would avoid many wetlands. Impacts of operation of the project on wetlands would be negligible to minimal and long term (see Section 5.7.9).

Cumulative Effects of Project on Wetlands

There are four reasonably foreseeable projects in the route width of one or more of the alternative routes. Two of those projects are the resurfacing projects on MN 9 and MN 210, which are not anticipated to have any effects on wetlands. The other two projects are the Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects, which would have beneficial impacts on wetlands through the restoration of habitat. The cumulative effects of the project on wetlands would be short term and minimal.

10.1.5.10 Wildlife and their Habitats

Potential Effects of Project on Wildlife and their Habitats

Construction of the project would have short-term and negligible to minimal impacts on most wildlife species. The species most likely to be directly impacted by construction are those that are small with limited mobility or visibility, such as small mammals, amphibians, and invertebrates. Burrows, dens, and other types of low or subsurface habitats might be removed, crushed, or damaged by construction. Impacts on ground nesting birds could occur as part of clearing and trenching activities. Larger and more mobile wildlife using existing habitats within the route width are expected to be temporarily displaced during construction due to increased human activity. Potential long-term impacts on terrestrial and aquatic species are anticipated to be minimal along all route alternatives. Operational impacts are expected from continued maintenance of the ROW (see Section 5.7.10).

Cumulative Effects of Project on Wildlife and their Habitats

There are four projects in the route width of one or more of the alternative routes. Two of those projects are the resurfacing projects on MN 9 and MN 210, which are not anticipated to have any effects on wildlife and their habitats. The other two projects are the Doran Creek Stream Rehabilitation Project and the Aquatic Ecosystem Restoration: Section 1135, Lower Otter Tail River projects. These stream restoration projects would temporarily displace individuals of larger wildlife species, and they would also impact smaller species, particularly those such as amphibians and invertebrates that are endemic to aquatic ecosystems, because work on the stream and ecosystem restoration projects would be focused on aquatic ecosystems. The cumulative impacts of the project on wildlife and their habitats are anticipated to be short term and minor.

- ¹ Minn. R. 4410.0200, subp. 11a
- ² Minnesota Department of Transportation District 4 2024–2033 Capital Highway Investment Plan (CHIP), <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ³ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ⁴ U.S. Army Corps of Engineers St Paul District Website, <https://www.mvp.usace.army.mil/Home/Projects/Article/940859/aquatic-ecosystem-restoration-section-1135-lower-otter-tail-river-wilkin-county/>. Accessed January 2024.
- ⁵ Doran Creek Stream Rehabilitation Project Environmental Assessment Worksheet, <https://webapp.pca.state.mn.us/eqb-search/project-detail/258224?sild=258224-PROJ0000000001>. Accessed July 2024.
- ⁶ Bois de Sioux Watershed District, http://www.bdswd.com/Projects_Template.html. Accessed January 2024.
- ⁷ Center for Rural Affairs, <https://www.cfra.org/blog/midwest-carbon-dioxide-pipelines-what-we-know-and-questions-remain>. Accessed January 2024.
- ⁸ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ⁹ City of Fergus Falls, Minnesota, <https://www.ci.fergus-falls.mn.us/government/city-projects/street-projects>. Accessed January 2024.
- ¹⁰ City of Breckenridge, <https://www.breckenridgemn.net/electric-distribution-system-projec>. Accessed January 2024.
- ¹¹ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ¹² Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ¹³ City of Fergus Falls, Minnesota, <https://www.ci.fergus-falls.mn.us/government/city-projects/downtown-riverfront>. Accessed January 2024.
- ¹⁴ City of Fergus Falls, Minnesota, <https://www.ci.fergus-falls.mn.us/government/city-projects/aquatic-center>. Accessed January 2024.
- ¹⁵ Otter Tail County, <https://ottertailcounty.gov/project/glacial-edge-trail/>. Accessed January 2024.
- ¹⁶ Parks & Trails Council of Minnesota, <https://www.parksandtrails.org/2023/07/03/an-update-on-the-2023-bonding-bill-grassroots-projects-edition/>. Accessed January 2024.
- ¹⁷ Otter Tail County, <https://ottertailcounty.gov/project/echo-bay-park/>. Accessed January 2024.
- ¹⁸ North Dakota Department of Transportation, <https://www.dot.nd.gov/projects/smart29/index.htm>. Accessed January 2024.
- ¹⁹ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ²⁰ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ²¹ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ²² Otter Tail County, <https://ottertailcounty.gov/project/perham-to-pelican-rapids-trail/>. Accessed January 2024.
- ²³ Otter Tail Lakes Country Association, <https://ottertailakescountry.com/place/the-heart-of-the-lakes-trail/>. Accessed January 2024.
- ²⁴ Otter Tail County, <https://ottertailcounty.gov/project/phelps-mill-master-plan/>. Accessed January 2024.

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- ²⁵ Otter Tail County, <https://ottertailcounty.gov/wp-content/uploads/2022/11/Phelps-Mill-Grant-funding-11-22.pdf>. Accessed January 2024.
- ²⁶ Buffalo-Red River Watershed District, <https://www.brrwd.org/whiskey-creek-enhancement-project>. Accessed January 2024.
- ²⁷ KVRr Local News, <https://www.kvrr.com/2023/05/18/work-to-resume-on-third-phase-of-7-million-whiskey-creek-restoration/>. Accessed January 2024.
- ²⁸ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ²⁹ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ³⁰ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ³¹ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ³² Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ³³ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
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- ³⁷ Minnesota Department of Transportation District 4 CHIP, <https://www.dot.state.mn.us/planning/10yearplan/district-chip.html>. Accessed January 2024.
- ³⁸ MetroFlood Diversion Authority, <https://fmdiversion.gov/about/how-the-diversion-will-work/>. Accessed May 2024.
- ³⁹ MetroFlood Diversion Authority, <https://fmdiversion.gov/project-status-road-closures/construction-status/>. Accessed May 2024.

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Chapter 11 Application of Route Selection Criteria

The analysis that follows applies the information and data available in the routing permit application, the scoping EAW, and this EIS to the criteria the Commission must consider when making a decision concerning a pipeline routing permit.

The Commission must locate proposed pipelines in an orderly manner that minimizes adverse human and environmental impacts, while ensuring that pipeline routing permit needs are met and fulfilled in an orderly and timely manner.¹ The Commission cannot set safety standards for pipeline construction.² Minnesota Rule 7852.1900, subpart 3, identifies the following 10 criteria the Commission must consider when making a permit decision for routing a pipeline:

- A. human settlement, existence and density of populated areas, existing and planned future land use, and management plans;
- B. the natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water, and recreational lands;
- C. lands of historical, archaeological, and cultural significance;
- D. economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations;
- E. pipeline cost and accessibility;
- F. use of existing rights-of-way and right-of-way sharing or paralleling;
- G. natural resources and features;
- H. the extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in part 7852.3400 for pipeline right-of-way preparation, construction, cleanup, and restoration practices;
- I. cumulative potential effects of related or anticipated future pipeline construction; and
- J. the relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws including ordinances adopted under Minnesota Statutes, section 299J.05, relating to the location, design, construction, or operation of the proposed pipeline and associated facilities.

The following sections analyze the three route alternatives (RA-North, RA-Hybrid, and RA-South) in comparison to these route selection criteria and summarize mitigation measures currently recommended by EERA staff should the Commission ultimately decide to issue a pipeline routing permit for the project.

11.1 Route Selection Criteria Summary

This section lists the route selection criteria and compares potential impacts of the three route alternatives.

Table 11-1 lists the route selection criteria outlined in Minnesota Rule 7852.1900, subpart 3, and compares potential impacts of the three route alternatives. Further discussion of each criterion is provided in Section 11.2.

Table 11-1 Summary of Potential Impacts of Route Alternatives by Route Selection Criterion

Criterion Considered by Commission	RA-North	RA-Hybrid	RA-South
A. Human settlement, existence and density of populated areas, existing and planned future land use, and management plans	<p>Impacts on human settlement would be generally short-term and negligible to minimal, including impacts on cultural resources, environmental justice populations, public services and infrastructure, populated areas, socioeconomics, Tribal treaty rights, future land use, zoning, and management plans. Aesthetic impacts would be minimal to moderate during construction.</p> <p>Would have slightly more residents with a view of the construction workspace. Impacts from project operation would be negligible to minimal.</p> <p>Would have more noise sensitive receptors (NSR) close to the construction workspace but fewer NSRs within 0.5 mile of a horizontal directional drill (HDD) entry.</p>	<p>Impacts on human settlement would be similar to RA-North.</p> <p>Would have slightly fewer residents than RA-North with at least a partial view of the construction workspace.</p> <p>Would have the fewest NSRs affected by construction noise.</p> <p>The applicant has obtained landowner agreement along a portion of RA-Hybrid.</p>	<p>Impacts on human settlement would be similar to RA-North.</p> <p>Would have slightly fewer residents than RA-Hybrid with at least a partial view of the construction workspace.</p> <p>Would have fewer NSRs close to the construction workspace than RA-North but more NSRs within 0.5 mile of an HDD entry.</p> <p>The applicant has obtained landowner agreement along RA-South.</p>

Criterion Considered by Commission	RA-North	RA-Hybrid	RA-South
B. The natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water, and recreational lands	<p>Would cross one Waterfowl Production Area (WPA). Impacts on public and designated lands would be short-term and negligible.</p> <p>Would cross the Pelican and Red Rivers by HDD. Impacts on water would be short-term and minimal.</p> <p>Would not cross the Otter Tail River or the Fergus Falls Fish & Game Club Orwell property, and likely would have fewer impacts on recreation than the other two route alternatives.</p> <p>Most impacts on wildlife and wildlife habitat would be highly localized, short-term, and negligible to minimal.</p>	<p>Would cross the same WPA as RA-North. Impacts on public and designated lands would be the same as RA-North.</p> <p>Would cross the Pelican, Otter Tail, and Bois de Sioux Rivers by HDD. Impacts on water would be similar to RA-North.</p> <p>Would not cross the Fergus Falls Fish & Game Club Orwell property. Recreation impacts are anticipated to be short-term and minimal to moderate.</p> <p>Impacts on wildlife and wildlife habitat would be similar to RA-North.</p>	<p>Would cross the same WPA as RA-North. Route width would partially overlap two other WPAs; however, the WPAs would be outside of the construction workspace. Impacts on public and designated lands would be the same as RA-North.</p> <p>Would cross the Pelican, Otter Tail, and Bois de Sioux Rivers by HDD. Impacts on water would be similar to RA-North.</p> <p>Would cross the Fergus Falls Fish & Game Club Orwell property. Recreation impacts are anticipated to be short-term and minimal to moderate.</p> <p>Impacts on wildlife and wildlife habitat would be similar to RA-North.</p>
C. Lands of historical, archaeological, and cultural significance	<p>Low potential for archaeological resources based on the route's proximity to waterbodies and the number of previously identified archaeological resources within the project area (area within 1 mile of the route width).</p>	<p>Higher potential for archaeological resources than RA-North based on the route's proximity to waterbodies and the number of previously identified archaeological resources within the project area (area within 1 mile of the route width).</p>	<p>Low potential for archaeological resources based on survey results.</p> <p>None of the archaeological sites identified have been determined to be eligible for or listed in the National Register of Historic Places.</p>
D. Economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations	<p>Minimal agricultural impacts; crop losses during construction would be mitigated by compensation from the applicant.</p> <p>Negligible impacts on commercial, industrial, and recreational economies.</p> <p>No impacts on forestry or mining operations.</p>	<p>Similar to RA-North.</p>	<p>Similar to RA-North.</p>

Criterion Considered by Commission	RA-North	RA-Hybrid	RA-South
E. Pipeline cost and accessibility ^b	\$40.0 million +/- 15%	\$40.4 million +/- 15%	\$37.0 million +/- 15%
F. Use of existing rights-of-way and right-of-way sharing or paralleling	96.0% of length parallels road right-of-way.	76.5% of length parallels road right-of-way.	46.1% of length parallels road right-of-way.
G. Natural resources and features	See Criterion B.	See Criterion B.	See Criterion B.
H. The extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in part 7852.3400 for pipeline right-of-way preparation, construction, cleanup, and restoration practices	Most effects of the project could be mitigated by regulatory control and application of permit conditions.	Similar to RA-North. No difference in the extent to which effects would be subject to mitigation.	Similar to RA-North. No difference in the extent to which effects would be subject to mitigation.
I. Cumulative potential effects of related or anticipated future pipeline construction	No related or anticipated future pipeline construction was identified for Otter Tail or Wilkins County. Overall negligible to minimal short-term cumulative effects with the MCE Project in Richland County, North Dakota, if constructed at the same time.	Similar to RA-North.	Similar to RA-North.

Criterion Considered by Commission	RA-North	RA-Hybrid	RA-South
J. The relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws including ordinances adopted under Minnesota Statutes, section 299J.05, relating to the location, design, construction, or operation of the proposed pipeline and associated facilities	Applicant would obtain all applicable permits and comply with permit conditions, regulations, and ordinances.	Similar to RA-North. No difference in the permits needed or regulations and ordinances that would be applicable.	Similar to RA-North. No difference in the permits needed or regulations and ordinances that would be applicable.

^a Costs are for the pipeline portion of the project only. The cost of the capture facility is the same for all route alternatives and is estimated at \$29.75 million +/- 15%.

11.2 Discussion

This section discusses each of the 10 route selection criteria and compares each criterion for the three route alternatives.

11.2.1 Criterion A

Human settlement, existence and density of populated areas, existing and planned future land use, and management plans

Aesthetics

The construction and operation of the capture facility and one of the three pipeline route alternatives would each have minimal to moderate short-term impacts on aesthetic resources. RA-North would have several more residences with at least a partial view of the construction workspace compared to RA-Hybrid. RA-South would have several fewer residences with at least a partial view of the construction workspace compared to RA-Hybrid. For those residences with at least a partial view of the construction workspace, visual impacts would be noticeable during construction, but would be short term. The capture facility would blend with the existing ethanol plant. Once constructed, the pipeline would be below ground. Aboveground pipeline facilities would have minimal visual impacts. Aesthetic impacts from project operation would be negligible to minimal, with no noticeable difference among the route alternatives.

Cultural Resources

Potential impacts on cultural resources would be subjective. Agricultural operations, which can have contemporary cultural value, would be impacted along each of the route alternatives, but the project would not remove cultivated land from production. The project could temporarily impact hunting activities and the habitats of plants and wildlife of Tribal cultural interest during construction and until restoration of disturbed areas is complete. Overall, potential impacts to cultural resources during construction and operation of the project are anticipated to be minimal and would be similar for all

route alternatives, though landowners with property within the construction workspace would experience this impact to a greater extent.

Environmental Justice

An EJ assessment was conducted to identify disadvantaged communities that have been historically marginalized and overburdened by pollution and evaluates if a project would disproportionately affect these communities. Census Tract 9609, which is crossed by all three alternatives, was identified by the MPCA screening tool as an EJ area of concern. Potential impacts along each of the route alternatives are expected to be minimal for EJ communities during construction. Local roadways would experience a short-term minimal increase in traffic during construction activities. Construction would use HDD and boring techniques at road crossings to limit impacts on local traffic. Residents within Census Tract 9609 and the other census tracts crossed by the project might experience intermittent, short-term noise from construction equipment for up to 30 days. Operation of the capture facility and pipeline facilities would not generate noticeable noise. The project would not result in significant impacts on air quality during construction or operation. In the event of a CO₂ release, potential impacts to EJ populations are expected to be similar to potential impacts on the general population and are described in Chapter 8. Overall, EJ impacts from construction and operation of the project would not result in disproportionate adverse impacts for EJ areas of concern and are similar across the three route alternatives.

Land Use

Land use in the route width, and in the area of the project generally, is predominantly agriculture. Project construction would have a short-term, minimal to moderate impact on land use within the construction workspace where agricultural land would be taken out for production for one growing season. Operation of the pipeline would have a long-term, minimal impact on land use. An operational ROW would be created, but agriculture (the most prevalent land use) could continue. Landowners could not plant trees or build structures within the operational pipeline ROW. The project would be compatible with local and regional land use plans. Overall, impacts on land use and zoning are anticipated to be minimal and the same for each of the three route alternatives.

Noise

Heavy equipment needed to construct the pipeline would have an intermittent and short-term impact on noise levels in the vicinity of the project. Except for HDDs and some hydrostatic testing activities, construction would be limited to daytime hours. Noise from HDDs would be noticeable but temporary, typically lasting 5 to 6 days or more, depending on the length and depth of the drill path. Construction equipment noise would be expected to decrease to levels below state daytime standards within 500 to 1,600 feet. The project is expected to conform to state noise standards. Compared to the other route alternatives, RA-South would have fewer NSRs close to the construction workspace but more NSRs within 0.5 mile of an HDD entry. Noise from the operation of the capture facility is not expected to result in a perceptible increase in the sound levels experienced at NSRs near the capture facility and would not be distinguishable from the noise already produced at the ethanol plant. Operation of the pipeline facilities would not have a noticeable impact on ambient sound levels. Because the project is expected to conform to state noise standards, and the applicant would use barrier walls as needed for mitigating noise from HDDs, overall, noise impacts would be temporary, minimal, and short term for each of the three route alternatives.

Populated Areas

Populated areas are defined for this analysis as incorporated areas, and census-designated places. There would be no impacts on defined populated areas because no populated areas are within 1,600 feet of

the route width for any of the three route alternatives. The EIS describes potential impacts on the human environment, regardless of whether they would or would not occur within defined populated areas.

Property Values

A property's value is influenced by a complex interaction of characteristics, such as size, location, and improvements. The value of a tract of land is related to many tract-specific variables, including the utilities and services available or accessible, the current land use, and the values of adjacent properties. Property valuations generally do not consider subjective aspects. Potential impacts to property values in the event of release of CO₂ are described in Chapter 8. Construction-specific impacts on property values would be temporary (less than 6 months) and the applicant would be responsible for any construction-related damages and for returning affected property to its original condition. Impacts on property values during construction would be temporary but could be significant for landowners attempting to sell their properties during construction. During project operation, landowners could continue activities within the pipeline easement on their property with some restrictions, such as planting trees or building structures. Although no studies related to the impacts of CO₂ pipelines on property values have been identified, studies for natural gas pipelines have not shown that the proximity of a pipeline affects the sale price or value of residential properties. The applicant states it would indemnify landowners for losses resulting from the applicant's use of easements, which would include increases in property insurance, if incurred. Overall, impacts on property values are anticipated to be minimal lessen with distance from the pipeline, and would be similar for all three route alternatives. However, impacts on specific properties could vary.

Public Health and Safety

Construction of the project would have negligible impacts on public health and safety. The presence of construction personnel and equipment could temporarily increase demand for local public services. As with any major construction project, worker health and safety concerns exist. Operational impacts to health and safety would be a concern primarily in the event of an accidental release of CO₂, when public health and safety impacts are expected to be minimal to significant (depending on the extent and where a release occurs). As discussed in Chapter 8, local first responders would receive training and equipment related to a potential release, funded by the applicant. Aerial dispersion modeling and computational fluid dynamics modeling were conducted to estimate the extent of a CO₂ plume in the event of a rupture. Potential impacts on public health and safety are expected to be negligible to minimal, short term, and similar for all three route alternatives. Accident conditions are discussed in Chapter 8.

Public Services

Public services and infrastructure include emergency services, hospitals, school districts, and public utilities that serve residents and business. The presence of additional construction personnel could affect law enforcement agencies, fire protection services, and health care facilities in the communities adjacent to the project for all route alternatives. Local emergency services would be able to manage these minor increases during the 6 months of construction. There are no anticipated impacts on schools, public transit, or railroads. Impacts on roads would be minimal and primarily from increased construction traffic. A temporary increase of water use, sewage, and solid waste is anticipated due to the influx of construction workers and materials. The existing utilities would be sufficient to handle the temporary increase. An existing well at the ethanol plant would supply water for operating the capture facility. During operation, electrical service would be supplied to the capture facility through existing service lines, and the project is not anticipated to require additional power generation capacity. Public

services and infrastructure impacts are anticipated to be short term, negligible to minimal, and similar across the three route alternatives.

Socioeconomics

Socioeconomics assesses overall social and economic character of an area and the project's effects on the well-being of current and future residents of the affected community. Most impacts would be beneficial. Construction would result in a temporary increase in local population associated with the workers and associated spending from lodging, transportation, and food. The nearby cities have adequate housing and infrastructure to support the additional workers for all three route alternatives. Local labor would also be used, increasing employment in the surrounding area. The applicant estimates its total direct capital cost or investment would be \$69.75 million for RA-North, \$70.12 million for RA-Hybrid, and \$66.75 million for RA-South with a construction payroll of \$37,411,000. The project would increase tax revenues, benefiting the counties and state. Socioeconomic impacts are anticipated to be minimal, short term to long term, and similar across the three route alternatives.

Tribal Treaty Rights

Lands in the local vicinity of the project were ceded to the United States government in two 1851 treaties, and neither treaty that ceded lands within the project area established government-recognized usufructuary hunting or gathering rights within the ceded lands. Therefore, potential impacts on Tribal treaty rights are expected to be negligible along each of the three route alternatives during construction and operation of the project.

11.2.2 Criterion B

The natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water, and recreational lands

Air Quality

Air quality and GHG emission impacts from the project could contribute to increased levels of air pollution in Minnesota. The analysis in this EIS includes both air pollutant and GHG emissions from fossil fuel sources that would be used during construction and operation. The project would capture and sequester the biogenic CO₂ produced by the ethanol fermentation process at the ethanol plant. The analysis presented includes both air pollutant and GHG emissions from fossil fuel sources that would be used during construction and operation. By capturing and sequestering CO₂ underground, the project would provide a net benefit to GHG emissions, because the CO₂ sequestered from ongoing annual operations at the ethanol plant would outweigh construction and operation emissions. This benefit would vary depending on the capture rate and final end use of the captured CO₂. Construction impacts would include emissions from construction equipment and vehicles as well as temporary changes in land use along the pipeline ROW. Operational impacts would include emissions from operation of the pipeline and the CO₂ capture facility, including equipment leaks. Construction emissions for the route alternatives would be directly proportional to their lengths. In other words, RA-North would have somewhat lower construction emissions and RA-Hybrid would have somewhat higher emissions compared to RA-South. Operational impacts on air quality would be minimal and would not differ depending on the route alternative.

Climate Change

Climate change is expected to result in increasing temperatures and a greater frequency and intensity of extreme weather events. In Minnesota, climate models have identified the potential for increased rainfall, heat, localized flooding, and persisting drought conditions. The project would contribute to a

beneficial effect on climate change as it would capture and store CO₂ emissions from the ethanol plant. Concerns were raised during scoping and in comments on the draft EIS that the captured CO₂ from this project would be used for enhanced oil recovery (EOR). This would contribute to further fossil fuel extraction and GHG emissions and defeat the stated purpose of injecting CO₂ into Class VI wells for permanent sequestration. The applicant has indicated that it does not propose or plan to use CO₂ transported by the project for EOR. With respect to climate resiliency, the pipeline would be buried underground with sufficient cover to protect it from flooding and scour during operation of the project. Any MLVs located in floodplains would be constructed in accordance with floodplain permitting requirements. Drought conditions might require contingency water sources. All route alternatives would face similar impacts resulting from climate change. These impacts would generally be short term and negligible to minimal for construction and long term and negligible for operations.

Concerns were raised during scoping and in comments on the draft EIS that the captured CO₂ from this project would be used for EOR. Commenters noted that EOR would contribute to further fossil fuel extraction and GHG emissions and defeat the stated purpose of injecting CO₂ into Class VI wells for permanent sequestration. The applicant has indicated that it does not propose or plan to use CO₂ transported by the project for EOR.

Geology and Topography

The topography in the project area is relatively flat with localized areas of steeper slopes occurring adjacent to waterbodies. Bedrock is generally deeper than 50 feet. No mineral resources are within the construction workspaces for any of the three route alternatives. The risk to the project facilities from geologic hazards such as earthquakes and landslides is low. Surface contours would be restored after construction; however, differential settling could occur, causing crowning or subsidence (low areas). The applicant would monitor for and rectify areas of crowning or subsidence caused by settling. With these measures, impacts on geology and topography would be short term and minimal. Impacts would not vary among the route alternatives.

Public and Designated Lands

The only direct impact on public and designated lands would be at one WPA, which would be crossed by all three route alternatives. Impacts to the wetland associated with this WPA are not expected. The route width of RA-South would partially overlap with two other WPAs; however, the WPAs would be outside of the construction workspace. Potential project impacts on public and designated lands for all three route alternatives would be short-term and negligible.

Rare and Unique Resources

Most vegetation cover occurring along all route alternatives does not provide suitable habitat for rare and unique species. Potential impacts for all three route alternatives would be unique to individual listed species, could vary widely, and would be highly localized and limited to specific habitats. No federally listed species are expected to be directly taken. Indirect impacts on federally listed species would be negligible and could be avoided by following USFWS guidance. No bald or golden eagle nests would be removed or disturbed. There is a potential for take of state-listed marbled godwits or their nests, which would be lessened or avoided by conducting nest surveys ahead of construction. Because this species is already rare, the potential for additional loss of nests during construction and operational maintenance may have a greater local impact. There is also a potential for direct take of four state-listed plants. The loss of individuals from local populations of state-listed plant species could also be a long-term, minimal impact on the population. Potential for take of state-listed plants would be lessened or avoided by conducting surveys ahead of construction as needed. Overall, for each of the three route

alternatives, impacts on rare and unique species would be localized, negligible to minimal, and short term.

Soils

Soils in the project area consist mainly of well to poorly drained loams and clays. The route alternatives generally share similar soil characteristics. During construction, vegetation clearing, topsoil removal, and trenching would expose soils and increase the potential for erosion, compaction, and mixing of topsoil with subsoil. The applicant would minimize these impacts by complying with required permits and implementing the applicant's Minnesota ECP and Minnesota APP. With these measures, most impacts on soils during construction would be minimal and temporary, but some impacts could be long term. Impacts on soils during operation would be negligible. The applicant would develop a Phase I Geohazard Assessment for the project that is designed to comply with the recommendations in PHMSA Advisory Bulletin 2022-01, which advises operators to identify areas surrounding a pipeline that may be prone to large earth movement, including but not limited to slope instability, subsidence, frost heave, soil settlement, erosion, earthquakes, and other dynamic geologic conditions that may pose a safety risk. Impacts would be similar across all three route alternatives.

Vegetation

Vegetation in the construction workspace for the three route alternatives is dominated by cultivated crops. Vegetation associated with developed areas is also prevalent along all three route alternatives. Impacts to agricultural vegetation during construction and operation are lowest for RA-North due to its length. Agricultural impacts along RA-South and RA-Hybrid are about equal. Otherwise, the relative percent of cover and distribution of non-agricultural vegetation types is similar among all three route alternatives. Impacts on vegetation would result almost entirely from removal and crushing during construction. Indirect impacts include possible introduction of invasive species. Removal of woody vegetation in forested areas would be long term due to longer regeneration time for woody cover. Forested areas comprise less than 1 acre total for each of the route alternatives. Overall, construction impacts on vegetation are expected to be short term and minimal for all route alternatives. Operational impacts on vegetation would be long term and minimal due to routine maintenance.

Water Resources

None of the three route alternatives would cross lakes, or waters with federal or state designations related to high resource value. The route alternatives would cross a similar number of drainage ditches. RA-North would cross fewer rivers and streams than RA-Hybrid and RA-South. While there are wells within 1 mile of the route width for all three route alternatives, the majority are outside of the construction workspaces of RA-North and RA-South, and no wells are within the construction workspace of RA-Hybrid. Perennial streams would be crossed using trenchless construction methods, and other waterbodies with flow at the time of construction would be crossed using an isolated dry-trench construction method. Potential impacts on surface waters during construction would be short term and minimal for all route alternatives.

The applicant is coordinating with DNR on a groundwater investigation in the beach ridge system area to define existing conditions and inform construction practices. EERA staff recommends the applicant develop a plan for construction in this area with measures to minimize the potential for an aquifer breach. Construction activities would have temporary, minimal, and localized impacts on groundwater. Floodplain impacts would be short-term and negligible during construction for all route alternatives. If the existing well at the ethanol plant is used as the source of water for operating the capture facility, the water use would result in about a 7 percent increase in water withdrawal from the well. Water supply

appropriations would be regulated by DNR-issued permits that would have conditions to minimize impacts on groundwater resources. The applicant would provide a contingency plan that identifies potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of water withdrawals following DNR request, when necessary. Therefore, no long-term impacts on water resources are expected during project operation.

Wetlands

Based on the National Wetlands Inventory, most wetlands in the ROI for each route alternative are emergent wetlands, with lesser amounts of forested and riverine wetlands. Direct wetland impacts would occur during pipeline construction. The number of wetland acres within the ROI is much higher for RA-South because the route width for this alternative is increased in one area to allow for additional study and the potential need to make modifications to the alignment, while a similar increase was not included for RA-Hybrid and RA-North. The acreage of wetlands that would be within the construction ROW is relatively small for all three route alternatives, ranging from 0.7 acre for RA-North to 2.7 acres for RA-South. Impacts on forested wetlands would be slightly higher for RA-Hybrid relative to RA-North and RA-South. Impacts would be minimal and short term in emergent wetlands, and minimal to moderate and longer term in forested wetlands. Indirect impacts on wetlands would be comparable among all three route alternatives and would be negligible to minimal and long term during operation of the project. Wetland impacts would be minimized through implementation of standard best management practices and conditions required under the state and federal permits for work in wetlands. Overall, wetland impacts would be similar among the three route alternatives.

Wildlife and their Habitats

For all three route alternatives, the majority of wildlife species present are common generalist species well-adapted to disturbed habitats and human activities. Wildlife species range from larger mammals to smaller reptiles, amphibians and invertebrates. Fish, aquatic amphibians, and aquatic invertebrates could be present in intermittent and perennial streams crossed by the route alternatives. Larger, more mobile wildlife species would likely avoid portions of the ROI during construction. Smaller, less mobile wildlife species and/or species in burrows could be inadvertently injured or killed by construction equipment. Habitat loss or degradation would be minimal, as most of the route width for all three route alternatives is agricultural land. Potential impacts on wildlife would be comparable across all three route alternatives. Impacts on wildlife populations would be localized, short term, and negligible. Impacts on freshwater species are expected to be minimized by the use of HDD techniques and sediment controls. Operation of the project would have long-term, minimal impacts on wildlife and their habitats.

Recreational facilities could be affected by construction-related impacts on aesthetics, noise, and air quality. All three route alternatives would cross the King of Trails Scenic Byway (US Highway 75). RA-Hybrid and RA-South would cross the Otter Tail River, a state-designated water trail. The project could temporarily impact these recreational resources during construction due to the presence of equipment in the viewshed, generation of dust, removal of vegetation in the viewshed, and increased noise. RA-South would pass through the Fergus Falls Fish & Game Club's Orwell property. The applicant would continue to communicate with the club to minimize visual and noise impacts during construction. RA-North would not cross the Otter Tail River or the Orwell property, and would be anticipated to have fewer impacts on recreation than the other two route alternatives. Operation of the project would not cause visual or noise impacts on recreational resources. Recreation impacts are anticipated to be short term and minimal to moderate.

11.2.3 Criterion C

Lands of historical, archaeological, and cultural significance

Archaeological resources or unrecorded historic cemeteries identified within the project area, but outside the route width, are not expected to be impacted by the project. Known archaeological resources were identified within the route widths for all route alternatives, but none have been determined to be Eligible for or Listed in the National Register of Historic Places.

Archaeological Resources

The potential for archaeological impacts is based, in part, on proximity to waterbodies and the number of previously identified archaeological resources in the project area (area within 1 mile of the route width). Of the three route alternatives, RA-South crosses or is near the most waterbodies, increasing its overall archaeological potential, which is evidenced by the number of sites identified by the applicant's survey. Overall, RA-South has the greatest potential and RA-North has the lowest potential for archaeological resources to be present. If the previously identified archaeological sites within the route widths that have not been evaluated for the NRHP are determined to be Eligible for listing in the NRHP, construction of the project could result in moderate, permanent adverse impacts from direct construction activities. If previously identified archaeological resources are determined Not Eligible for listing in the NRHP, construction of the project could result in negligible impacts from direct construction activities.

Historic Architectural Resources

Historic architectural resources identified within the project area of the route alternatives, but outside the route width, are not expected to be impacted by the project. Historic architectural resources were identified within the route widths for all alternatives, but none have been determined to be Eligible for or Listed in the NRHP. Construction of the project would result in negligible impacts on the previously identified Not Eligible historic architectural resources in the project area.

11.2.4 Criterion D

Economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations

Impacts on commercial, industrial, forestry and mining economies would be negligible for all route alternatives.

Agricultural Economies

Short-term agricultural impacts would be minimal across the three route alternatives. Long-term agricultural impacts would also be minimal. During construction, lands would not be available for agricultural production. Easement agreements can compensate landowners for lost crops due to construction. Following construction of the pipeline, agricultural land would be restored, and agricultural activities could resume. Crop production could be reduced in areas disturbed by construction, resulting in long-term impacts from disturbance to soils. Anticipated impacts would be similar across the three route alternatives.

Industrial Economies

An ethanol plant is located at the east end of the three route alternatives. No other industrial facilities exist within the route width of the three alternatives. Construction of the pipeline and capture facility might result in temporary localized traffic delays for workers and delivery of raw materials and products

to and from the ethanol plant. Impacts during operation of the pipeline and capture facility are not anticipated. Impacts would be short term and negligible across the three route alternatives.

Recreational Economies

Otter Tail and Wilkin Counties offer a variety of recreational opportunities as their primary tourist attraction, such as nature preserves, hiking trails, biking trails, fishing, hunting, snowmobiling, boating, canoeing, kayaking, and swimming. Impacts on recreation would be short-term and minimal. Tourism opportunities are similar for the three route alternatives. Construction would result in temporary and minimal noise, dust, and visual impacts within the local vicinity that could be experienced by tourists in the area. The pipeline facilities would be almost entirely underground during operation and create minimal visual impacts on surrounding areas. The carbon capture facility would be adjacent to the ethanol plant and compatible with its surrounding viewshed. Once construction is finished and the project is in operation, it is not expected to cause any noise or dust impacts on adjacent tourism areas. The project's impacts on tourism economies would be negligible during operation. Impacts on tourism across the three route alternatives would be similar—short term and negligible to minimal.

11.2.5 Criterion E

Pipeline cost and accessibility

The primary difference in costs among the three route alternatives is the route length. The project would connect to a larger CO₂ system called the MCE Project. RA-North would not connect to the applicant's proposed MCE Project route in North Dakota; however, the connection point remains undefined because the applicant has not obtained a permit for the pipeline in North Dakota. The estimated cost for RA-North is \$69.75 million. RA-Hybrid would cost \$70.12 million, and RA-South would cost \$66.75 million.

11.2.6 Criterion F

Use of existing rights-of-way and rights-of-way sharing or paralleling

All three route alternatives parallel existing rights-of-way for a portion of their length. RA-North parallels existing road rights-of-way for 22.1 miles, or 96 percent of its length. RA-Hybrid parallels existing road rights-of-way for 22.3 miles, or 76.5 percent of its length. RA-South parallels existing road rights-of-way for 13.0 miles, or 46.1 percent of its length.

11.2.7 Criterion G

Natural resources and features

Natural resources and features are described above under Criterion B, Natural Environment.

11.2.8 Criterion H

The extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in [Minnesota Rule] 7852.3400 for pipeline right-of-way preparation, construction, cleanup, and restoration practices

EERA staff has not identified significant differences among the three route alternatives regarding the extent to which effects are subject to mitigation measures. Most effects of the project could be mitigated along all route alternatives.

11.2.9 Criterion I

Cumulative potential effects of related or anticipated future pipeline construction

Cumulative impacts of the project are described in Chapter 10. No related or reasonably foreseeably future pipeline construction has been identified in Otter Tail or Wilkins County. The pipeline described in this EIS would continue into North Dakota. This portion of the MCE Project in Richland County, North Dakota, is discussed in Chapter 10.

11.2.10 Criterion J

The relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws including ordinances adopted under Minnesota Statutes, section 299J.05, relating to the location, design, construction, or operation of the proposed pipeline and associated facilities

It is assumed that all route alternatives are equal such that all are subject to, and must comply with, the relevant applicable policies, rules, and regulations of other state and federal agencies, and local government land use laws.

11.3 EERA Staff Recommended Mitigation

This section summarizes mitigation measures currently recommended by EERA staff should the Commission ultimately decide to issue a pipeline routing permit for the project. These recommendations are above and beyond mitigation in the sample routing permit issued for the project. In addition to the mitigation measures summarized below, the Commission could require that an independent environmental monitor, who reports directly to EERA staff, monitor construction and restoration of the project. The applicant could be required to pay for the costs of the environmental monitor.

11.3.1 Noise

EERA staff recommends the applicant provide documentation of coordination with residents located within 1,320 feet of HDD entries. The submittal should document locations of sound dampening barrier walls and include a plan for monitoring noise levels at these locations during HDD operations. The information should be provided 30 days prior to submittal of the Plan and Profile. In its review of a preliminary version of the draft EIS, the Minnesota Department of Health concurred with this mitigation measure.

11.3.2 Public Health and Safety

EERA staff believes that a special permit condition requiring the applicant to provide its Human Trafficking Prevention Training for Commission review 30 days prior to submittal of the Plan and Profile is reasonable.

With respect to a potential accidental release of CO₂, EERA staff believes the following mitigations are reasonable:

- Applicant-provided indoor CO₂ detectors for residences within 1,000 feet of the project. This distance was chosen based on the area that could reach a concentration of 15,000 ppm CO₂, as described in **Appendix G**.

- Applicant-provided outdoor CO₂ detectors for residences within 1,000 feet of the project. This distance was chosen based on the area that could reach a concentration of 15,000 ppm CO₂, as described in **Appendix G**.
- A special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission.
- A special permit condition requiring the applicant to file the following information, developed in coordination with local emergency responders, for Commission review 30 days prior to submittal of the Plan and Profile:
 - Specific equipment, training, and reimbursement to be provided to emergency managers;
 - List of the names of the emergency responders and a provision to update contact information as needed;
 - Discussion on the feasibility of a “reverse 911” notice or other electronic notification system, such as Send Word Now, that goes out to landowners’ telephones in the event of an emergency shutdown or rupture;
 - Identification of how the applicant would pay for costs of any repair to public infrastructure or private property (including crops and livestock) that might occur during an accidental release.
- A special permit condition requiring the applicant to provide its public education plan for Commission review 30 days prior to submittal of the Plan and Profile. The public education plan could include specific safety information for neighboring landowners (residences within a minimum 1,000 feet of the project), including what to do in case of a rupture.
- A special permit condition requiring the applicant to prepare a monitoring protocol to identify potential impacts to fish and wildlife, water resources, and other environmental resources should an accidental release (leak or rupture) of CO₂ occur. This protocol should be developed in coordination with the DNR.

11.3.3 *Archaeological and Historic Resources*

Should the Commission issue a pipeline routing permit, appropriate surveys for archaeological resources that meet state standards and guidelines should occur regardless of which route alternative is selected. If archaeological resources are found, consultation with Tribes, SHPO, and Office of the State Archaeologist, as appropriate, should be conducted to provide the opportunity to review and comment on the results, determine if additional studies to evaluate the NRHP eligibility of the resources are warranted, and develop appropriate avoidance or treatment plans.

11.3.4 *Geology and Topography*

EERA staff believes that the results of the Phase I Geohazard Assessment, and any subsequent Phase II and Phase III assessments, should be provided to the Commission as a pre-construction filing.

11.3.5 *Soils*

EERA staff believes that the results of the Phase I Geohazard Assessment, and any subsequent Phase II and Phase III assessments, should be provided to the Commission as a pre-construction filing.

11.3.6 *Water Resources*

EERA staff believes that a special permit condition requiring the applicant to prepare a plan for pipeline construction in areas crossing the beach ridge area is reasonable. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during construction and

contingency measures to mitigate the impacts of a breach should one occur. This plan should be developed in coordination with DNR.

11.3.7 Wetlands

EERA staff recommends that the applicant provide the revised ECP to the Commission 30 days prior to the Plan and Profile submittal.

¹ Minn. R. 7852.0200, subp. 4.

² Minn. R. 7852.0100, subp. 28.

Chapter 12 List of Preparers

Chapter 12 provides information on primary roles/title of staff, and their education and experience applicable to preparing this EIS. Throughout the EIS process, multiple individuals have contributed to varying degrees related to their areas of expertise. Individual involvement has included a range of tasks, including developing text in the EIS, researching specific applicable topics, analyzing data, preparing graphics and summary tables, and reviewing and finalizing text in the document.

12.1 Minnesota Department of Commerce, Energy Environmental Review and Analysis Unit

The Commerce EERA unit is preparing the EIS on behalf of the Commission. The Commission is the Responsible Government Unit for the EIS.

Name, Title	Education and Experience
Ray Kirsch Unit Supervisor	JD MS Agronomy and Plant Genetics BS Nuclear Engineering Years of Experience: 16
Andrew Levi Environmental Review Manager	MPA BA Philosophy/Political Science Certified Arborist Years of Experience: 15
Jenna Ness Environmental Review Manager	BA Environmental Studies/Psychology Years of Experience: 5
Jessica Thiel Environmental Review Planner	BS Parks, Tourism, and Recreation Management and BS Resource Conservation Years of Experience: 7

12.2 Environmental Impact Statement Preparation Team

EERA staff was supported by HDR, Inc.; Allied Solutions, Inc.; and System Insight Engineering, LLC. The table below includes the list of preparers from HDR.

Name, Title, Role	Education and Experience
Joe Sedarski, P.E., J.D. Senior Environmental Project Manager/Senior Technical Advisor Project Manager	BS, Geotechnical Engineering JD, Law Years of Experience: 34
Catherine Storey Senior Environmental Scientist Assistant Project Manager, Public Health and Safety, Socioeconomics, Environmental Justice, Accidental Release of CO2, Cumulative Impacts	BS, Chemistry Years of Experience: 34

Name, Title, Role	Education and Experience
Patricia Terhaar, P.G. Senior Environmental Scientist/Project Manager Geology and Topography, Soils, Aesthetics, Alternatives	BS, Geological & Related Sciences MS, Geology Years of Experience: 37
Leandra Cleveland Industrial ES&P Leader Human Settlement	BS, Environmental Sciences/Studies Years of Experience: 23
Michael Mayer, J.D. Principal Environmental Project Manager Natural Environment	BS, Wildlife and Fisheries MS, Wildlife and Fisheries Years of Experience: 21
Jennifer Bring Environmental Science and Planning Section Manager Cultural Resources, Tribal Treaty Rights, Archaeological and Historic Resources	BS, Anthropology Years of Experience: 23
Megan Mueller Cultural Resource Specialist Cultural Resources, Tribal Treaty Rights, Archaeological and Historic Resources	BS, Anthropology (Archaeology Focus) Years of Experience: 14
Merin Swenson Senior Environmental Planner Land Use and Zoning, Agriculture	BS, Environmental Science Years of Experience: 15
Emily Ramos Environmental Planner Environmental Justice, Land Use and Zoning, Populated Areas, Property Values	MS, Environmental Biology BA, Biology BS, Environmental Science Years of Experience: 2
Benjamin Copenhaver Senior Acoustician Noise	MSE, Mechanical Engineering (Acoustics) BS, Physics Years of Experience: 9
Mauli Sand Environmental Scientist Noise, Recreation, Commercial, Forestry, Industrial, Mining, Tourism Economies	BS, Environmental Science, Policy, and Management Years of Experience: 2
Bonnie Wolgamot Environmental Scientist Public Health and Safety, Cumulative Impacts	BS, Biological Sciences Years of Experience: 3
Chelsea Huck Environmental Planner Public Services and Infrastructure, Aesthetics, Noise	MS, Environmental Biology BA, Communication Years of Experience: 1
Victoria Hsu Senior Air Quality Specialist Air Quality and Greenhouse Gas Emissions, Climate Change	MS, Public Policy MS, Engineering BS, Civil Engineering Years of Experience: 12

Name, Title, Role	Education and Experience
Megan McCabe Air Quality Specialist Air Quality and Greenhouse Gas Emissions, Climate Change	MS, Atmospheric Sciences BS, Atmospheric Sciences Years of Experience: 1
Daniel W. Jones Senior Environmental Scientist Public and Designated Lands, Rare and Unique Resources, Vegetation, Water Resources, Wetlands, Wildlife and their Habitats, Accidental Release	MS, Biology (Ecology & Evolution) BS, Botany and Plant Pathology Years of Experience: 35
Nicole Pahl Environmental Scientist Water Resources, Wetlands	BS, Geography Years of Experience: 8
William Neds, PE Sustainability Analyst Alternative Technologies	MS, Resilient and Sustainable Communities BS, Civil Engineering Years of Experience: 9
Danlyn Brennan, EIT Water Resources EIT Alternative Technologies	MS, Civil and Environmental Engineering BS, Biophysics Years of Experience: 5
Christine Justiniano GIS Technician	BA, Geography Years of Experience: 1
Kimberly Gust Senior Technical Editor	MA, English Composition and Rhetoric BS, English and Secondary Education Years of Experience: 26
Matthew Hodgson Copy Editor	MA, Composition Theory and Rhetoric BA, English and Education Years of Experience: 17

The table below includes the list of preparers from Allied Solutions, Inc.

Name, Title	Education and Experience
Dan Prascher PHMSA Compliance and Pipeline Integrity Principal Air Dispersion Modeling and Analysis, Accidental Release of CO2	MS, Engineering BS, Mechanical Engineering Years of Experience: 19

The table below includes the list of preparers from System Insight Engineering, LLC.

Name, Title	Education and Experience
Arlen Ward, PE Principal and CEO, Computational Fluids Dynamics (CFD) Modeling	PhD, Mechanical Engineering MS, Mechanical Engineering BS, Mechanical Engineering Years of Experience: 14

12.3 Contributing Tribes and Minnesota State Agencies

The Commission requested “that EERA coordinate with the Minnesota Office of Pipeline Safety along with other state agencies and tribal governments to ensure their expertise is reflected in the EIS.” EERA staff provided draft sections of the EIS for review. Draft sections were not complete, and not all sections were provided because of timing constraints. The table below lists Tribes and state agencies that provided comment.

List of Contributing Tribes and State Agencies

Tribe: Mille Lacs Band of Ojibwe

State Agency: Office of Pipeline Safety

State Agency: Department of Transportation

State Agency: Department of Health

State Agency: Department of Natural Resources

Appendix A

Final Scoping Decision



In accordance with the Public Utilities Commission's September 26, 2023, *Order Approving Scope of Environmental Review and Denying Stay*, Energy Environmental Review and Analysis staff provides herein the final scoping decision for the environmental impact statement to be prepared for the Otter Tail to Wilkin Carbon Dioxide Pipeline Project. Consistent with the Order, staff inserted the word "reasonable" in the *Incorporation of Mitigation Measures Identified Through Public Comments* section on page 3. Additionally, because the draft scoping decision was part of a larger document, staff spelled out acronyms and abbreviations at first use and corrected one typographical error.

A handwritten signature in blue ink, appearing to read 'A. Levi', positioned above a horizontal line.

Andrew Levi
Energy Environmental Review and Analysis

Final Scoping Decision

Otter Tail to Wilkin Carbon Dioxide Pipeline Project

Docket No. IP 7093/PPL-22-422

INTRODUCTION

Energy Environmental Review and Analysis (EERA) will prepare an environmental impact statement (EIS) on behalf of the Public Utilities Commission (Commission) for the Otter Tail to Wilkin Carbon Dioxide (CO₂) Pipeline Project (project). The EIS will include the information required for the Commission to make a route permit decision for the project. It will also inform governmental agencies making other permit and approval decisions.

The EIS will be prepared in accordance with Minnesota Rule 4410.2100 to 4410.2800. It will describe the project, the existing environment, and the human and environmental resources potentially affected by the project. It will provide information about potential direct and indirect impacts—both positive and negative—resulting from construction, operation, and maintenance of the project. Decommissioning of the project will be discussed. The EIS will describe mitigation measures that could reasonably be implemented to reduce or eliminate identified negative impacts. The EIS will identify impacts that cannot be avoided and irreversible and irretrievable commitments of resources.

Data and analyses in the EIS will be commensurate with the importance of potential impacts and the relevance of the information to consider mitigation measures. Consideration will be given to the relationship between the cost of data and analyses and the relevance and importance of the information in determining the level of detail to provide in the EIS. Less important material may be summarized, consolidated, or simply referenced.

The EIS will list information sources. If relevant information cannot be obtained within timelines prescribed by applicable statute and rule, the costs of obtaining such information is excessive, or the means to obtain it is unknown, a statement that such information is incomplete or unavailable and the relevance of the information in evaluating potential impacts or alternatives will be included in the EIS.

The issues outlined below will be analyzed in the EIS. This outline is not intended to serve as a table of contents for the document itself. The EIS will incorporate the Scoping environmental assessment worksheet (EAW) by reference.

ALTERNATIVES

Pursuant to Minnesota Rule 4410.2300(G), an EIS must compare the potentially significant impacts of a proposal with those of other reasonable alternatives to the proposed project. The EIS should include one or more of each of the following types of alternatives or provide an explanation of why no alternative of a particular type is included:

- Alternatives sites (routes),
- Alternative technologies,
- Modified designs or layouts,
- Modified scale or magnitude,
- Alternatives incorporating reasonable mitigation measures, and
- No action alternative.¹

¹ Minn. R. 4410.2300(G).

Minnesota Rule 4410.2300(G) states that an alternative may be excluded from detailed analysis in an EIS if “it would not meet the underlying need for or purpose of the project, it would likely not have any significant environmental benefit compared to the project as proposed, or another alternative, of any type, that will be analyzed in the EIS would likely have similar environmental benefits but substantially less adverse economic, employment, or sociological impacts.”

Whether an alternative meets the underlying purpose of a project therefore can be used to determine whether to exclude an alternative from detailed analysis in an EIS. In effect, the purpose statement defines the range of reasonable alternatives to be studied. The purpose of the project is as follows:

The purpose of the project is to capture and transport CO₂ from the Green Plains ethanol plant via pipeline to permanent underground sequestration facilities in North Dakota and to reduce the carbon intensity score of ethanol produced at the Green Plains ethanol plant and enhance its marketability in low-carbon fuel standard markets.

Project

The EIS will evaluate the applicant’s project including the applicant’s adjustments provided during scoping, which included one route adjustment, nine alignment adjustments, modifications to the capture facility, and minor changes to additional temporary workspace and access roads. (Map 1)

No Action Alternative

The EIS will describe expected conditions if a pipeline route permit was not granted, and the project was not constructed. Ethanol production could decrease or increase at the Green Plains ethanol plant. The EIS will discuss variable levels of ethanol production within the no-action alternative but will not try to predict future ethanol production.

Alternative Sites

The project is linear infrastructure; accordingly, alternative sites are alternative routes, that is, alternative paths for delivering CO₂ by pipeline between the applicant’s designated endpoints. The EIS will evaluate alternative routes:

CURE Alternative 2 This alternative starts at the Green Plains ethanol plant and travels west along County Road 116 to County Highway 11, then follows 240th Street into Wilkin County where it turns into 320th Street, before continuing to the Minnesota-North Dakota border. (Map 2)

CURE Alternative 3 This alternative starts at the Green Plains ethanol plant, travels west along County Highway 116 and County Highway 11, continuing onto 240th Street. The route then turns south approximately 0.95 miles from the intersection of County Highway 11, 240th Street, and 110th Avenue, along the Otter Tail/Wilkin County border. The route continues south until turning west on Highway 210, then turns south again along 330th Avenue. Continuing south, the route would eventually connect with the preferred route near the intersection of 370th Street and 330th Avenue. (Map 3)

The Commission will not evaluate other CO₂ pipelines (existing, proposed, or newly constructed) that might be utilized to meet the purpose of the project.

Alternative Technologies

The Commission will evaluate alternative technologies.

Agricultural Practices The EIS will evaluate a suite of agricultural practices could be used to reduce the carbon intensity of the ethanol produced at the Green Plains ethanol plant—essentially requiring farmers selling corn to the ethanol plant to implement certain agricultural practices. Different practices could include reduced tillage, reduced fertilizer application, cover cropping, or strip and no till. These practices could plausibly reduce or permanently sequester CO₂ sufficient to match the permanent sequestration levels proposed by the project. Avoiding emissions is functionally the same as capturing and permanently sequestering carbon that would otherwise be released to the air. Staff recommends that this alternative technology be included for study in the EIS as it is plausible that these agricultural practices—alone or in combination with other alternatives—could reduce the carbon intensity score of the ethanol produced at a level consistent with the project’s purpose or match the benefits of transporting carbon dioxide away from the region for geological storage.

Staff notes it might be plausible that, when combined with the *Energy Use and Efficiency Changes* alternative below, the need for geological storage could be substantially reduced via a combination of lowered emissions and increase soil sequestration.

Energy Use and Efficiency Changes The EIS will evaluate a suite of energy use and efficiency changes such as combined heat and power systems, co-generation, and renewable energy could be used to reduce the carbon intensity of the ethanol produced at the Green Plains ethanol plant. These actions could be undertaken by the Green Plains ethanol plant itself and be required of farmers selling corn to the ethanol plant. Staff recommends this alternative technology be included for study in the EIS as it is plausible—though staff cannot yet say to what extent—that these energy use changes could reduce the carbon intensity score of the ethanol produced at a level consistent with the project’s purpose.

Staff notes it might be plausible that, when combined with the *Agricultural Practices* alternative above, the need for geological storage could be substantially reduced via a combination of lowered emissions and increase soil sequestration.

Modified Designs or Layouts

The EIS will analyze whether an alternative pipe diameter is feasible to the extent that it would result in a significant environmental benefit over the project. EERA will work with the applicant to define this alternative. Specifications will be determined during development of the EIS. All specifications will be based on current PHMSA regulations. If the modified design is feasible, it would be further studied in the EIS. If it is not feasible, the EIS would provide the reasons why and the alternative would be excluded from detailed analysis.

Alternative Scale or Magnitude

The EIS will analyze whether a reduced throughput is feasible to the extent that it would result in a significant environmental benefit over the project. If the modified throughput is feasible, it would be further studied in the EIS. If it is not feasible, the EIS would provide the reasons why and the alternative would be excluded from detailed analysis.

Incorporation of Mitigation Measures Identified Through Public Comments

The EIS will consider all reasonable mitigation measures suggested through public comment. The EIS will identify and recommend reasonable mitigative measures for the project. The EIS will study the use of independent environmental monitors during construction of the project.

ISSUES

The following issues will be studied in the EIS. Pipeline safety is entirely within the purview of PHMSA. In considering and potentially issuing a route permit for the project, the Commission may not set safety standards (Minnesota Statute 216G.02, Subd. 3). The Commission may, however, require mitigation measures for potential impacts associated with the project. To the extent safety related issues are discussed, the EIS will make every effort to point out any conflict with applicable federal regulations.

1.0 Project Information

The EIS will provide information about the proposed project, including:

- Purpose
- Description
- Location
- Route Width and Right-of-Way Requirements
- Engineering and Design (including shut-off valve locations)
- Construction (including summer and winter conditions)
- Restoration
- Operation and Maintenance
- Decommissioning
- Cost and Accessibility
- Schedule

2.0 Regulatory Framework

The EIS will discuss the regulatory framework associated with the project:

- Certificate of Need
- Route Permit
- Environmental Review Process
- Federal Regulations
- Other Permits or Approvals

3.0 Affected Environment, Potential Impacts, and Mitigative Measures

The EIS will discuss the following resources and potential impacts. The EIS will analyze potential impacts during construction, normal operation, and accident conditions, that is, an accidental release of CO₂ from the pipeline. The EIS will also analyze potential impacts associated with decommissioning of the pipeline.

3.1 Human Settlements

Aesthetics

The EIS will discuss aesthetic and visual resources in the project area. Visual changes that would occur due to the project will be described.

Cultural Resources

The EIS will identify cultural resources and sacred places in the project area. Impacts to tribal trust assets, such as historic hunting grounds, water, lands, and treaty stipulations will also be evaluated. The EIS will evaluate potential impacts to wild rice and its cultivation.

Land Use and Zoning

The EIS will discuss current and future land use and zoning. The EIS will review existing land use and zoning plans and ordinances. The EIS will discuss potential impacts to ongoing land uses and whether the project or alternative routes are consistent with current zoning and ongoing land uses.

Environmental Justice

The EIS will use U.S. Census Bureau information on race, ethnicity, and poverty rates to determine the potential for disproportionate and adverse effects to tribal, minority, or low-income populations.

Noise

The EIS will identify potential noise sources associated with the project. The EIS will discuss short- and long-term noise impacts associated with the project.

Populated Areas

The EIS will identify populated areas in the project area, including residences outside urban areas. Potential impact to populated areas and residences will be discussed.

Public Health and Safety

The EIS will analyze and discuss potential human health and safety impacts of the project, including potential impacts associated with a pipeline rupture. The analysis will draw on rupture modeling and analysis (see “Studies” section below). Emergency management will be discussed as well as a range of mitigative techniques to address these concerns including training and equipment reimbursement, leak detection equipment, use of an odorant, and public education. Alternative inspection schedules and redundant monitoring will be discussed.

To assess emergency response capabilities in case of a pipeline rupture, the EIS will identify law enforcement agencies, city and community fire departments, volunteer fire departments, rural fire departments, and fire protection districts in the project area. The EIS will also identify hospitals, emergency response centers, emergency medical services, and ambulance districts.

Public Services and Infrastructure (including right-of-way sharing and utility corridors)

The EIS will assess potential impacts on public utilities that serve residents and business. Road crossings and associated restoration should damage occur will be discussed. The EIS will identify existing electric and natural gas utilities that could be crossed or affected by the project. Impacts to the electrical grid and local water supply will be analyzed.

Recreation

The EIS will identify recreational opportunities in the project area. Potential impacts to these activities or areas will be discussed.

Socioeconomics

The EIS will discuss local economies with regional and project-specific significance and will evaluate economic impacts to local economies. Employment will be discussed, including changes in the number

of temporary and permanent jobs associated with the project. Impacts to property values as a result of the project will be discussed.

Tribal Treaty Rights

The EIS will summarize tribal rights reserved through treaties and will evaluate the potential impacts on natural resources associated with these rights.

3.2 Economies

Agriculture

The EIS will evaluate potential impacts to agricultural areas and livestock, including prime farmland and potential crop damages and losses. The EIS will discuss potential impacts associated with depth of cover, tile lines, and general damage to farming operations (for example, broken fence).

Commercial

The EIS will evaluate potential impacts to commercial properties.

Industrial

The EIS will evaluate potential impacts to industrial properties.

Forestry

The EIS will evaluate potential impacts to forestry operations.

Mining

The EIS will evaluate potential impacts to mining operations.

Tourism

The EIS will identify tourism centers and designated areas such as trails. The EIS will also assess potential economic impacts to local and regional recreational tourism.

3.3 Archaeological and Historic Resources

Sites that are eligible for, listed in, or nominated but currently unevaluated for listing in the Minnesota State Historic Sites Network and the Minnesota State Register of Historic Places will be included in the EIS. In addition, the EIS will assess impacts to historic properties that are eligible for, listed in, or unevaluated for listing in the National Register of Historic Places.

3.4 Natural Environment

Air

Air quality impacts associated with the proposed project include associated emissions from fugitive dust and fossil-fuel fired equipment. The air quality impacts analysis will include a review of the emission inventory assessment for criteria pollutants and hazardous air pollutant emissions related to construction and operation of the project. The EIS will review air quality impacts considering federal, state, and local air pollution standards and regulatory requirements, where applicable.

Climate Change

GHG emissions will be assessed due to the project in accordance with EQB Guidance.² Construction impacts will include emissions from construction equipment and vehicles, and as well as changes in land use along the pipeline right-of-way. Operational impacts will include operations of the pipeline and capture facilities. Different capture rates and their methodologies will be discussed. The EIS will identify the types of impacts that climate change may have on the environment in Minnesota. The EIS will also consider the potential impacts of climate change on the project itself, such as increased rain and flooding potential.

The EIS will study the potential indirect effects of enhanced oil recovery (EOR). The EIS will study the expected effects on GHG of EOR on GHG emissions or discuss why the effects are too remote or speculative to measure.

Geology

The EIS will assess geology and topography to determine the presence of slopes, including steep vertical and side slopes, using available geologic and topographic studies and databases. These areas will be evaluated in relation to the potential for geohazards, for example, erodibility, landslides, and seismic-related instability.

Public and Designated Lands

The EIS will identify public and designated lands and analyze potential impacts of the project on these areas.

Rare and Unique Resources

The EIS will analyze natural resources with special protection and management. These resources include state and federally listed threatened and endangered species and state and federally designated areas, for example, Scientific and Natural Areas and Minnesota Biological Survey Sites of Biodiversity Significance.

Soils

Potential impacts on soil resources such as topsoil loss or mixing with subsoil, crowning, winter conditions (frozen ground), compaction, erodibility, and potential alteration in soil temperatures from operation of the pipeline will be assessed. The potential effects of frost-heaving (freeze and thaw cycle) on the pipeline will also be assessed.

Vegetation

Vegetation will be assessed through geospatial analysis. Potential impacts to vegetation, including oak trees, will be discussed. The EIS will evaluate the presence and potential for spread of invasive species. Use of a vegetation management plan for the project will be studied.

Water Resources

The EIS will identify water resources, including floodplains, and potential impacts to these resources. Water use and appropriation will be discussed. Waterbody crossing will be discussed, including the

² Environmental Quality Board (July 2023) *Environmental assessment worksheet (EAW) guidance: Developing a carbon footprint and incorporating climate adaptation and resilience*, retrieved from: <https://www.eqb.state.mn.us/sites/default/files/documents/2023%20EAW%20Climate%20Guidance.pdf>.

isolated dry trench method and HDD method. Shut-off valve locations will be discussed. Use of sheet piling and trench breaker placement will be discussed.

Wetlands

Wetlands will be identified according to the National Wetlands Inventory (NWI) and Minnesota NWI updates, where available. Special feature wetlands such as calcareous fens and state or federal wetland mitigation bank sites will also be identified. Potential impacts will be discussed.

Wildlife and their Habitats

Typical wildlife species, including aquatic, avian, and terrestrial species, in the project area will be identified. Potential impacts will be discussed.

4.0 Unavoidable Impacts

Impacts that cannot be avoided will be identified.

5.0 Irreversible and Irretrievable Commitments of Resources

Resource commitments are irreversible when it is impossible or very difficult to redirect that resource to a different future use; an irretrievable commitment of resources means the resource is not recoverable for later use by future generations. These commitments will be identified in the EIS.

6.0 Cumulative Potential Effects

Cumulative potential effects could result from the incremental effects of the Project in addition to other projects, including future projects, in the environmentally relevant area that might reasonably be expected to affect the same environmental resources.³

With respect to the cumulative potential effects of ethanol production, the EIS will review existing studies of the human and environmental impacts of ethanol production and provide a synthesized analysis of potential impacts to human and environmental resources. Where differences of opinion are evident, those differences will be discussed, but no attempt will be made to resolve those differences. The EIS will not attempt to predict future ethanol production at the Green Plains ethanol plant or in Minnesota generally. Rather, the EIS will provide discussion of possible production scenarios and bracket potential impacts within these hypothetical scenarios.

STUDIES

A *Pipeline Rupture Analysis Study* will be developed to support the assessment of environmental impacts from an accidental release of CO₂ from the project.

EERA will engage a qualified consultant to conduct computer modeling and analysis. This study and its associated report will contain the following information:

Project Design Summary: The study will summarize the proposed CO₂ design and engineering specifications. This is not an engineering review or verification of design but a summary of the

³ Minn. R. 4410.0200, Subp. 11a

applicant's proposed project engineering information. This information will be used for modeling purposes.

Computer Software: The study will identify and compare various computer modeling software packages that are available to evaluate and assess a potential release of CO₂ from a pipeline. This will be a representative, not exhaustive, listing and comparison of software. The purpose is to better understand available modeling software packages related to CO₂ release, how they work, limitations of their use, and their utility in assessing risk.

Existing Studies: The study will identify and summarize existing studies concerning CO₂ dispersion from a pipeline rupture.

Review and Verify Applicant's Model: The study will independently review and verify that the applicant's approach, inputs, assumptions, outputs, results, and analysis that it intends to provide to PHMSA are consistent with conservative evaluation of a potential release of CO₂ from the project. The study may utilize CFD or other modeling tools where appropriate based on topography and other factors to "spot check" results. The study will not conduct CFD or other modeling along the entire length of the project. Models used will be appropriate for the project and consistent Minnesota Rule 4410.2300(H). A written summary and analysis of the applicant's modeling results will be provided in the report.

Independent Modeling: The study will independently model CO₂ releases at representative locations under a variety of environmental conditions. Variables will be developed that could include wind speed, humidity, temperature, etc. Realistic inputs will be used given the project's location. Modeling inputs and conditions will be determined based on documented historical averages in the project area as the study is developed. The study will report worst-case scenarios and conduct sensitivity analysis to determine what variables are most important at select locations. Hazard zones will be discussed.

Report: The study will conclude with a report, which will be included as an appendix to the draft EIS. Figure(s) showing plume dispersion(s) from independent modeling results will be included.

IDENTIFICATION OF PERMITS

The EIS will include a list and description of permits from other governmental agencies that might be required for the project.

ISSUES OUTSIDE THE SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

The EIS will not consider the following:

- Any alternative not specifically identified for study in this scoping decision.
- The two additional MCE Project pipelines proposed for south-central Minnesota.
- Easements and acquisition of land for the pipeline.
- The appropriateness of Federal and state policies regarding carbon capture and ethanol. The EIS may reference these policies; however, the EIS will take no position for or against these policies.

- The appropriateness of PHMSA regulations and related standards for CO₂ pipelines. The EIS may reference certain PHMSA standards; however, the EIS will not address the adequacy of these standards.

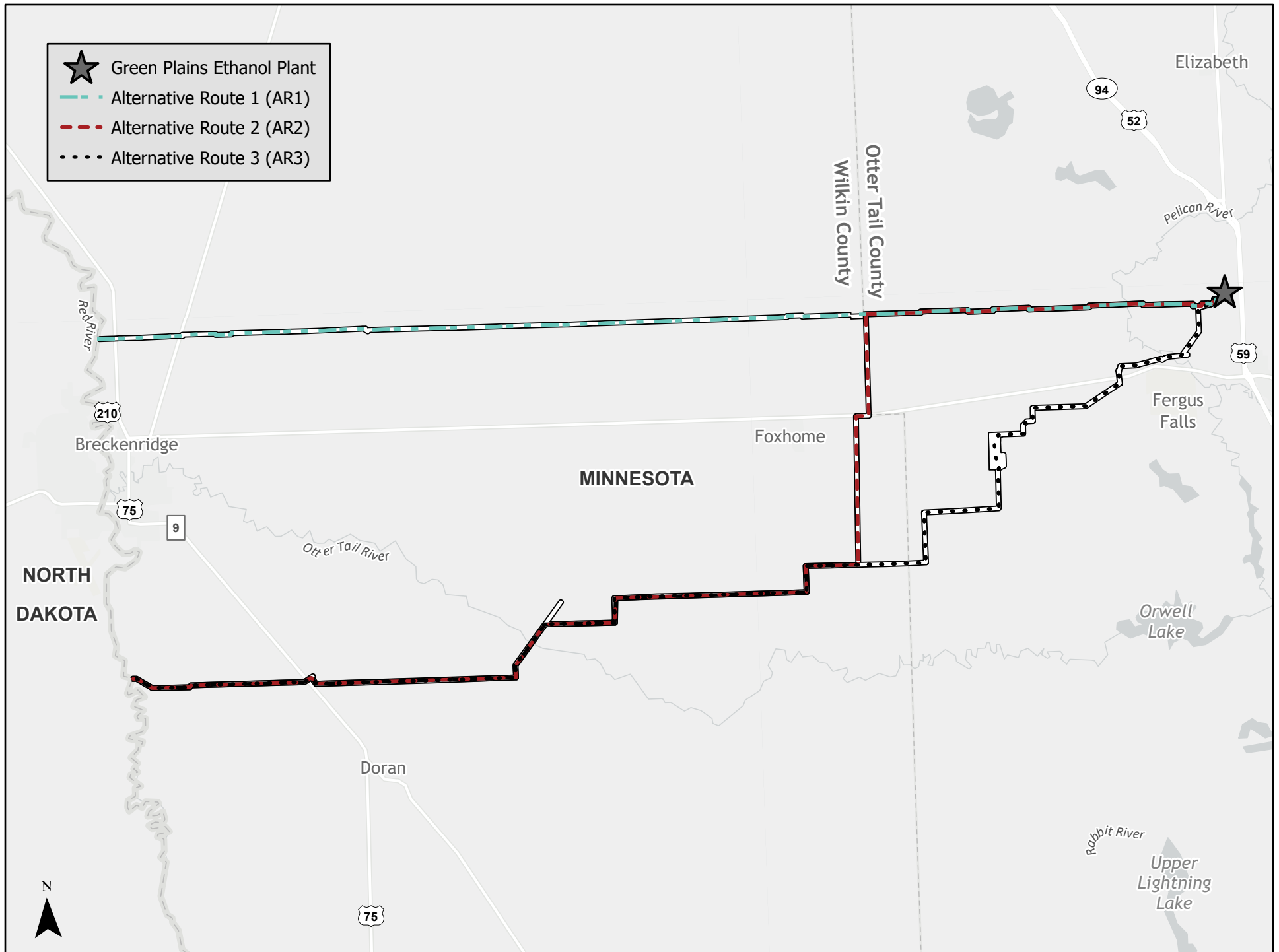
SCHEDULE

Upon issuance of the EIS scoping decision and preparation notice, preparation of the draft EIS will begin. After the draft EIS is complete and made available, public meetings will be held in the project area with an associated public comment period. This process allows the public to provide comments on the draft EIS. At the conclusion of the draft EIS comment period, EERA staff will respond to substantive comments received and issue a final EIS. Following issuance of the final EIS, a public comment period will allow the public to comment on the adequacy of the EIS. In addition, public hearings will be held in the project area with an associated public comment period. Upon completion of the hearing process, the Commission will then decide whether to issue a route permit for the project.

An approximate schedule is as follows: EIS Preparation Notice (Summer 2023), Draft EIS (Winter 2023), Final EIS (Spring 2024), Adequacy Decision (Spring/Summer 2024).

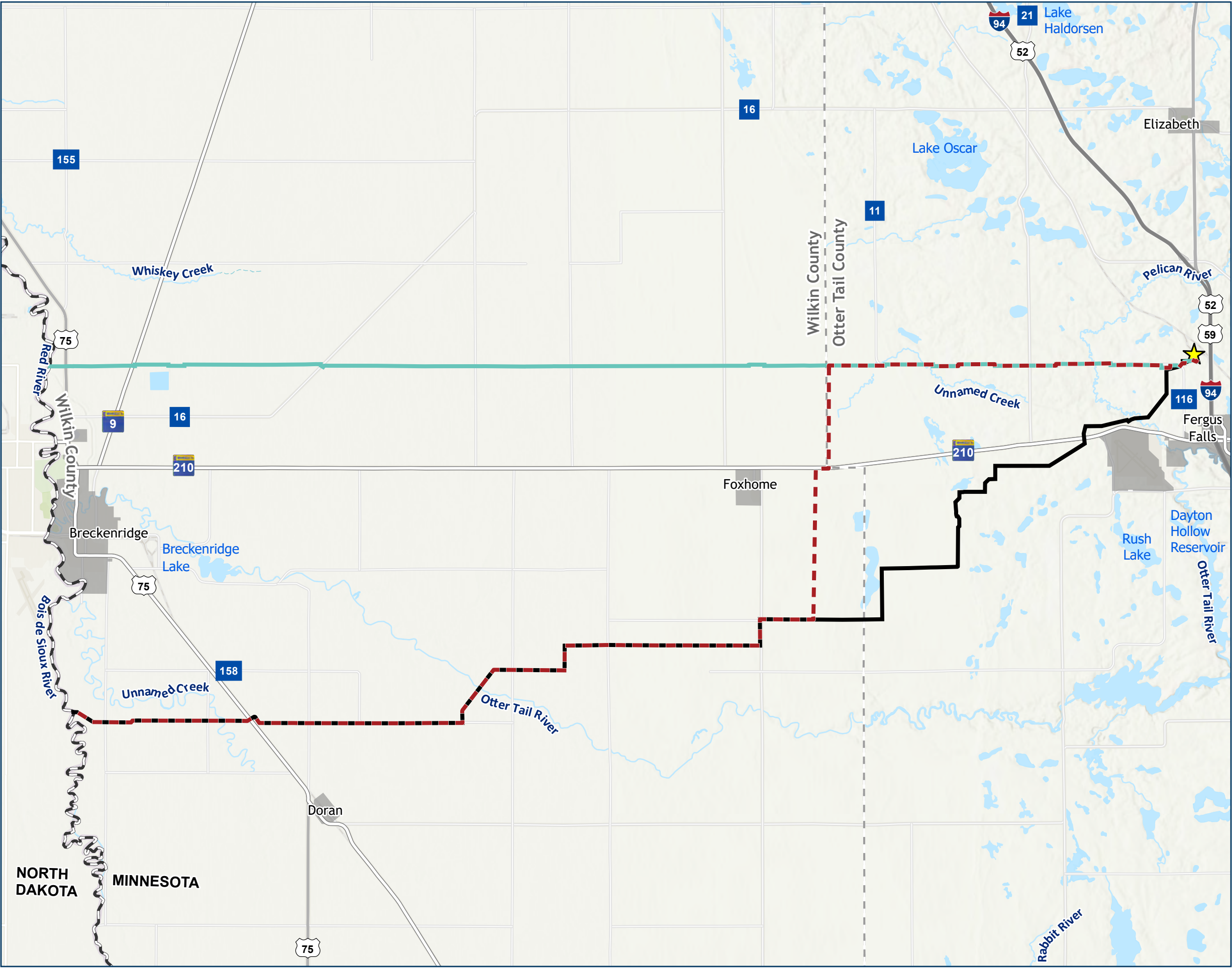
Map

Route Alternatives



Appendix B

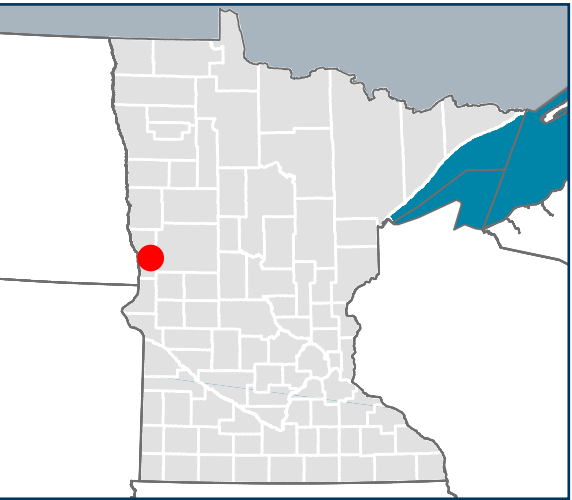
Detailed Route Maps



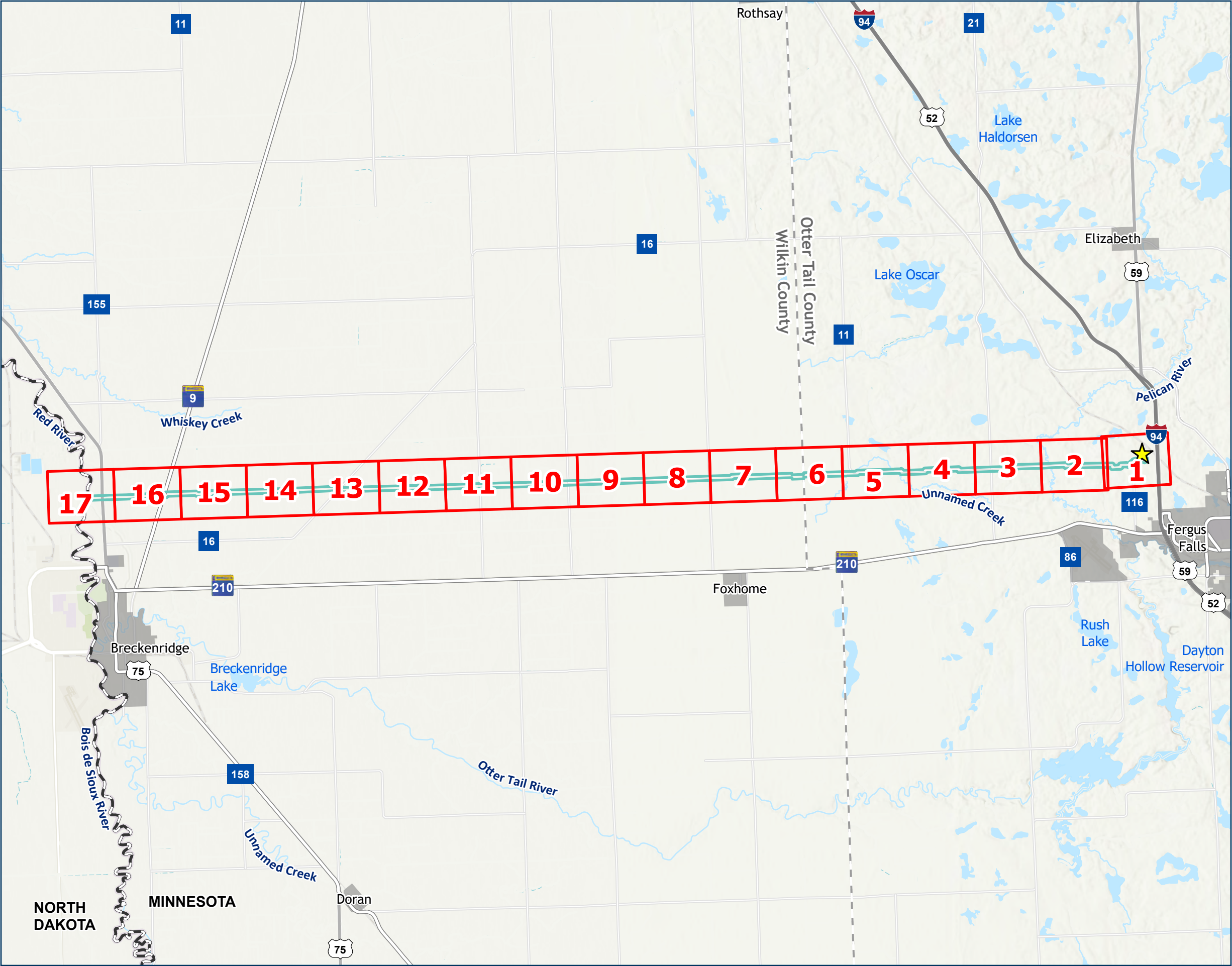
ROUTE OVERVIEW MAP

Legend

- ★ Green Plains Ethanol Plant
- RA-North
- - RA-Hybrid
- RA-South
- ▬ State Boundary
- - County Boundary
- ▬ City Boundary
- Public Water Basin
- Public Water Watercourse
- Interstate
- US Highway
- MN Highway
- County Road



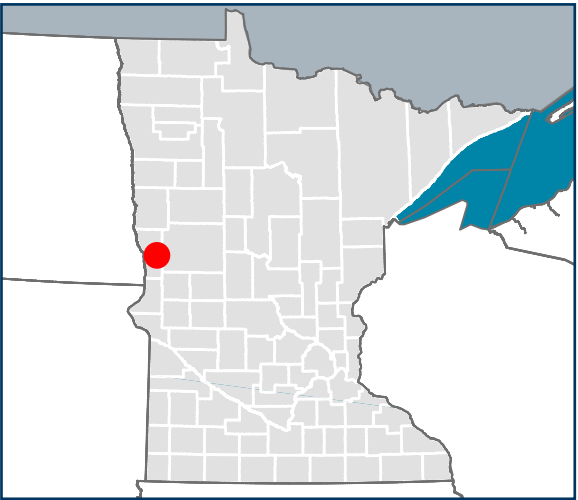
**North Route Alternative
Detail Map**

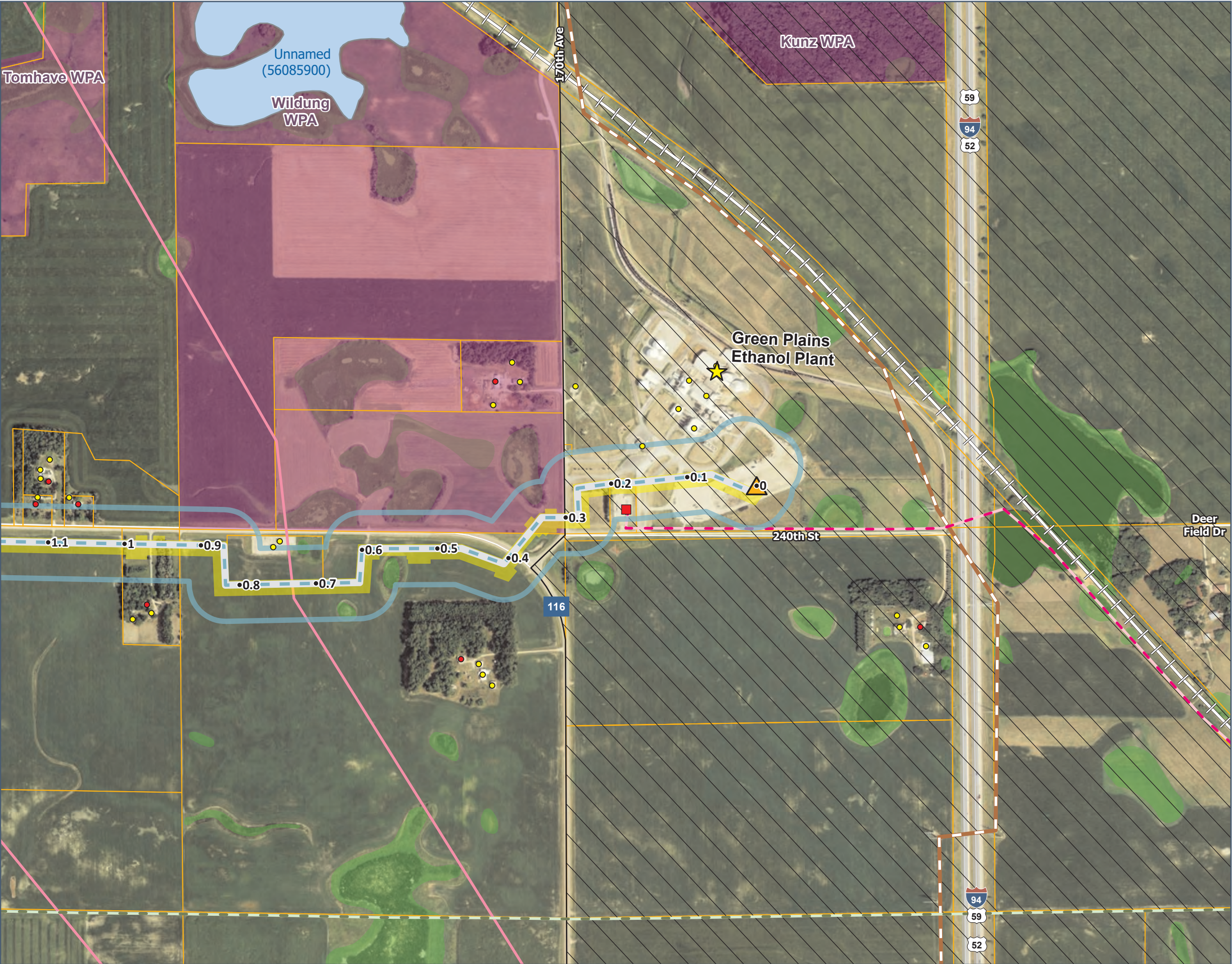


NORTH ROUTE ALTERNATIVE DETAIL OVERVIEW MAP

Legend

- Grid Index
- Green Plains Ethanol Plant
- RA-North Route Width
- State Boundary
- County Boundary
- City Boundary
- Public Water Basin
- Public Water Watercourse
- Interstate
- US Highway
- MN Highway
- County Road





NORTH ROUTE ALTERNATIVE DETAIL MAP

Legend

- ★ Green Plains Ethanol Plant
- Milepost
- RA-North
- RA-North Route Width
- Permanent Right-of-Way
- Construction Workspace
- Valve
- Parcel
- Active Railroad
- Pipeline - Refined Products
- Public Water Basin
- Existing Substation
- Waterfowl Production Area
- Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

- Residence
- Other*

Transmission Line

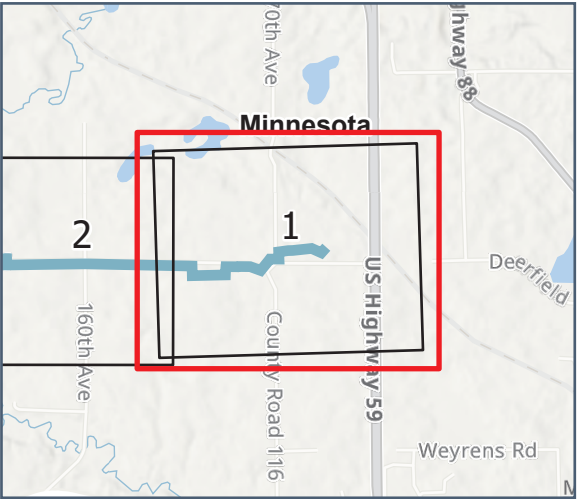
- 115 kV
- 230 kV
- 345 kV

MPCA Environmental Justice Areas

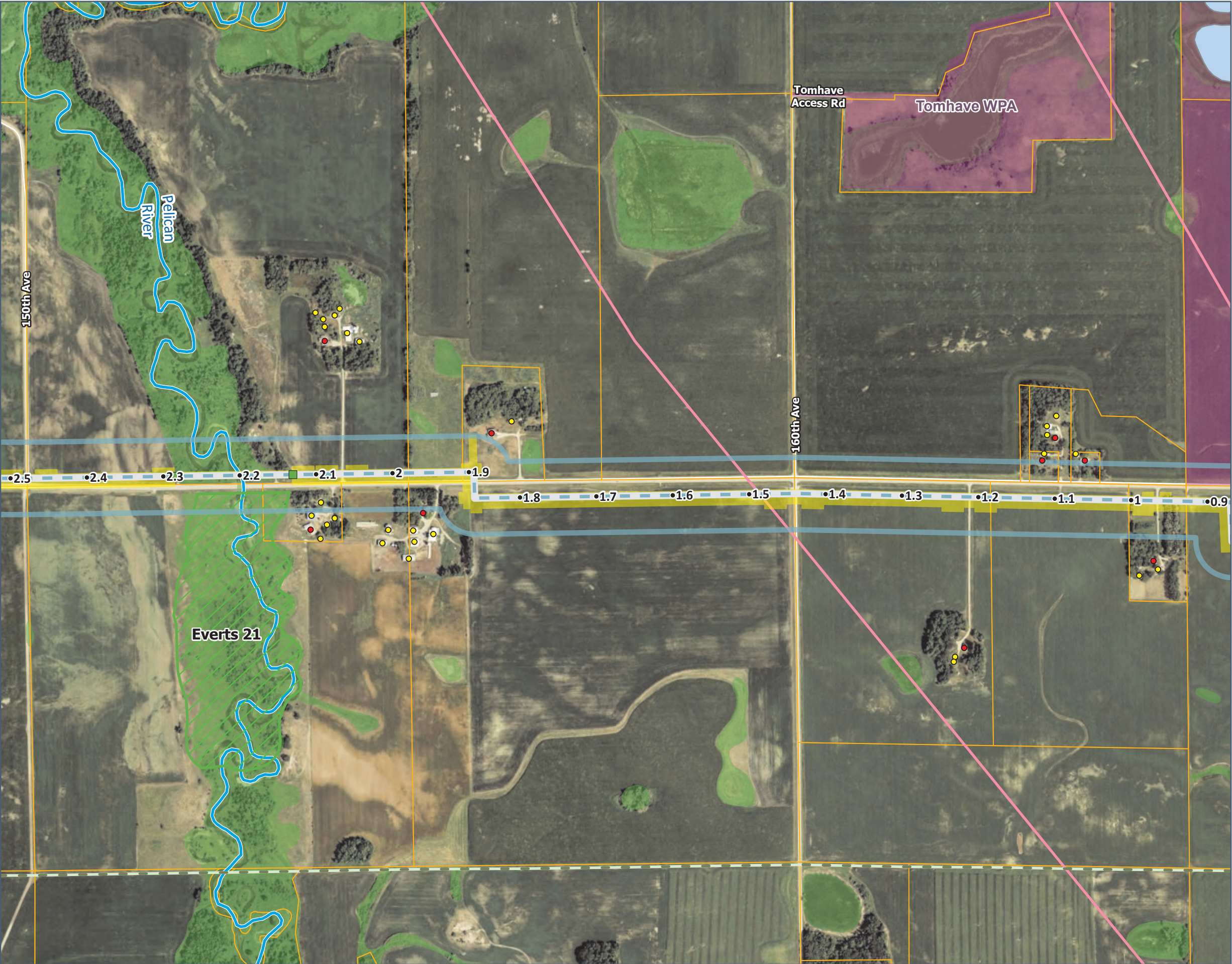
- 35% of Households with income less than 200 percent of poverty level

0 1,000 Ft

↑



*Other includes buildings identified as Business, Garage/Barn, or Industrial



**NORTH ROUTE
ALTERNATIVE
DETAIL MAP**

Legend

- Milepost
- RA-North
- ▭ RA-North Route Width
- ▭ Permanent Right-of-Way
- ▭ Construction Workspace
- ▭ HDD
- ▭ Parcel
- Pipeline - Refined Products
- ▭ Public Water Basin
- Public Water Watercourse
- ▭ Waterfowl Production Area
- ▭ Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

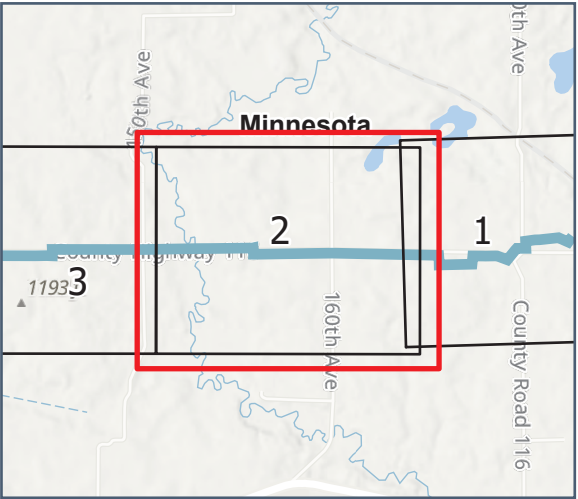
- Residence
- Other*

MBS Site

- ▭ Moderate

Transmission Line

- 230 kV



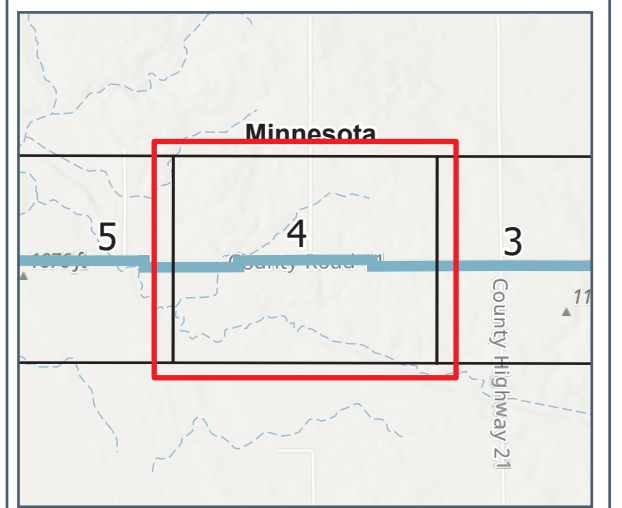
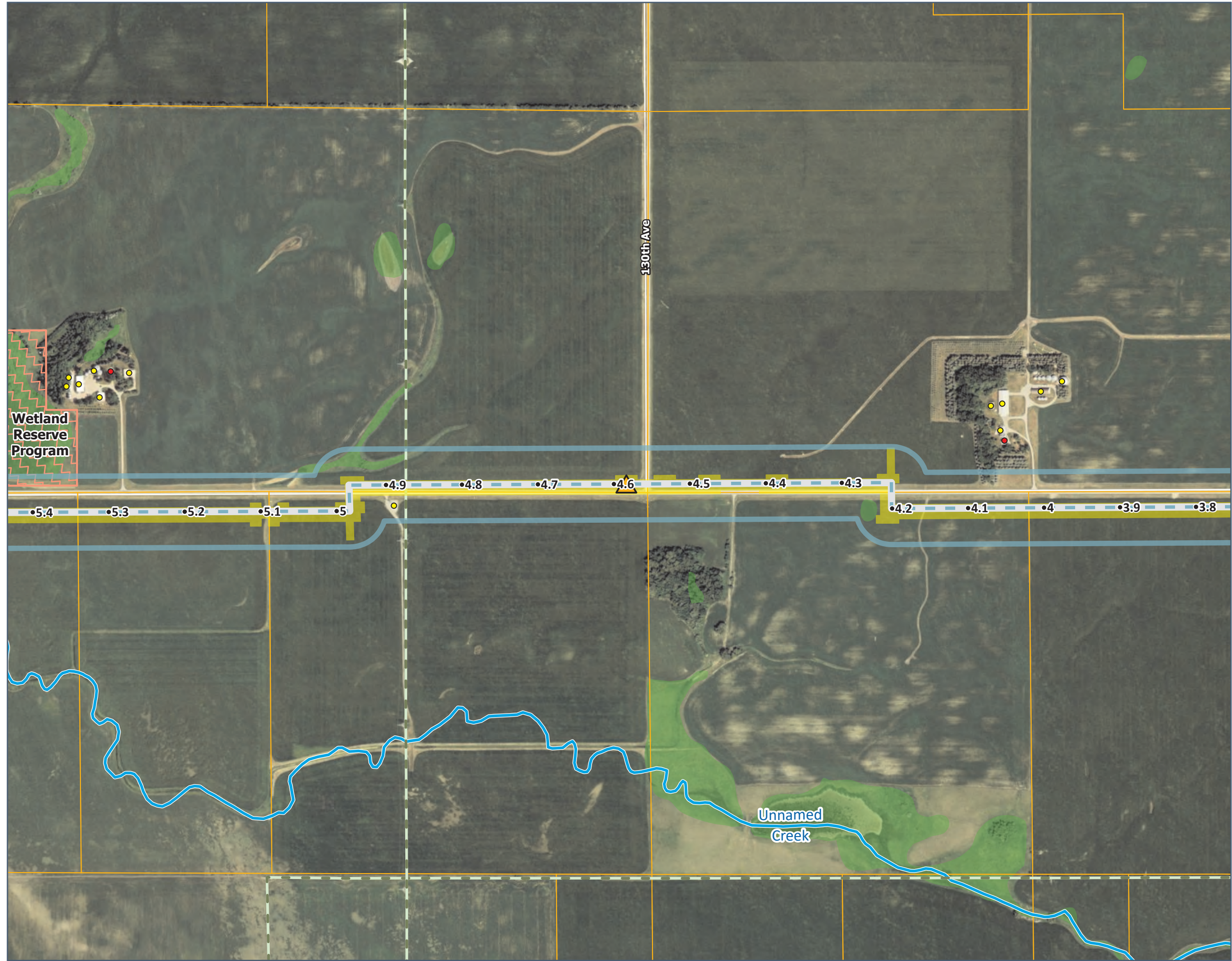
*Other includes buildings identified as Business, Garage/Barn, or Industrial

NORTH ROUTE ALTERNATIVE DETAIL MAP

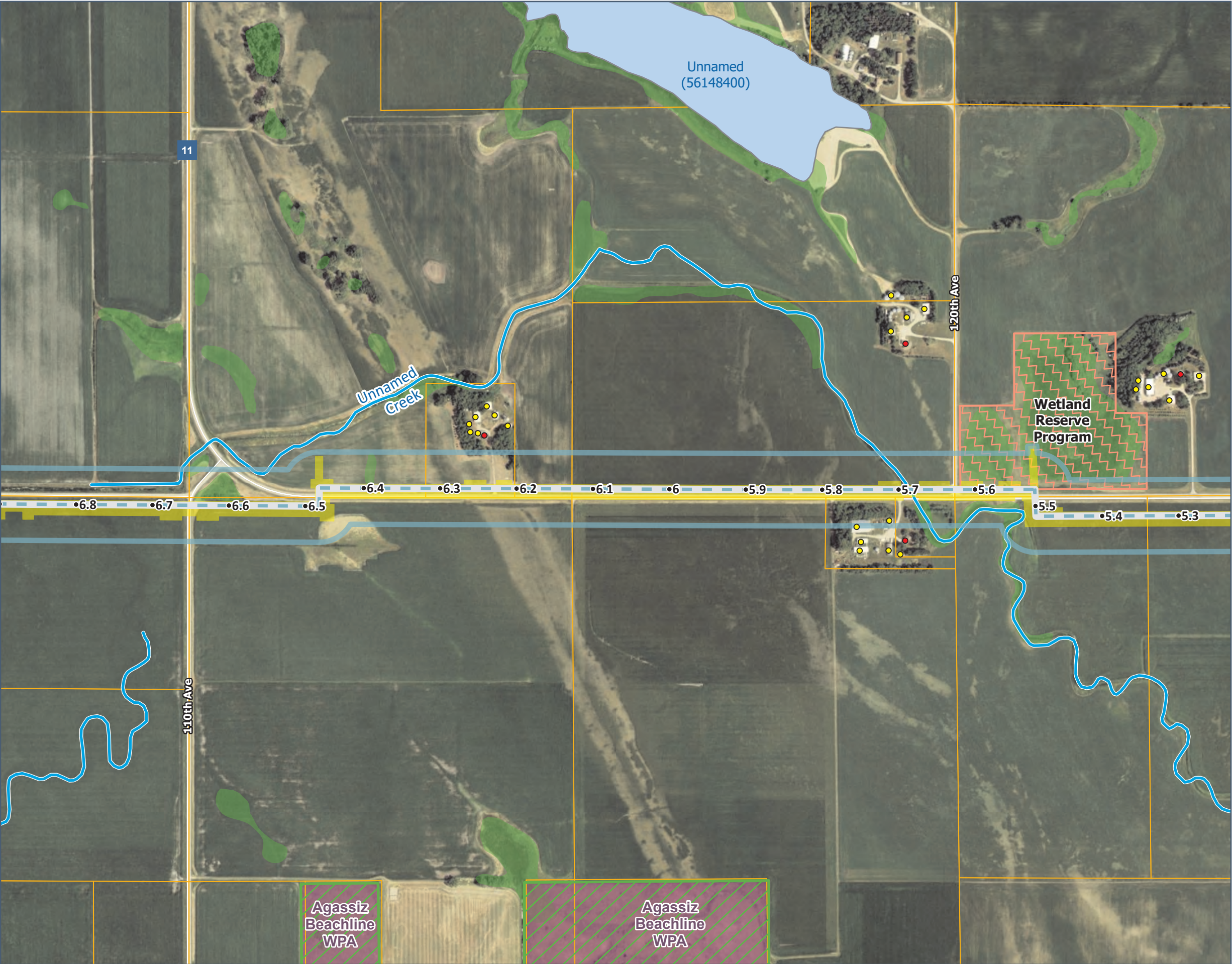
Page 4 of 17

Legend

- Milepost
- RA-North
- ▭ RA-North Route Width
- ▭ Permanent Right-of-Way
- ▭ Construction Workspace
- ▲ Valve
- ▭ Parcel
- ~ Public Water Watercourse
- ▭ National Resources Conservation Service Easement
- ▭ Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
 - Residence
 - Other*
- Transmission Line**
 - 230 kV

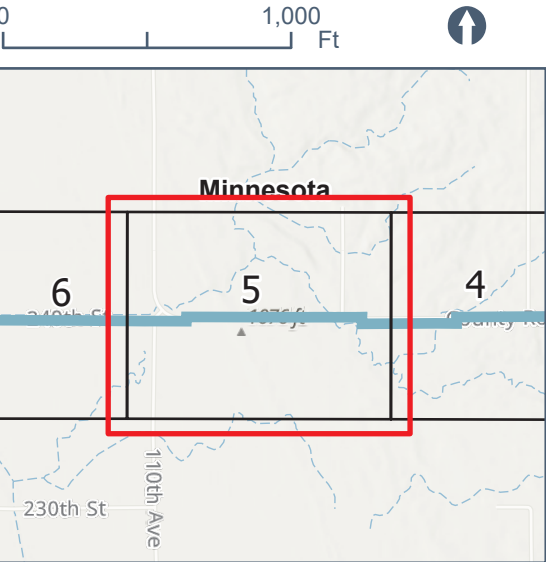


*Other includes buildings identified as Business, Garage/Barn, or Industrial



NORTH ROUTE
ALTERNATIVE
DETAIL MAP

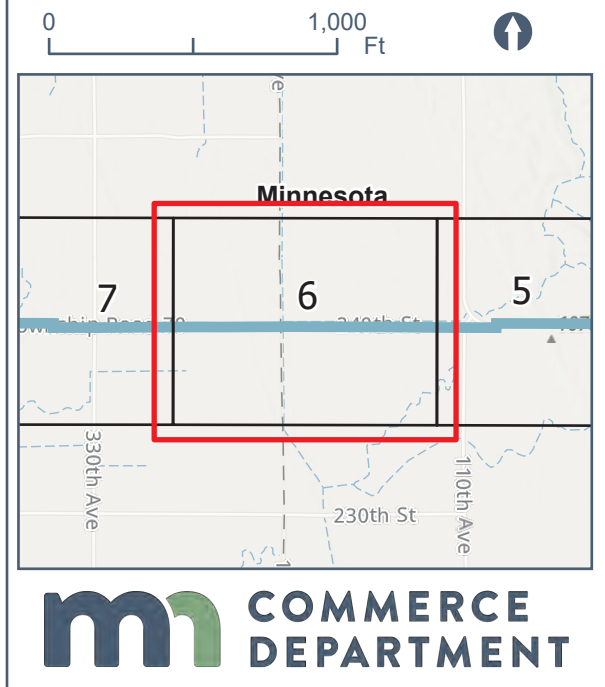
- Legend**
- Milepost
 - RA-North
 - ▭ RA-North Route Width
 - ▭ Permanent Right-of-Way
 - ▭ Construction Workspace
 - ▭ Parcel
 - ▭ Public Water Basin
 - ▭ Public Water Watercourse
 - ▭ National Resources Conservation Service Easement
 - ▭ Waterfowl Production Area
 - ▭ Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
- Residence
 - Other*
- MBS Site**
- ▭ Moderate



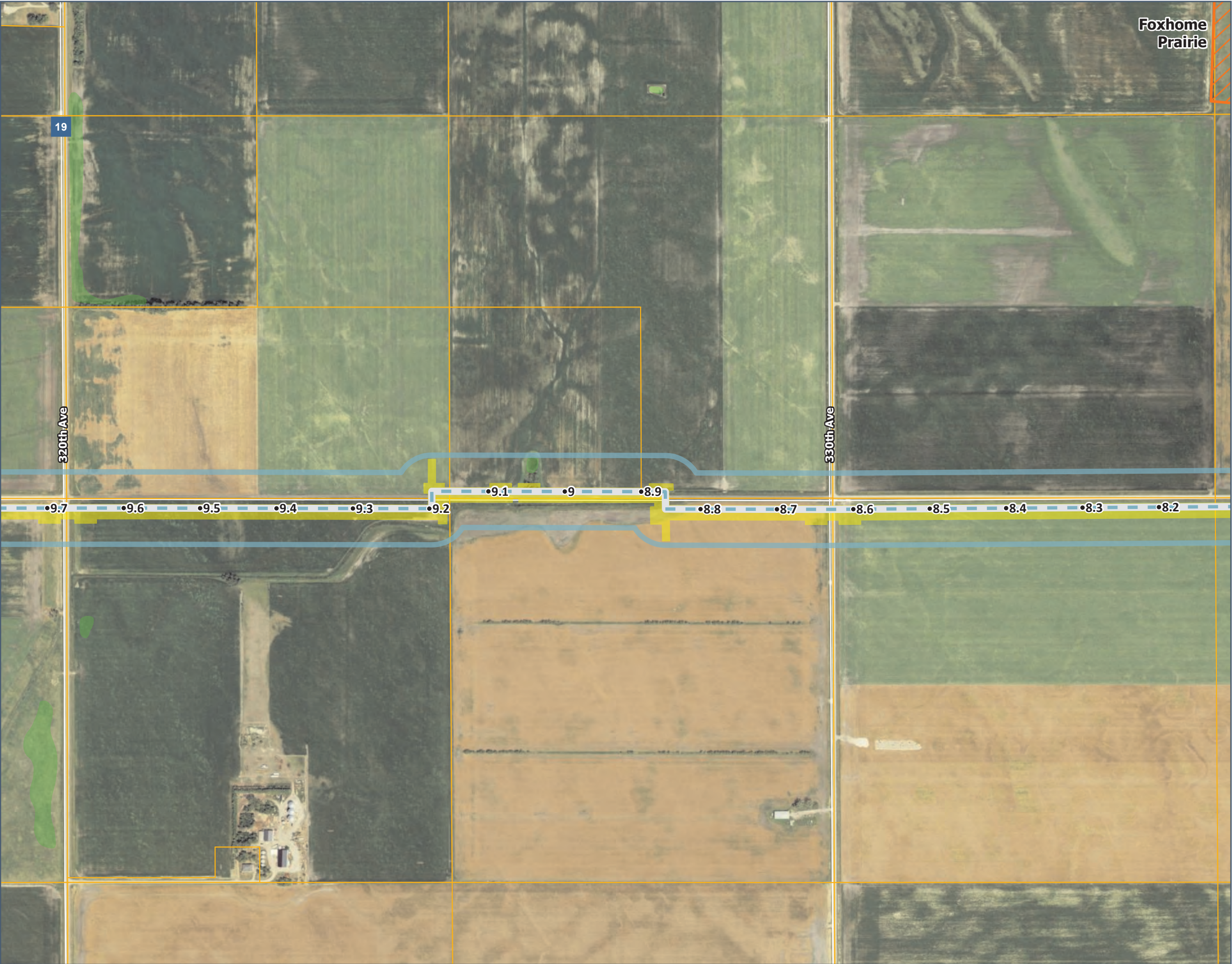
*Other includes buildings identified as Business, Garage/Barn, or Industrial

NORTH ROUTE ALTERNATIVE DETAIL MAP

- Legend**
- Milepost
 - RA-North
 - ▭ RA-North Route Width
 - ▭ Permanent Right-of-Way
 - ▭ Construction Workspace
 - - County Boundary
 - ▭ Parcel
 - ~ Public Water Watercourse
 - ~ Undelineated NWI Wetland
- MBS Site**
- ▨ High

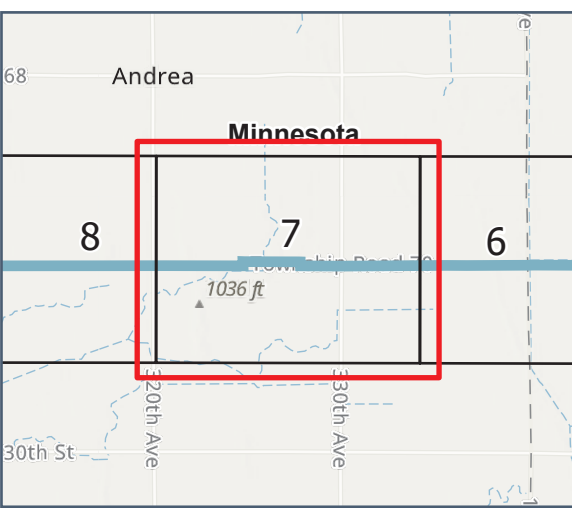


*Other includes buildings identified as Business, Garage/Barn, or Industrial



NORTH ROUTE ALTERNATIVE DETAIL MAP

- Legend**
- Milepost
 - RA-North
 - ▭ RA-North Route Width
 - ▭ Permanent Right-of-Way
 - ▭ Construction Workspace
 - ▭ Parcel
 - ▭ Undelineated NWI Wetland
- MBS Site**
- ▭ High



*Other includes buildings identified as Business, Garage/Barn, or Industrial

NORTH ROUTE
ALTERNATIVE
DETAIL MAP

Legend

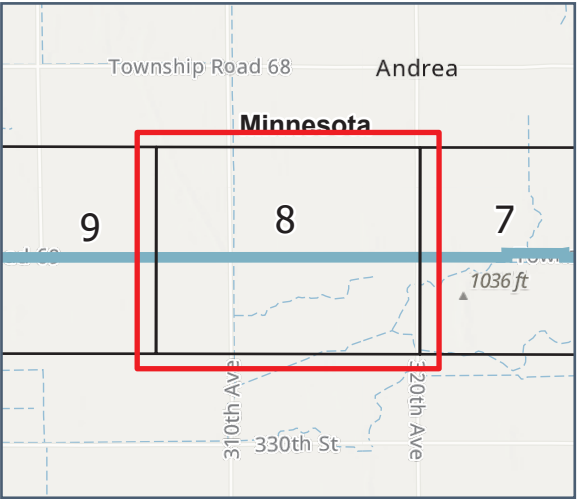
- Milepost
- RA-North
- ▭ RA-North Route Width
- ▭ Permanent Right-of-Way
- ▭ Construction Workspace
- ▭ Parcel
- ▭ Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

- Residence
- Other*



0 1,000 Ft



mi COMMERCE
DEPARTMENT

*Other includes buildings identified as Business, Garage/Barn, or Industrial

NORTH ROUTE
ALTERNATIVE
DETAIL MAP

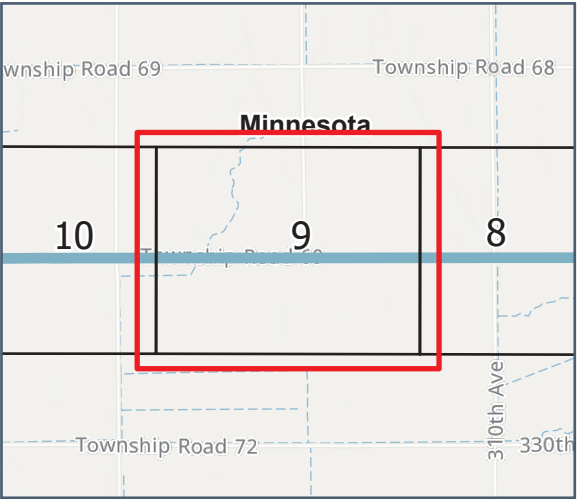
Legend

- Milepost
- RA-North
- RA-North Route Width
- Permanent Right-of-Way
- Construction Workspace
- Parcel
- Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

- Residence
- Other*

0 1,000 Ft

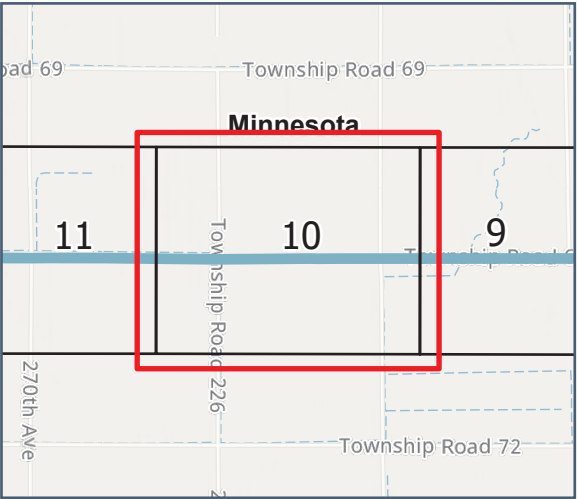


*Other includes buildings identified as Business, Garage/Barn, or Industrial

NORTH ROUTE
ALTERNATIVE
DETAIL MAP

Legend

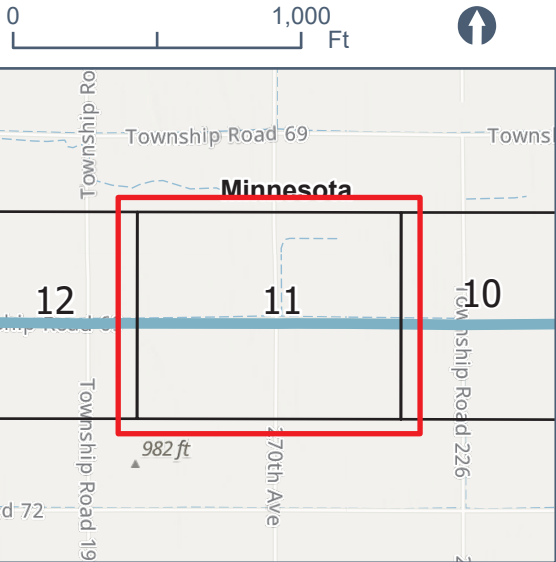
- Milepost
 - RA-North
 - RA-North Route Width
 - Permanent Right-of-Way
 - Construction Workspace
 - Parcel
 - Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width
- Residence
 - Other*



*Other includes buildings identified as Business, Garage/Barn, or Industrial

NORTH ROUTE
ALTERNATIVE
DETAIL MAP

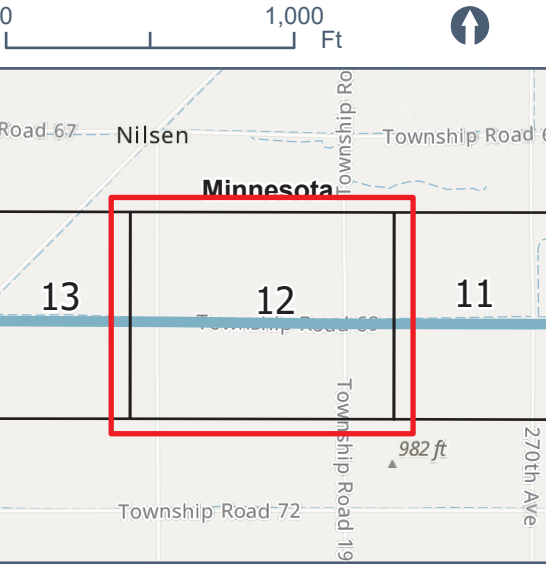
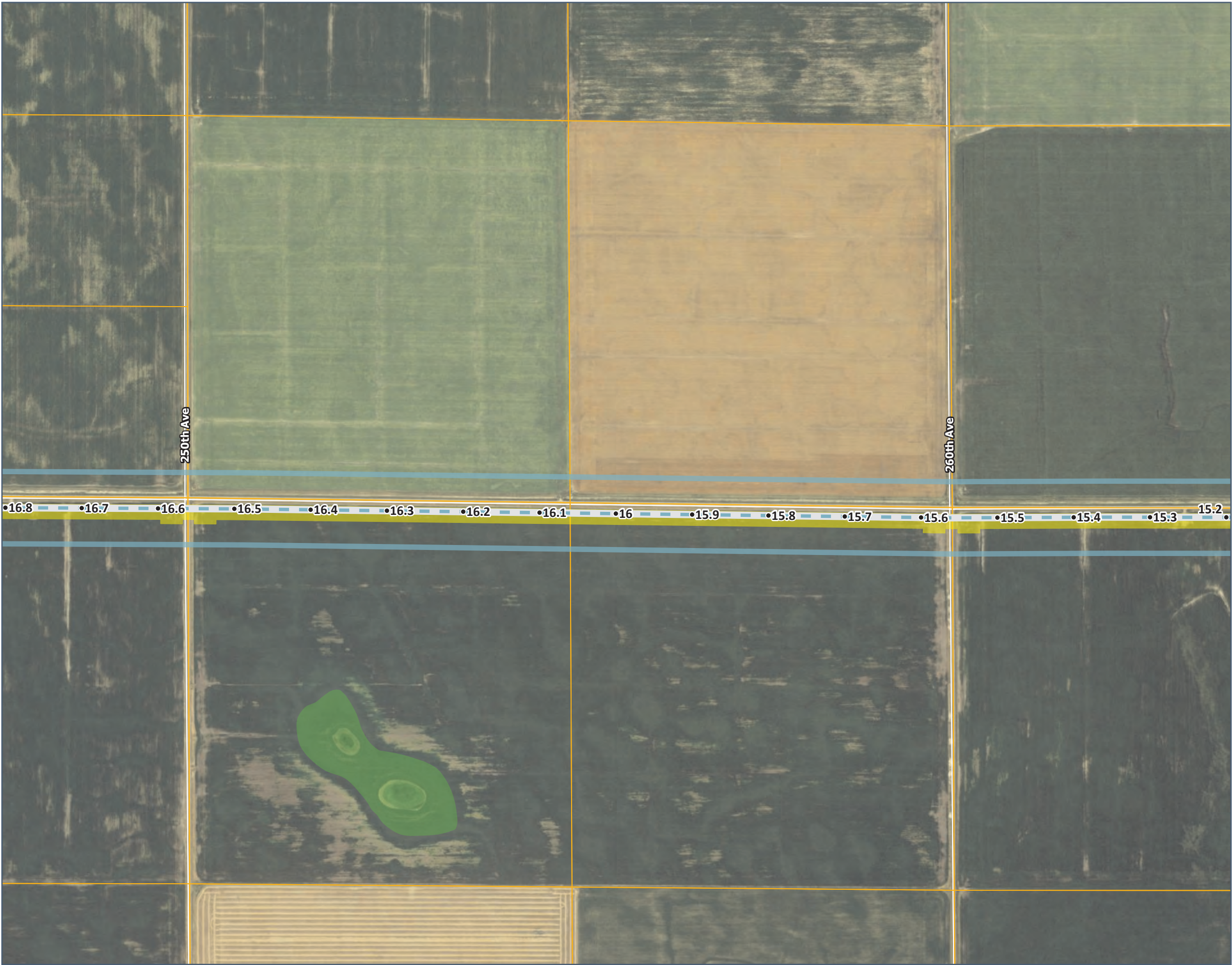
- Legend
- Milepost
 - RA-North
 - ▭ RA-North Route Width
 - ▭ Permanent Right-of-Way
 - ▭ Construction Workspace
 - ▭ Parcel
 - ▭ Undelineated NWI Wetland



*Other includes buildings identified as Business, Garage/Barn, or Industrial

NORTH ROUTE
ALTERNATIVE
DETAIL MAP

- Legend
- Milepost
 - - - RA-North
 - RA-North Route Width
 - Permanent Right-of-Way
 - Construction Workspace
 - Parcel
 - Undelineated NWI Wetland

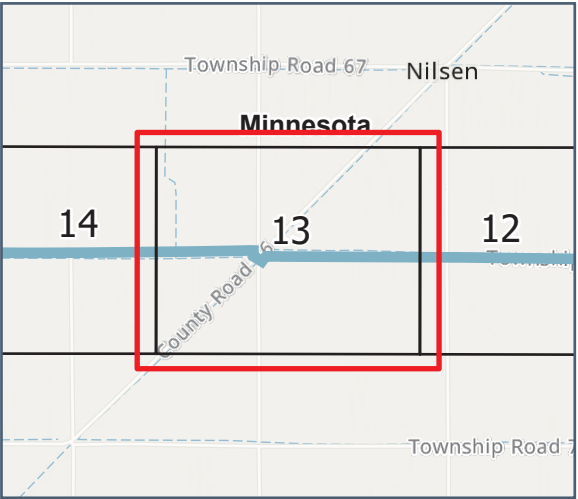
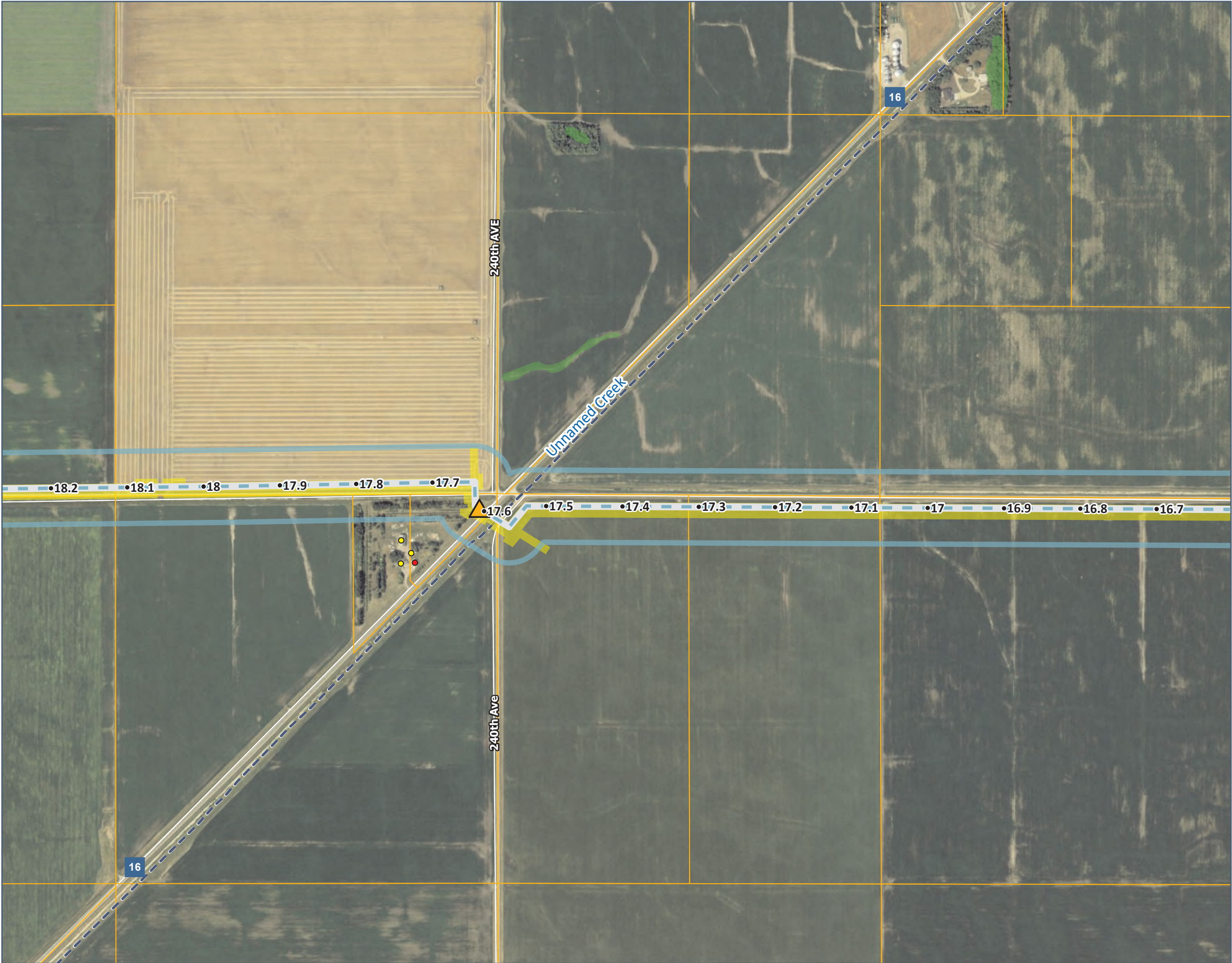


*Other includes buildings identified as Business, Garage/Barn, or Industrial

NORTH ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-North
- RA-North Route Width
- Permanent Right-of-Way
- Construction Workspace
- Valve
- Parcel
- Public Ditch/Altered Natural Watercourse
- Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width
 - Residence
 - Other*

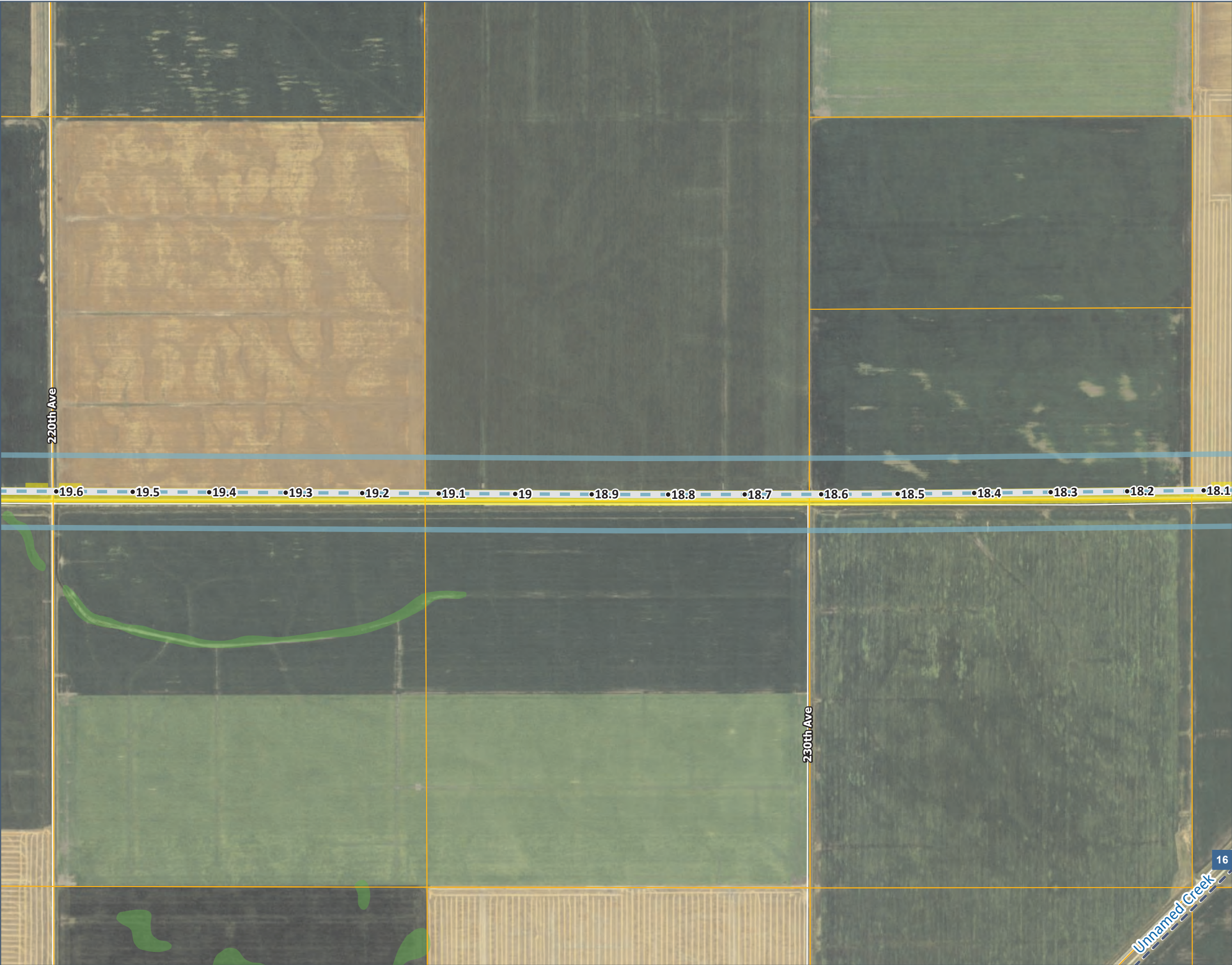


*Other includes buildings identified as Business, Garage/Barn, or Industrial

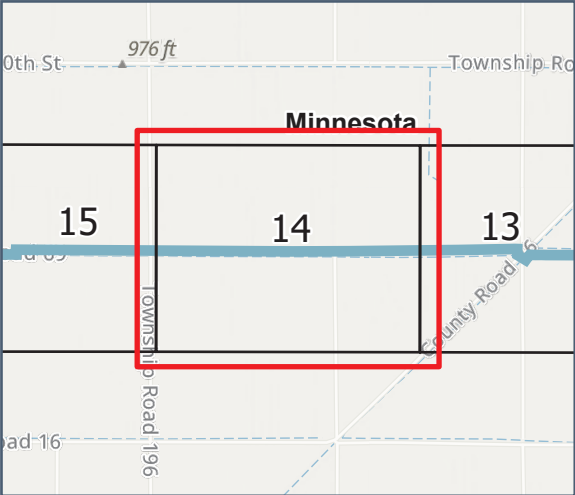
NORTH ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-North
- RA-North Route Width
- Permanent Right-of-Way
- Construction Workspace
- Parcel
- Public Ditch/Altered Natural Watercourse
- Undelineated NWI Wetland



0 1,000 Ft

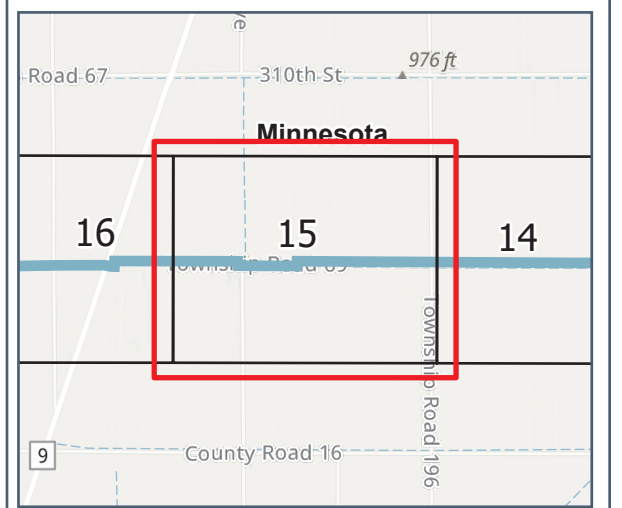
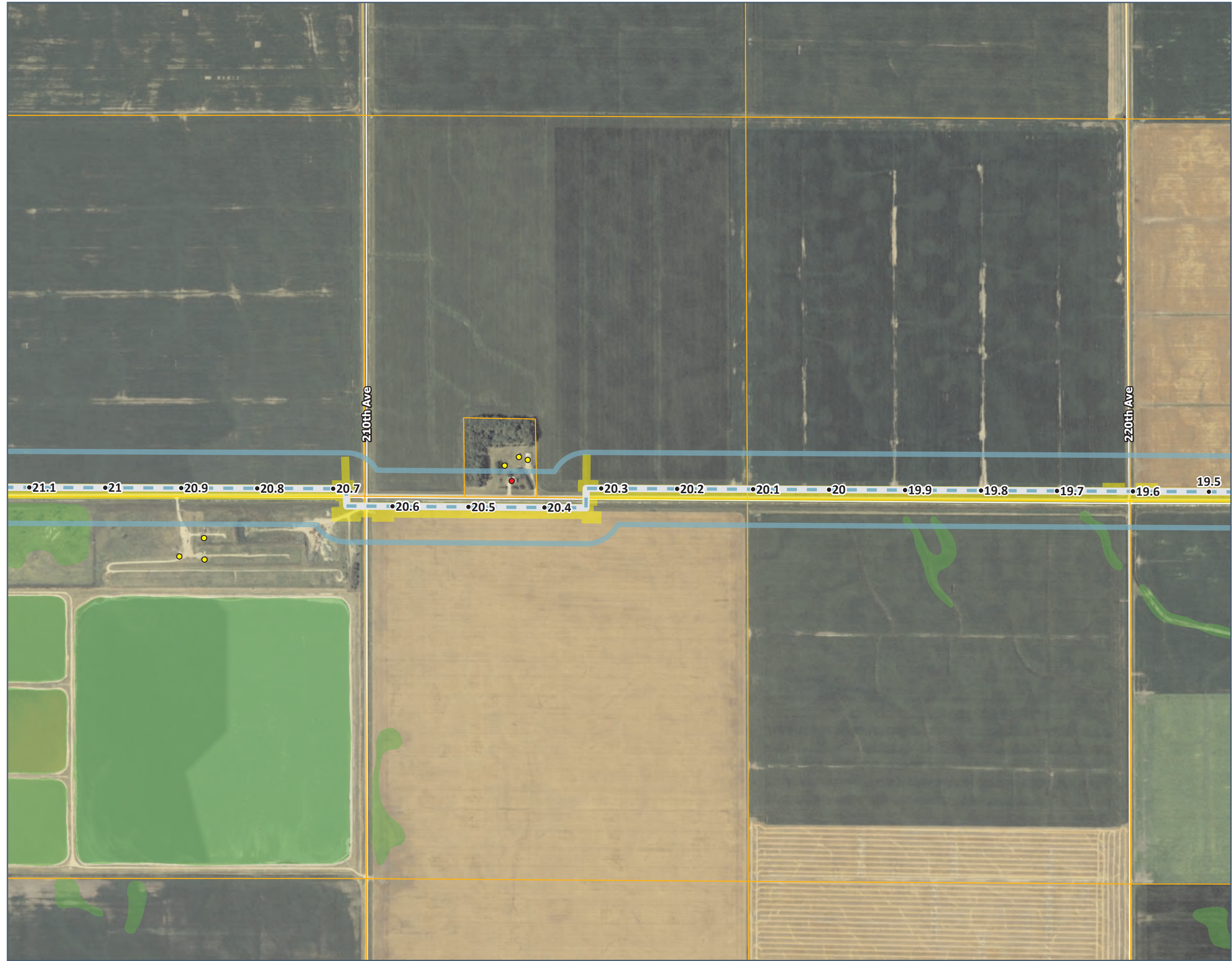


*Other includes buildings identified as Business, Garage/Barn, or Industrial

NORTH ROUTE ALTERNATIVE DETAIL MAP

Legend

- Milepost
 - RA-North
 - ▬ RA-North Route Width
 - ▬ Permanent Right-of-Way
 - ▬ Construction Workspace
 - ▬ Parcel
 - ▬ Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
- Residence
 - Other*

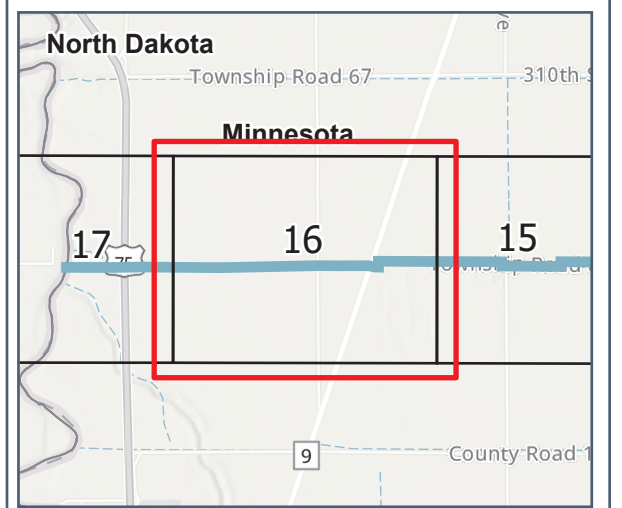
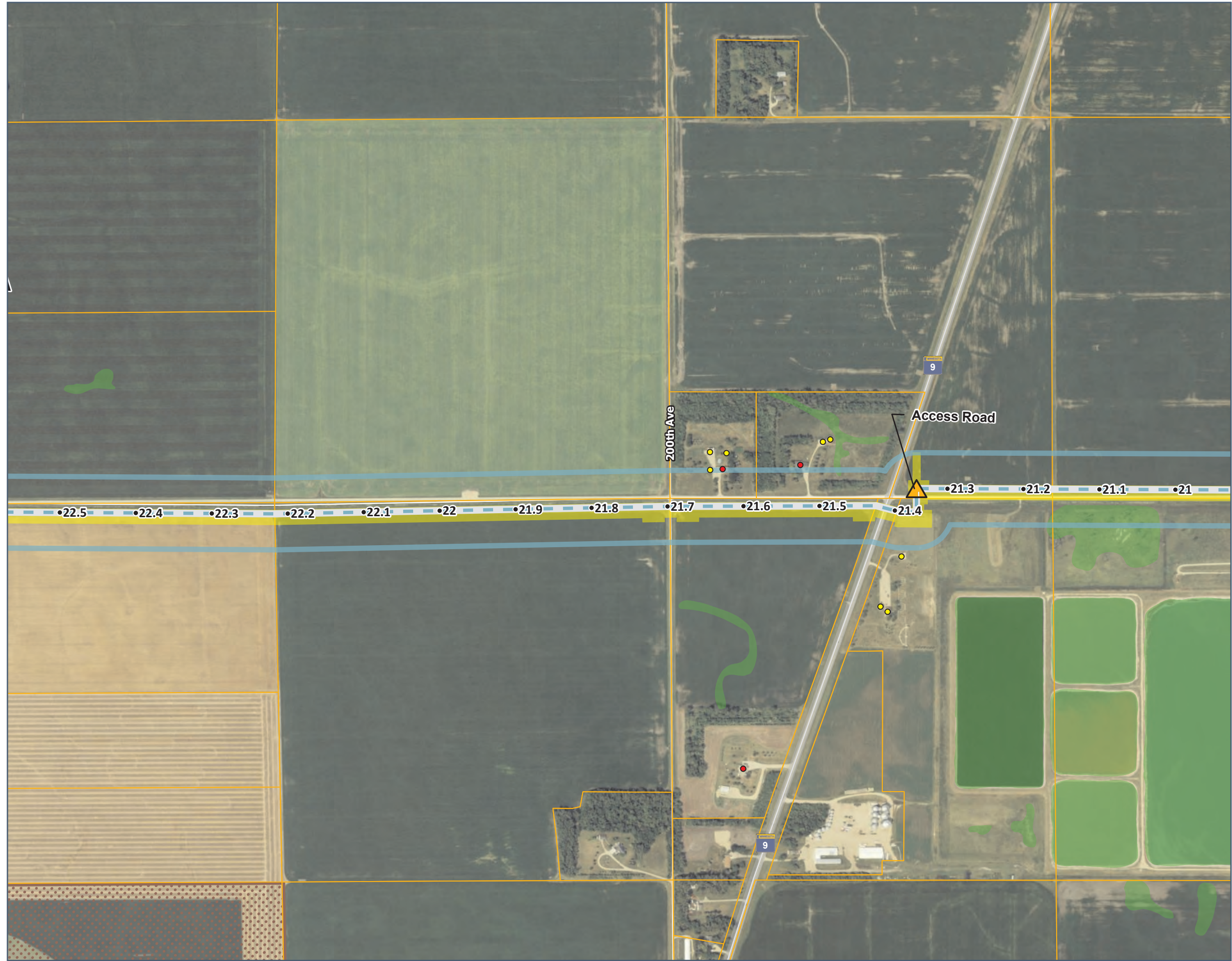


*Other includes buildings identified as Business, Garage/Barn, or Industrial

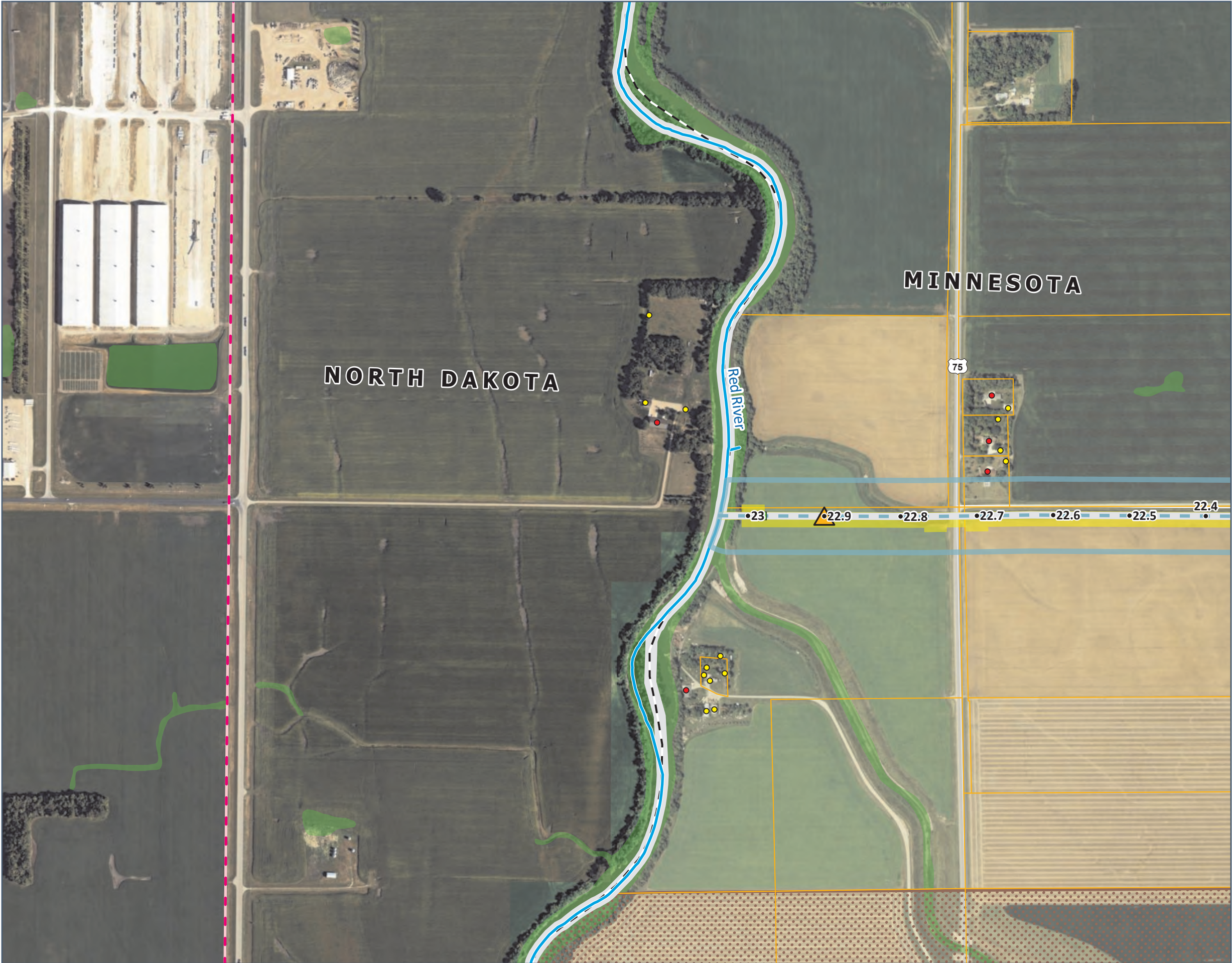
NORTH ROUTE ALTERNATIVE DETAIL MAP

Legend

- Milepost
- RA-North
- RA-North Route Width
- Permanent Right-of-Way
- Construction Workspace
- Access Road
- Valve
- Parcel
- Drinking Water Supply Management Area
- Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
 - Residence
 - Other*

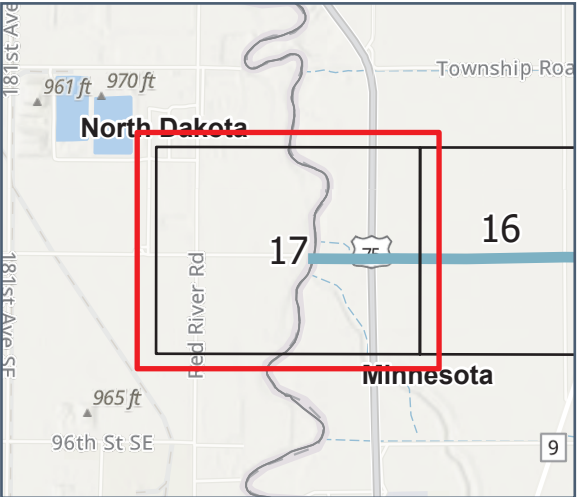


*Other includes buildings identified as Business, Garage/Barn, or Industrial



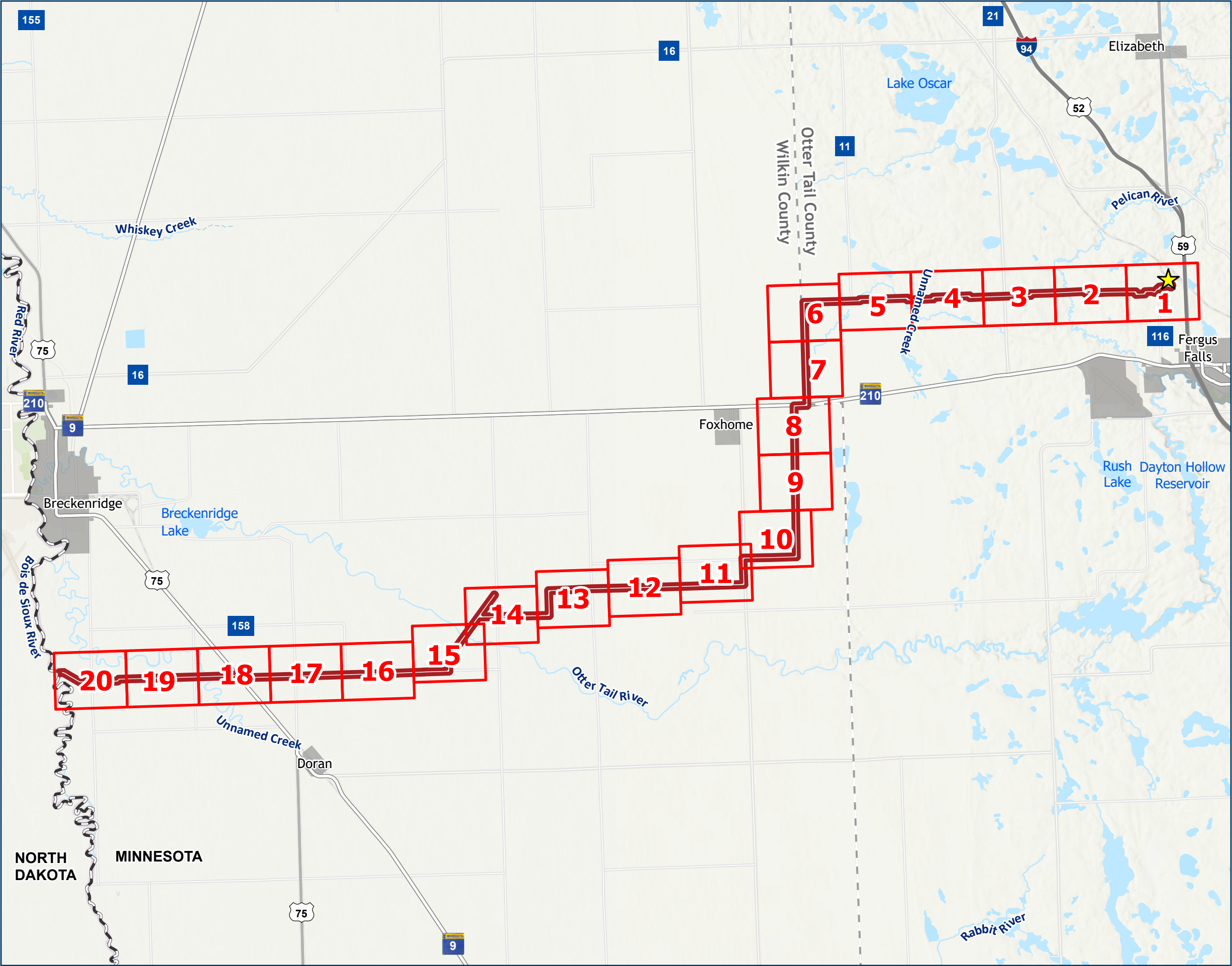
NORTH ROUTE ALTERNATIVE DETAIL MAP

- Legend**
- Milepost
 - RA-North
 - RA-North Route Width
 - Permanent Right-of-Way
 - Construction Workspace
 - HDD
 - Valve
 - State Boundary
 - County Boundary
 - Parcel
 - Public Water Watercourse
 - Drinking Water Supply Management Area
 - Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
- Residence
 - Other*
- Transmission Line**
- 115 kV



*Other includes buildings identified as Business, Garage/Barn, or Industrial

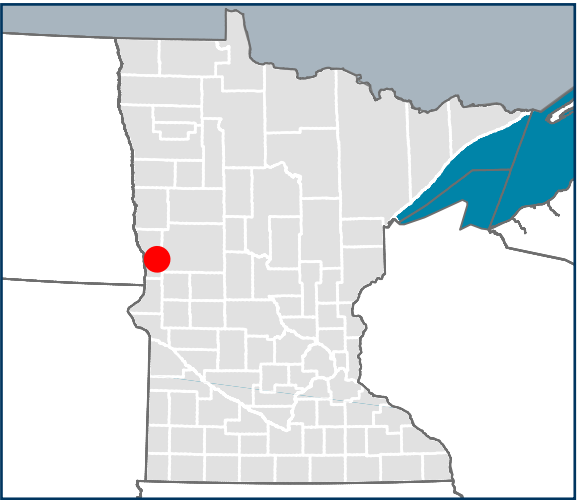
**Hybrid Route Alternative
Detail Map**

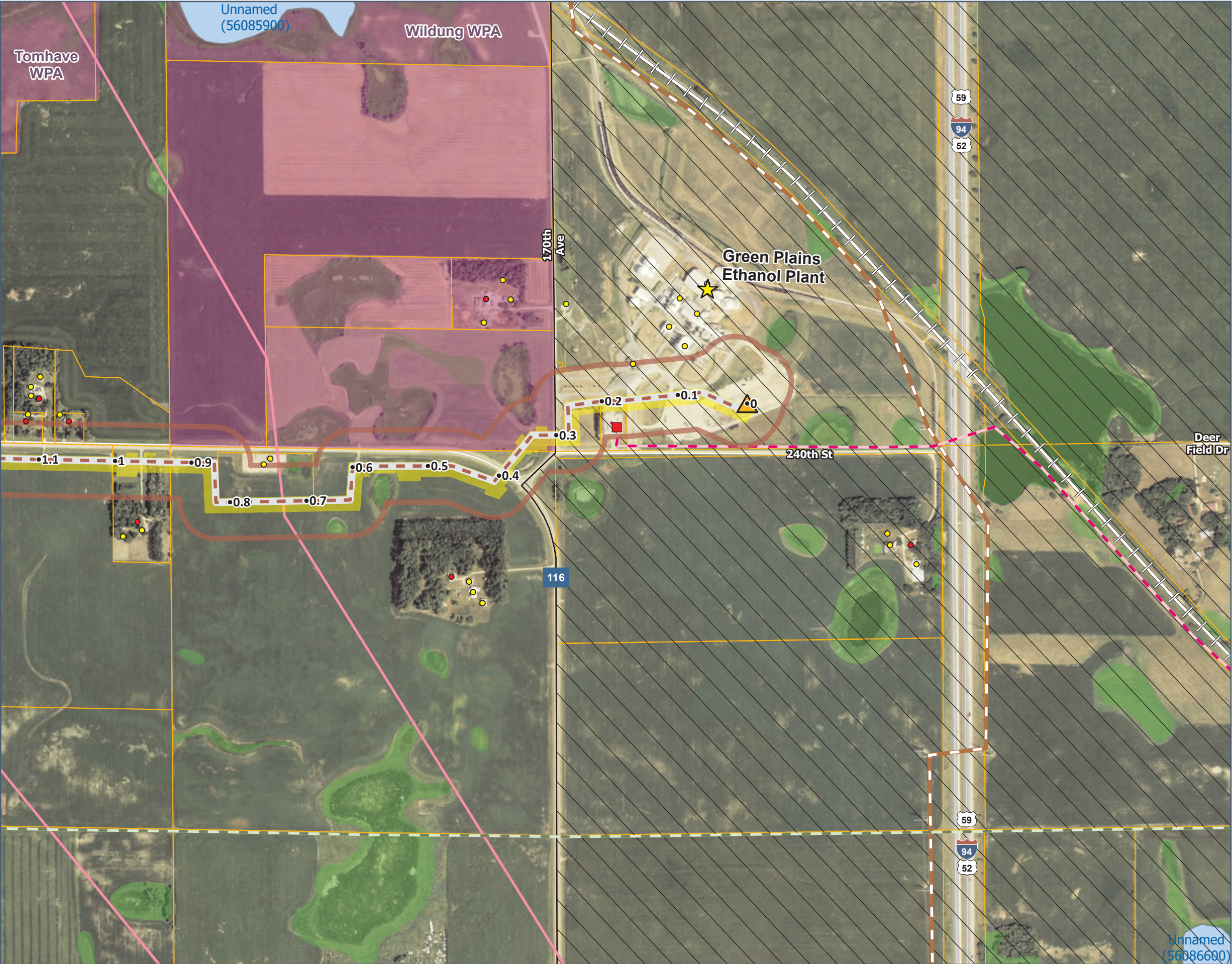


HYBRID ROUTE ALTERNATIVE DETAIL OVERVIEW MAP

Legend

- Grid Index
- Green Plains Ethanol Plant
- RA-Hybrid Route Width
- State Boundary
- County Boundary
- City Boundary
- Public Water Basin
- Public Water Watercourse
- Interstate
- MN Highway
- US Highway
- County Road

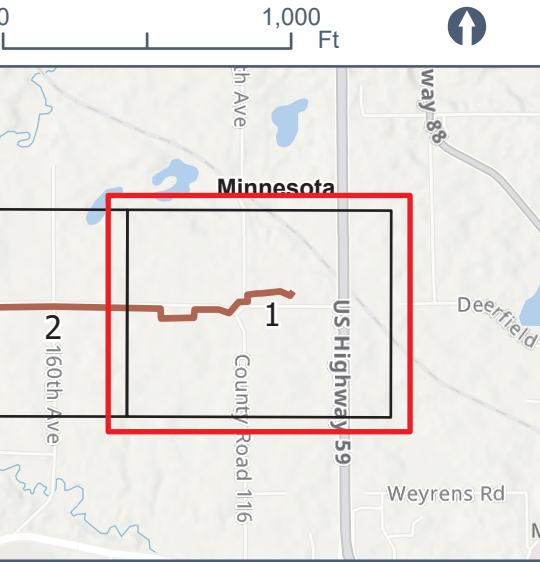




HYBRID ROUTE ALTERNATIVE DETAIL MAP

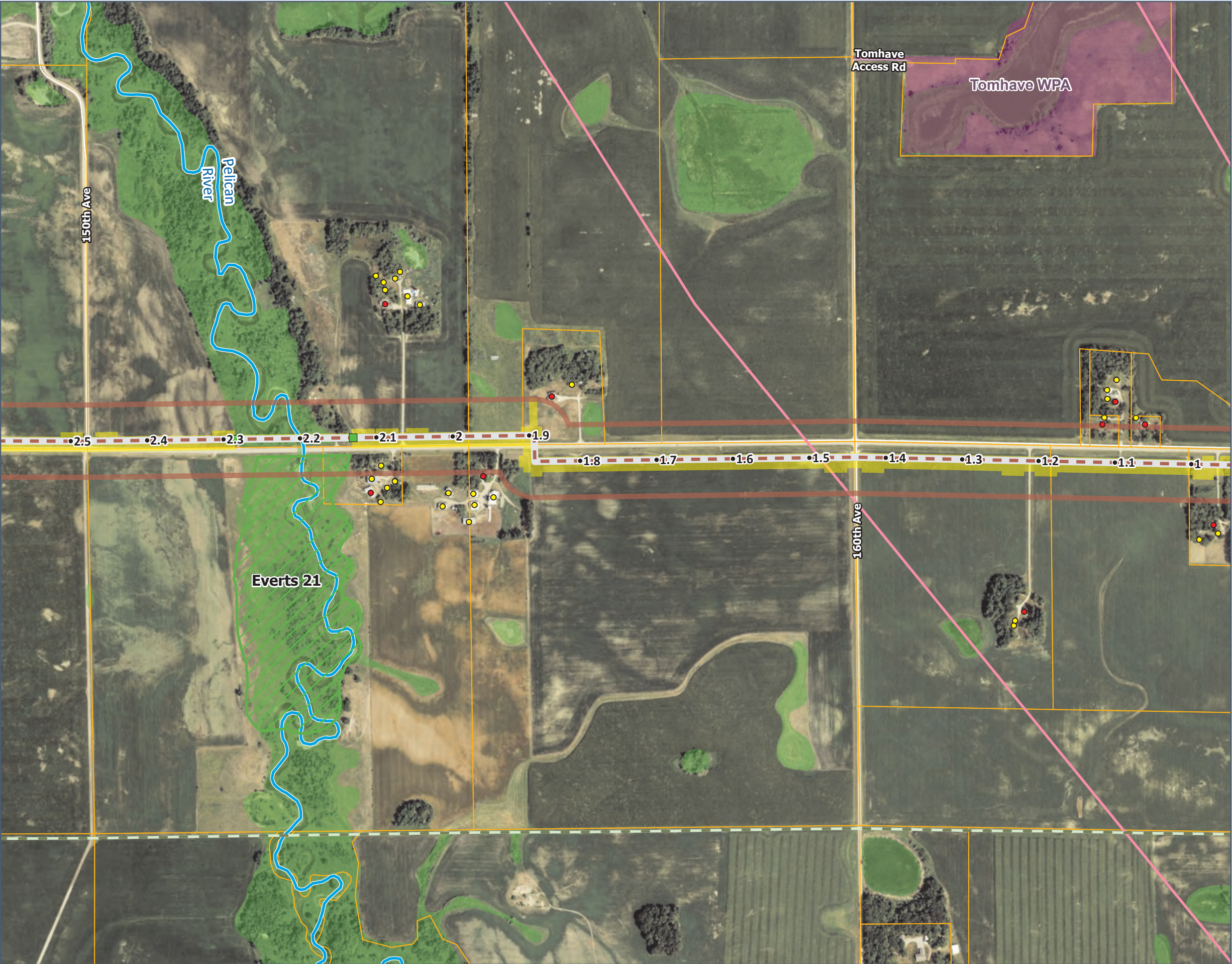
Page 1 of 20

- Legend**
- ★ Green Plains Ethanol Plant
 - Milepost
 - RA-Hybrid
 - RA-Hybrid Route Width
 - Permanent Right-of-Way
 - Construction Workspace
 - ▲ Valve
 - ▭ Parcel
 - ⊥ Active Railroad
 - Pipeline - Refined Products
 - Public Water Basin
 - Existing Substation
 - Waterfowl Production Area
 - Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
- Residence
 - Other*
- Transmission Line**
- 115 kV
 - 230 kV
 - 345 kV
- MPCA Environmental Justice Areas**
- 35% of Households with income less than 200 percent of poverty level



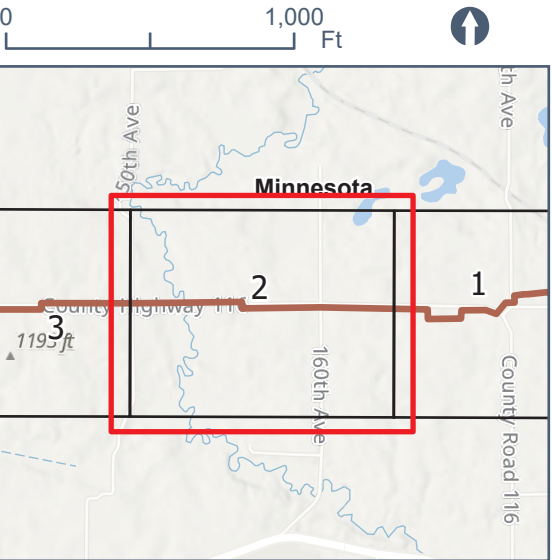
**COMMERCE
DEPARTMENT**

*Other includes buildings identified as Business, Garage/Barn, or Industrial

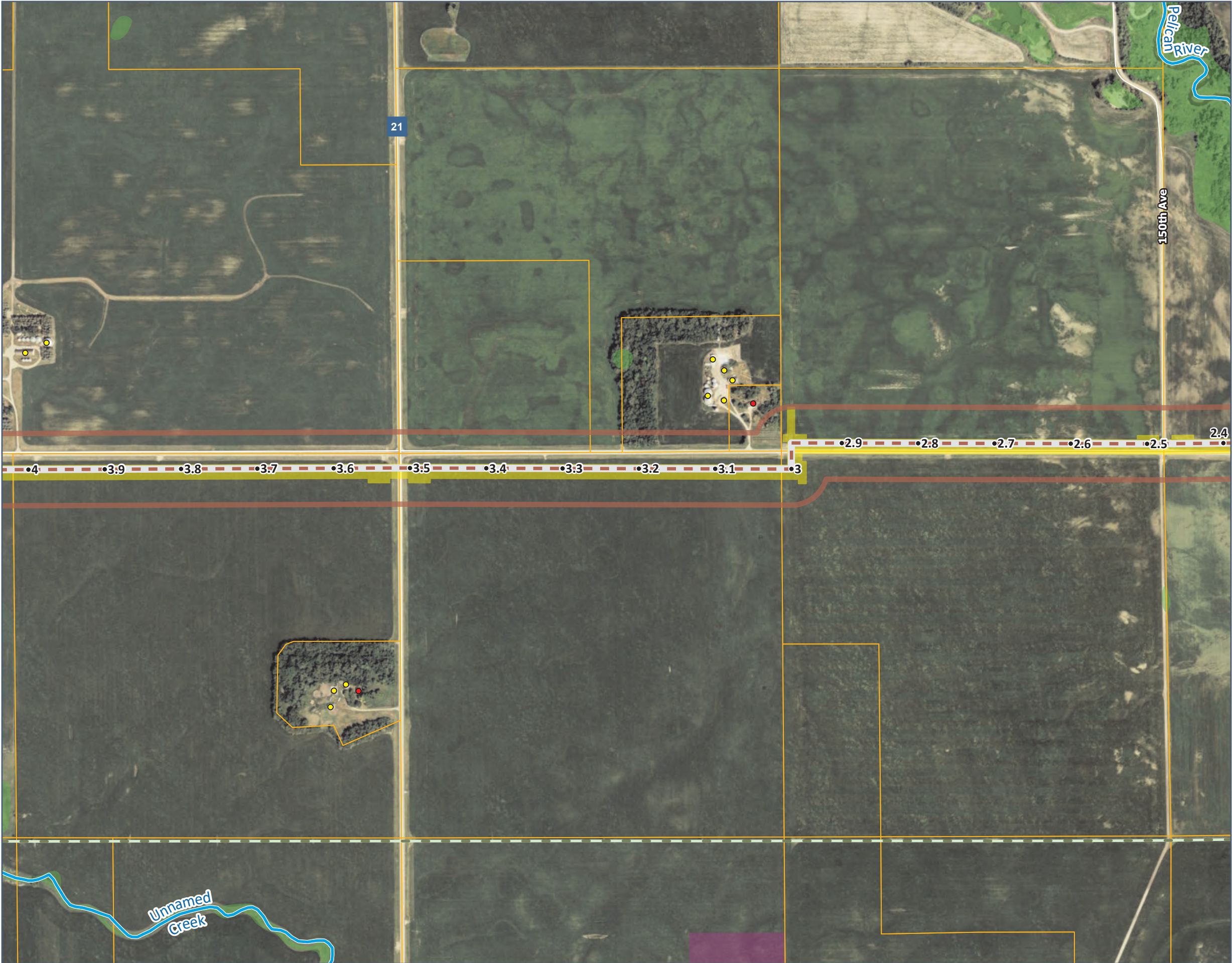


HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

- Legend**
- Milepost
 - RA-Hybrid
 - RA-Hybrid Route Width
 - Permanent Right-of-Way
 - Construction Workspace
 - HDD
 - Parcel
 - Pipeline - Refined Products
 - Public Water Watercourse
 - Waterfowl Production Area
 - Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
- Residence
 - Other*
- MBS Site**
- Moderate
- Transmission Line**
- 230 kV



*Other includes buildings identified as Business, Garage/Barn, or Industrial



HYBRID ROUTE ALTERNATIVE DETAIL MAP

Legend

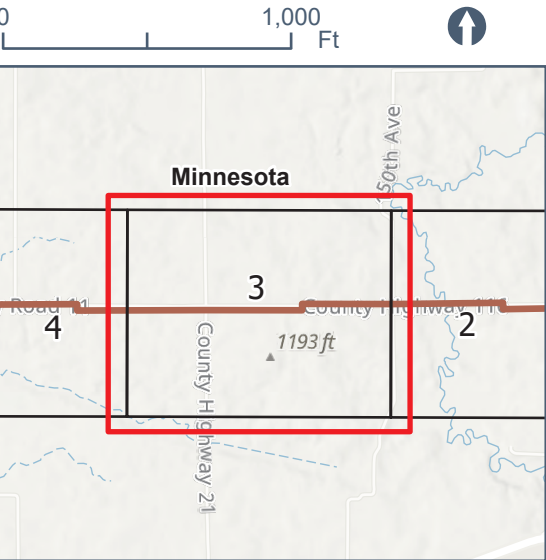
- Milepost
- RA-Hybrid
- ▭ RA-Hybrid Route Width
- ▭ Permanent Right-of-Way
- ▭ Construction Workspace
- ▭ Parcel
- ~ Public Water Watercourse
- ▭ Waterfowl Production Area
- ▭ Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

- Residence
- Other*

Transmission Line

- 230 kV



*Other includes buildings identified as Business, Garage/Barn, or Industrial

HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- Valve
- Parcel
- Public Water Watercourse
- National Resources Conservation Service Easement
- Undelineated NWI Wetland

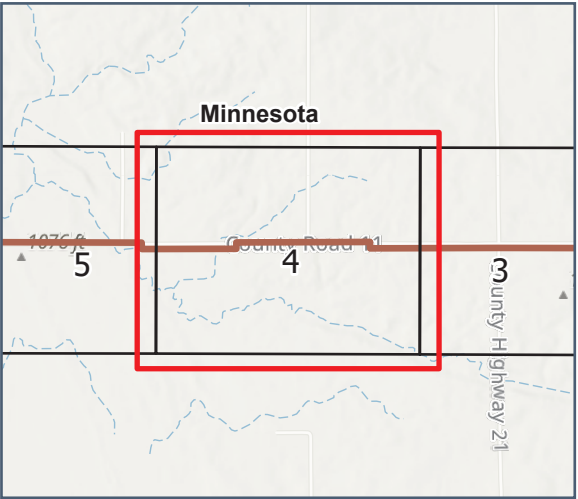
Structures within 1,600 Ft of Route Width

- Residence
- Other*

Transmission Line

- 230 kV

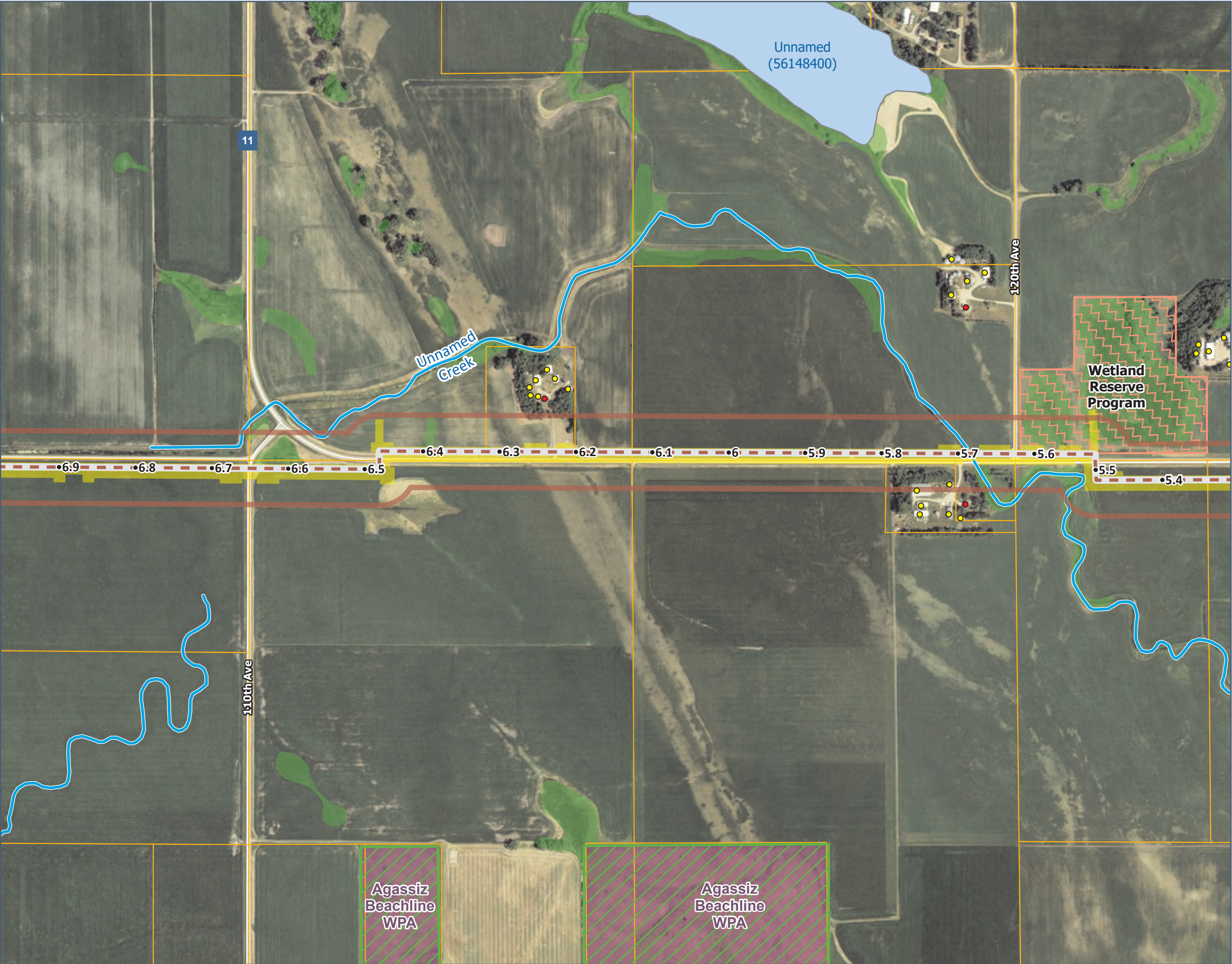
0 1,000 Ft



mn COMMERCE
DEPARTMENT

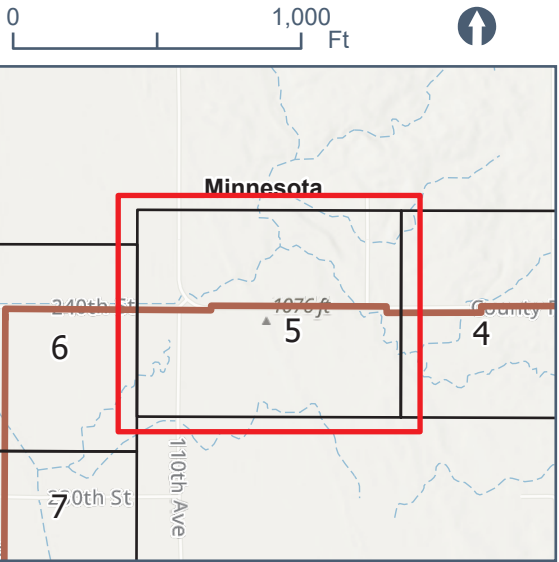


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HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

- Legend**
- Milepost
 - RA-Hybrid
 - RA-Hybrid Route Width
 - Permanent Right-of-Way
 - Construction Workspace
 - Parcel
 - Public Water Basin
 - Public Water Watercourse
 - National Resources Conservation Service Easement
 - Waterfowl Production Area
 - Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
- Residence
 - Other*
- MBS Site**
- Moderate



*Other includes buildings identified as Business, Garage/Barn, or Industrial

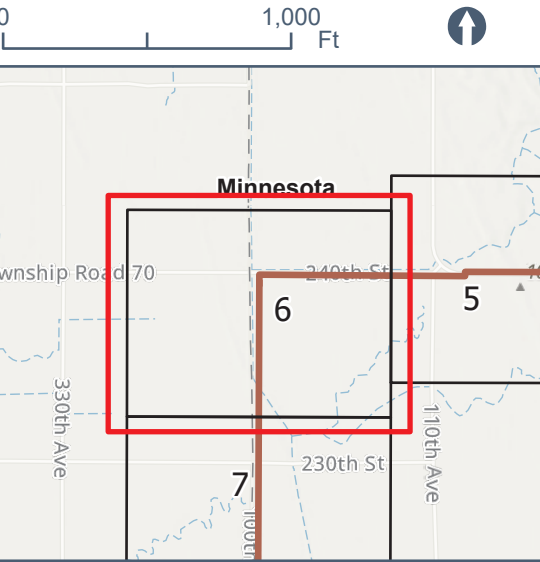
HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- County Boundary
- Parcel
- Public Water Watercourse
- Undelineated NWI Wetland

MBS Site

- High



*Other includes buildings identified as Business, Garage/Barn, or Industrial

HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

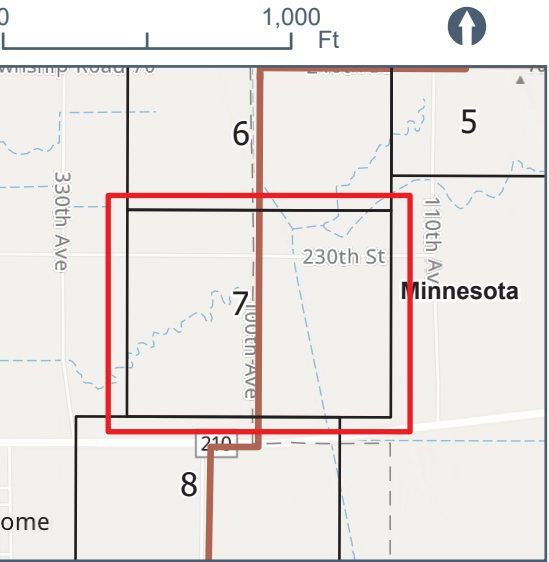
- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- County Boundary
- Parcel
- Active Railroad
- Pipeline - Natural Gas
- Public Water Watercourse
- Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

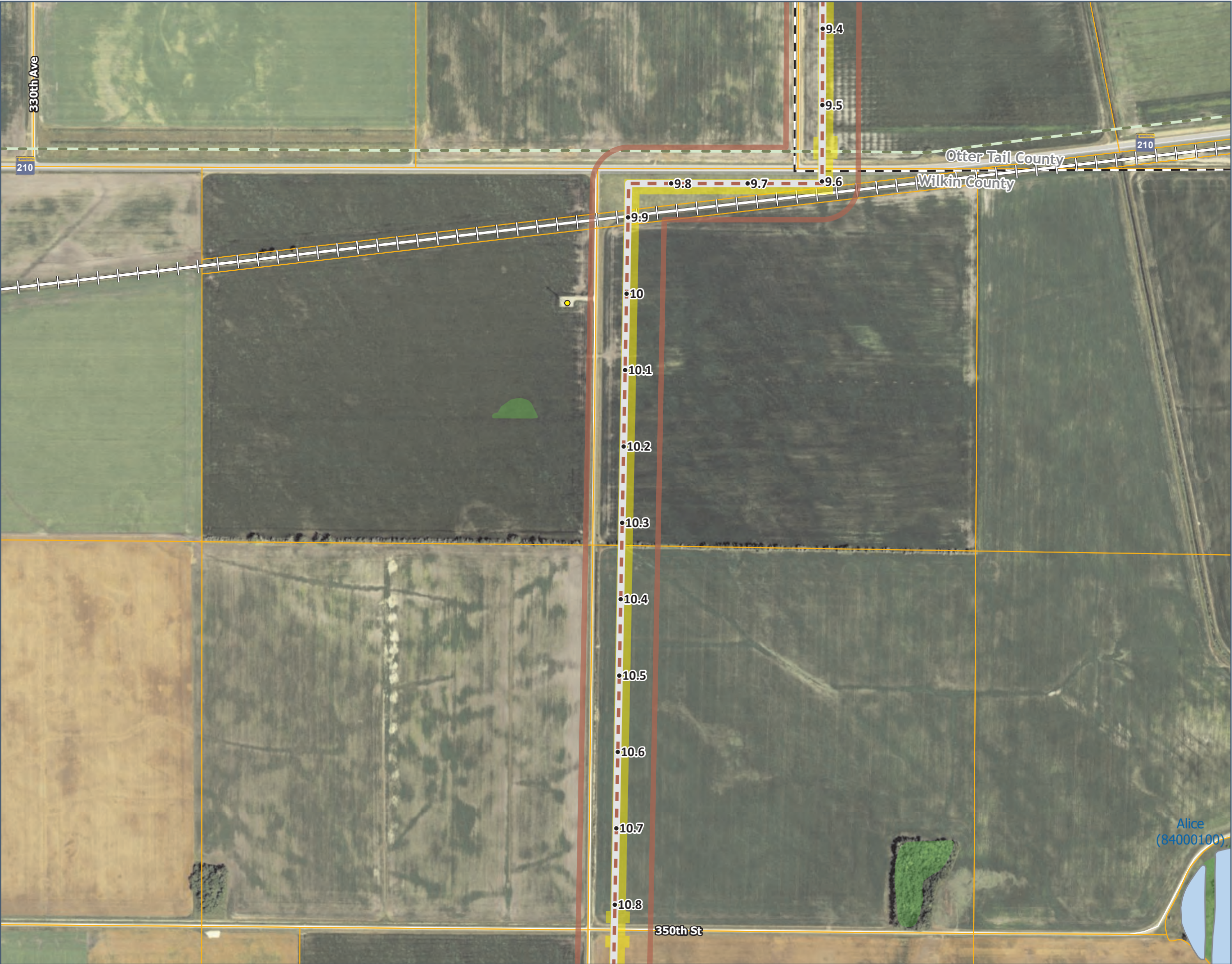
- Residence
- Other*

Transmission Line

- 230 kV



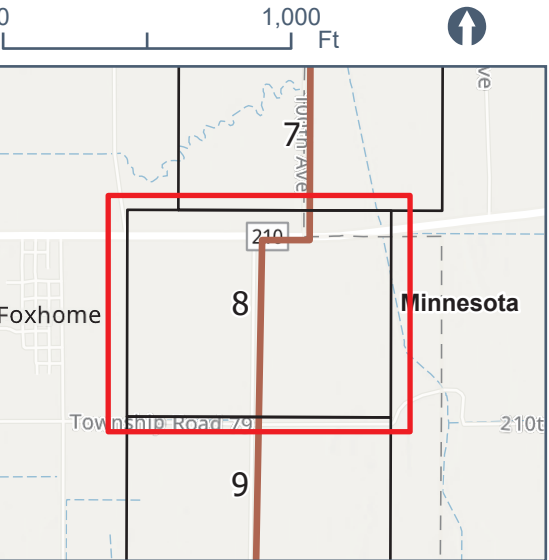
*Other includes buildings identified as Business, Garage/Barn, or Industrial



HYBRID ROUTE ALTERNATIVE DETAIL MAP

Legend

- Milepost
 - RA-Hybrid
 - RA-Hybrid Route Width
 - Permanent Right-of-Way
 - Construction Workspace
 - County Boundary
 - Parcel
 - Active Railroad
 - Public Water Basin
 - Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
- Other*
- Transmission Line**
- 230 kV

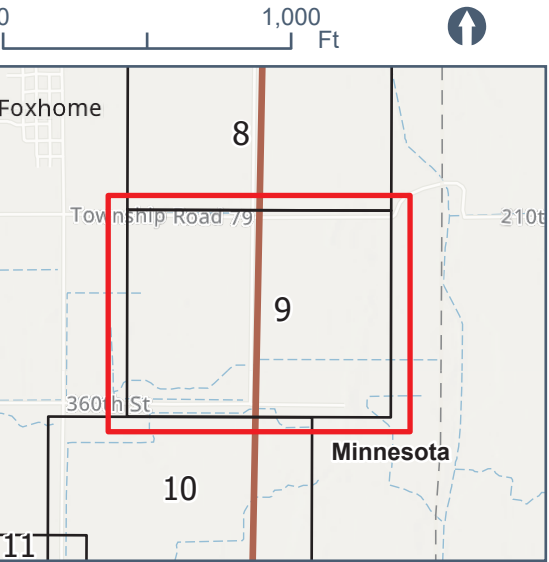


*Other includes buildings identified as Business, Garage/Barn, or Industrial

HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- Parcel
- Public Water Basin
- Undelineated NWI Wetland

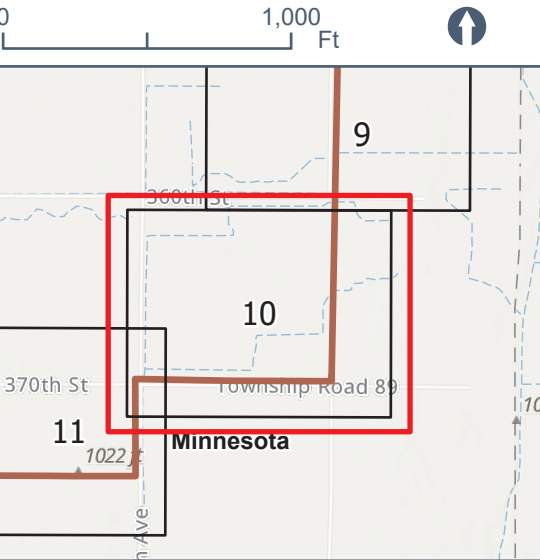


*Other includes buildings identified as Business, Garage/Barn, or Industrial

HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- Parcel
- Board of Water & Soil Resources Easement
- Undelineated NWI Wetland



*Other includes buildings identified as Business, Garage/Barn, or Industrial

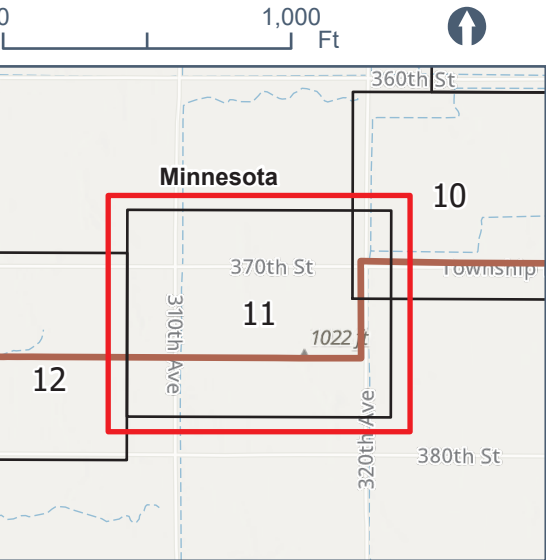
HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- ▭ RA-Hybrid Route Width
- ▭ Permanent Right-of-Way
- ▭ Construction Workspace
- ▭ Parcel
- ▭ Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

- Residence
- Other*

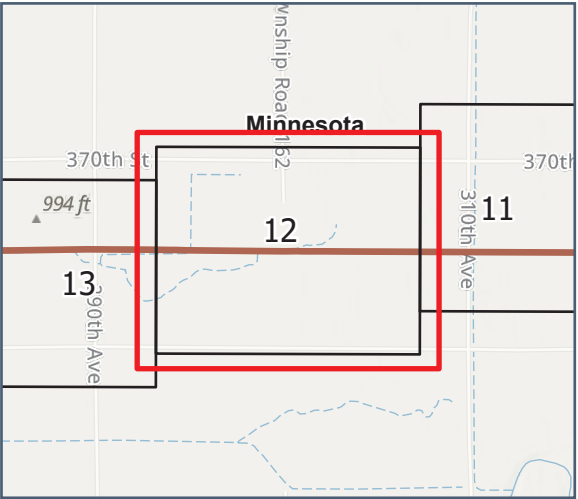


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HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- Parcel

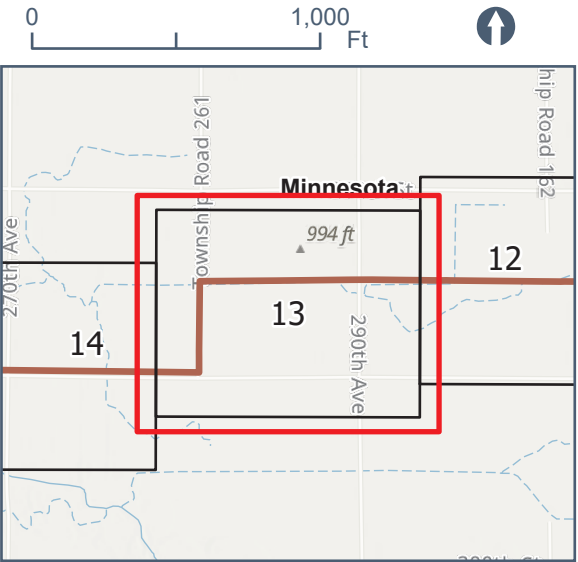
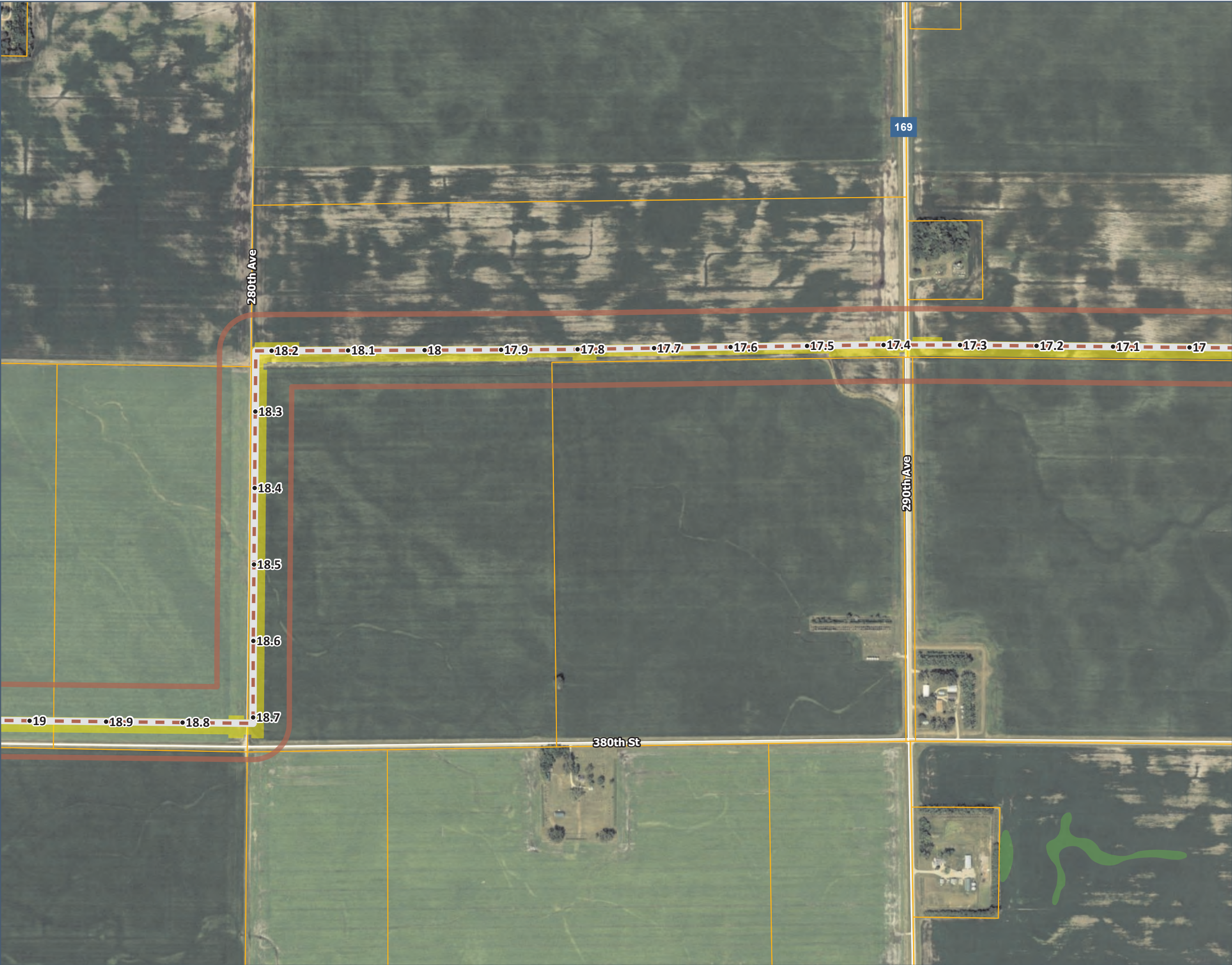


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HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- Parcel
- Undelineated NWI Wetland



*Other includes buildings identified as Business, Garage/Barn, or Industrial

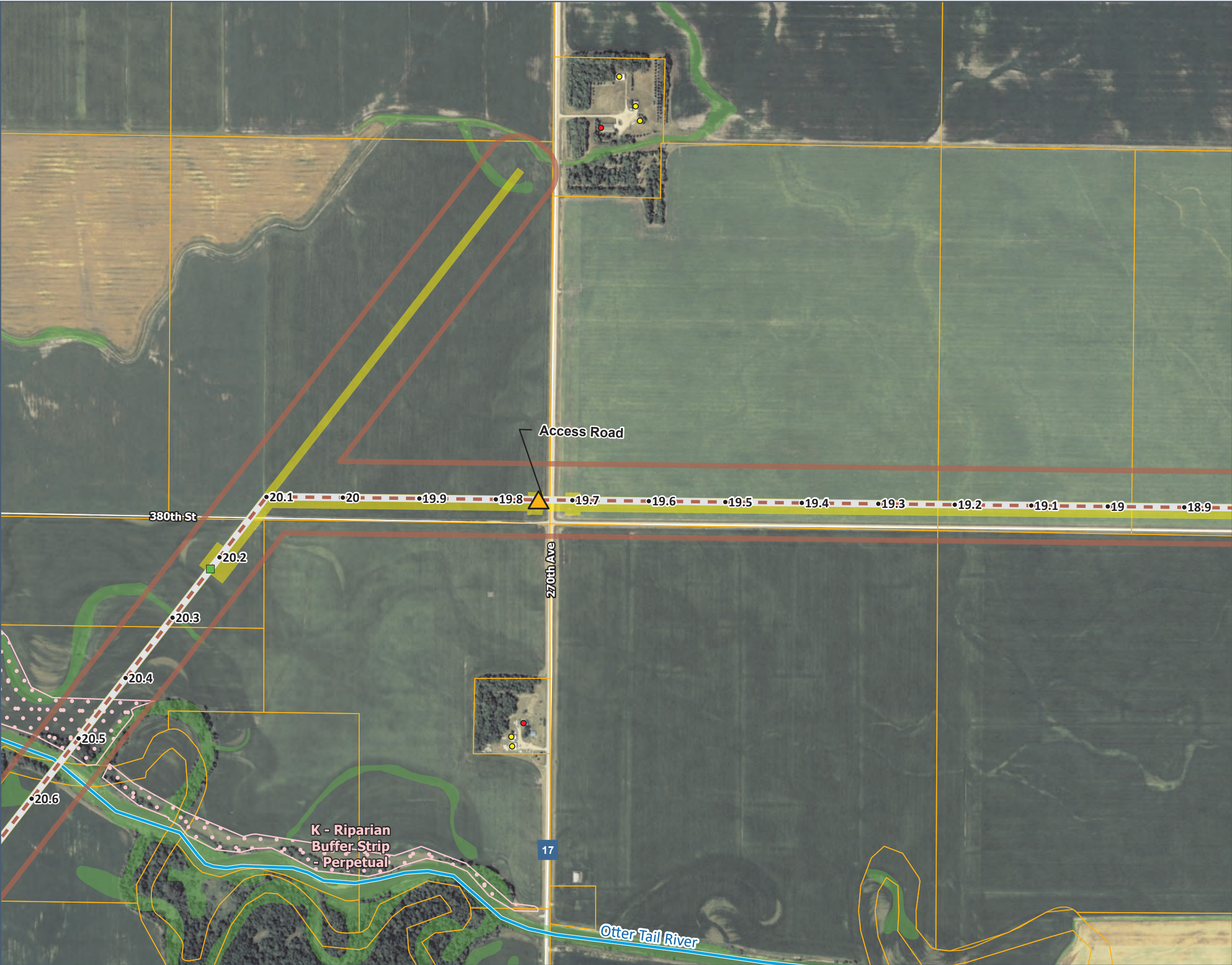
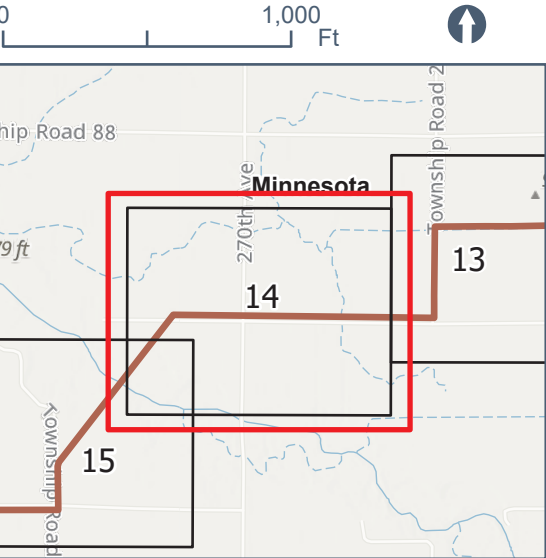
HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- HDD
- Valve
- Parcel
- Public Water Watercourse
- Board of Water & Soil Resources Easement
- Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

- Residence
- Other*



*Other includes buildings identified as Business, Garage/Barn, or Industrial

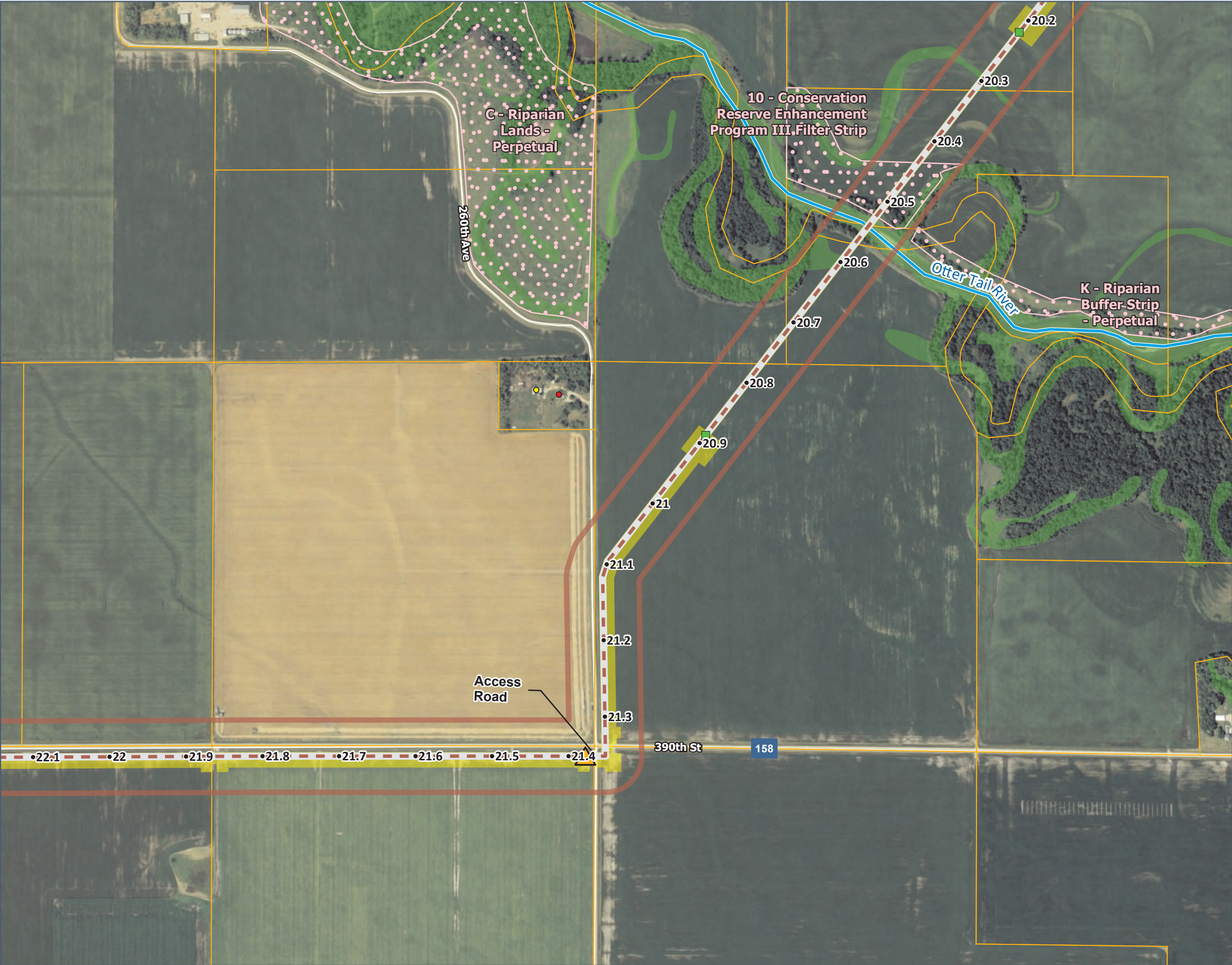
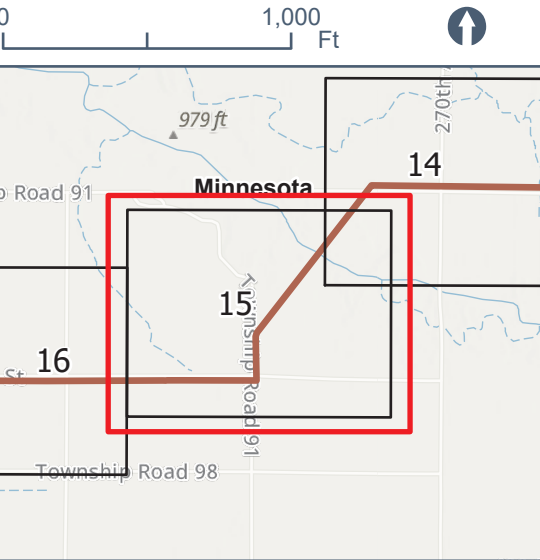
HYBRID ROUTE ALTERNATIVE DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- HDD
- Valve
- Parcel
- Public Water Watercourse
- Board of Water & Soil Resources Easement
- Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

- Residence
- Other*



*Other includes buildings identified as Business, Garage/Barn, or Industrial

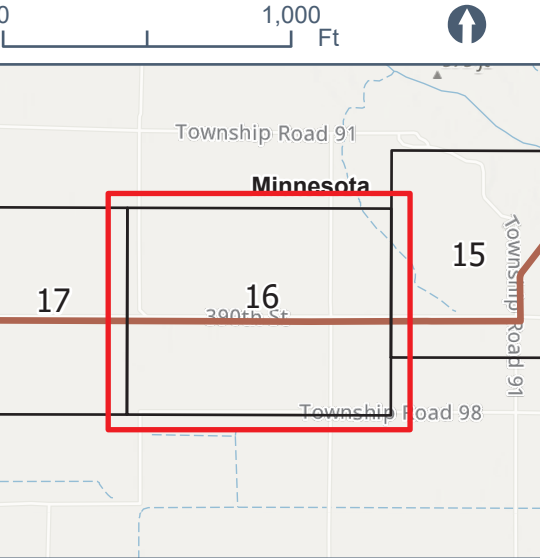
HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- Parcel
- Board of Water & Soil Resources Easement

Structures within 1,600 Ft of Route Width

- Residence
- Other*

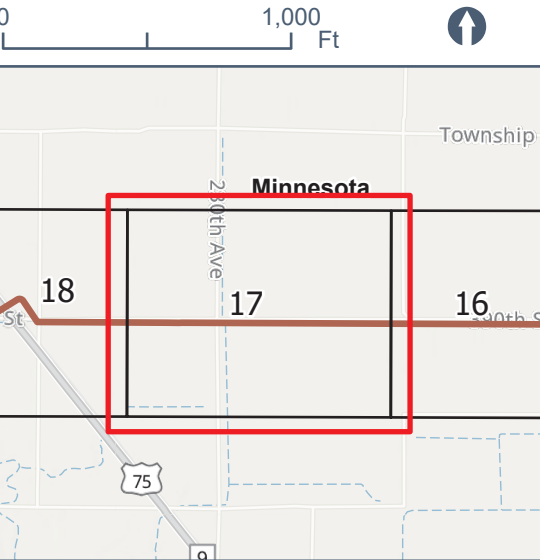


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HYBRID ROUTE ALTERNATIVE DETAIL MAP

Legend

- Milepost
 - RA-Hybrid
 - ▭ RA-Hybrid Route Width
 - ▭ Permanent Right-of-Way
 - ▭ Construction Workspace
 - ▭ Parcel
 - ▭ Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
- Residence
 - Other*

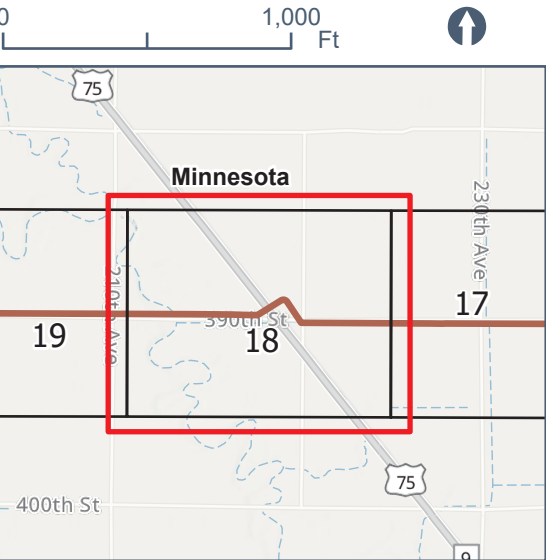


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HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- HDD
- Parcel
- Active Railroad
- Public Water Watercourse
- Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width
 - Residence
 - Other*

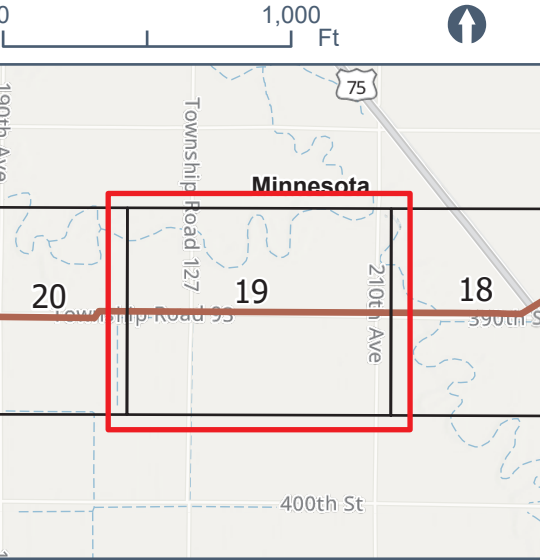


*Other includes buildings identified as Business, Garage/Barn, or Industrial

HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- ▭ RA-Hybrid Route Width
- ▭ Permanent Right-of-Way
- ▭ Construction Workspace
- ▭ Parcel
- ~ Public Water Watercourse
- ~ Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
 - Residence
 - Other*



*Other includes buildings identified as Business, Garage/Barn, or Industrial

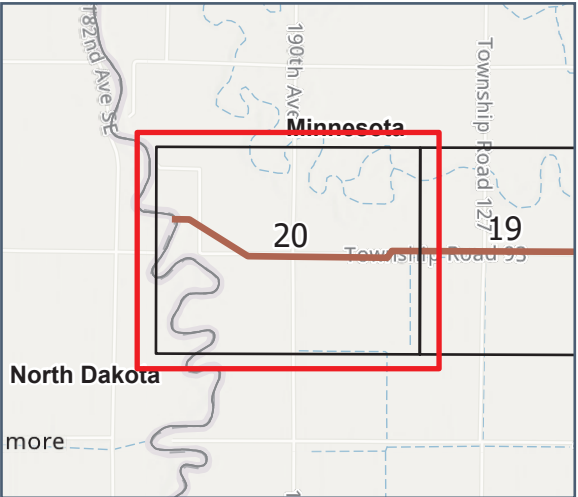
HYBRID ROUTE
ALTERNATIVE
DETAIL MAP

Legend

- Milepost
- RA-Hybrid
- RA-Hybrid Route Width
- Permanent Right-of-Way
- Construction Workspace
- HDD
- Valve
- State Boundary
- County Boundary
- Parcel
- Public Water Watercourse
- Board of Water & Soil Resources Easement
- Undelineated NWI Wetland

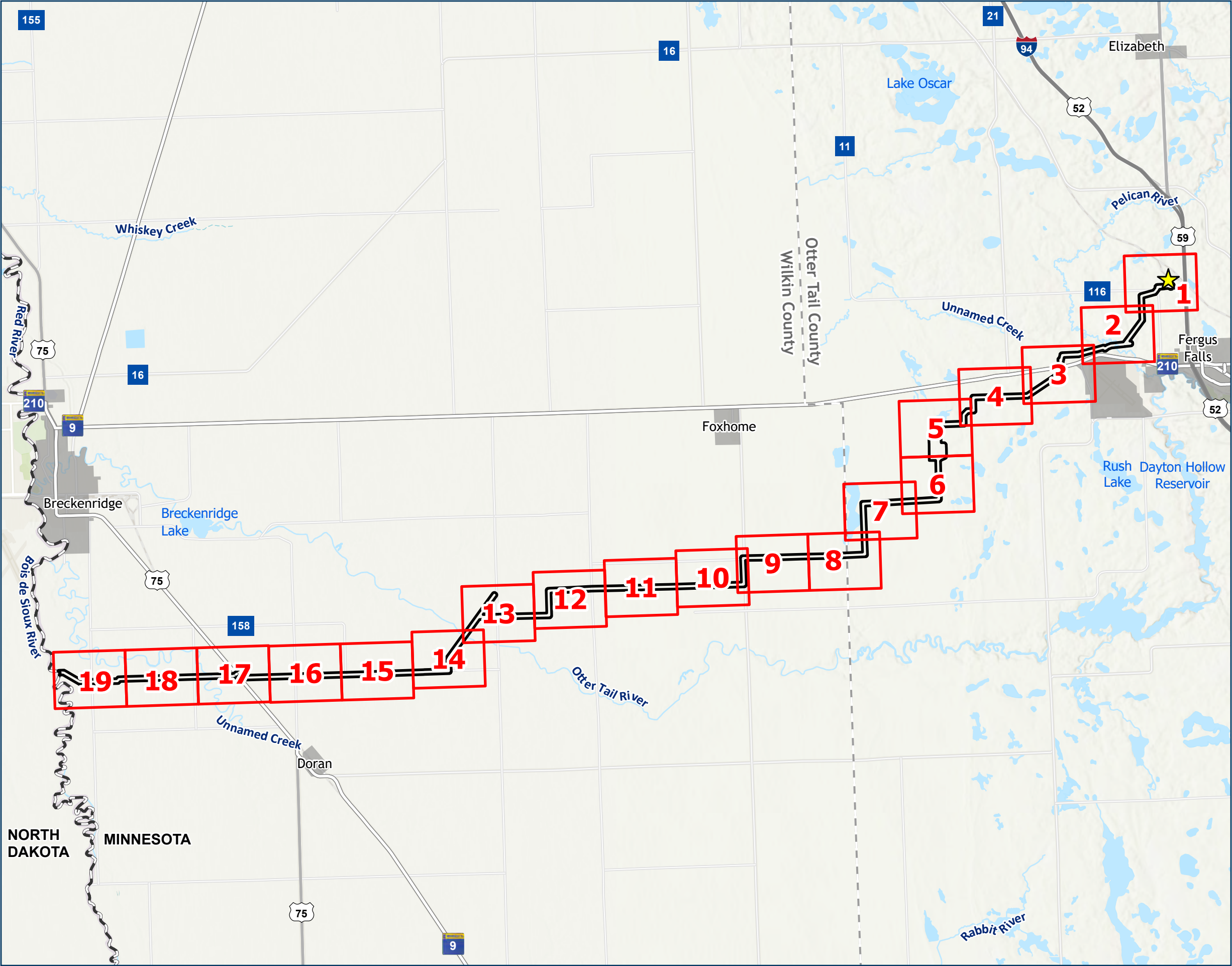
Structures within 1,600 Ft of Route Width

- Residence
- Other*



*Other includes buildings identified as Business, Garage/Barn, or Industrial

**South Route Alternative
Detail Map**

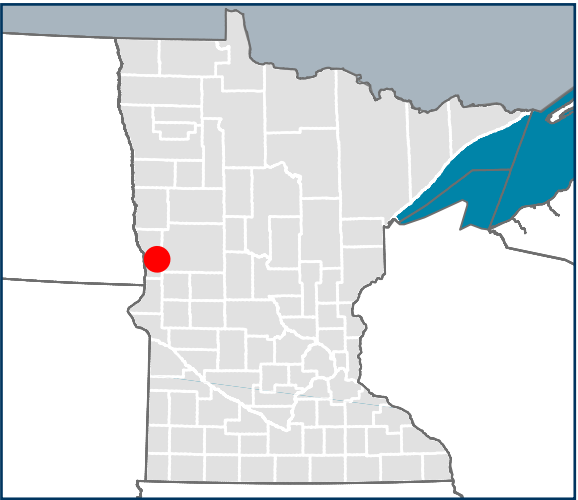


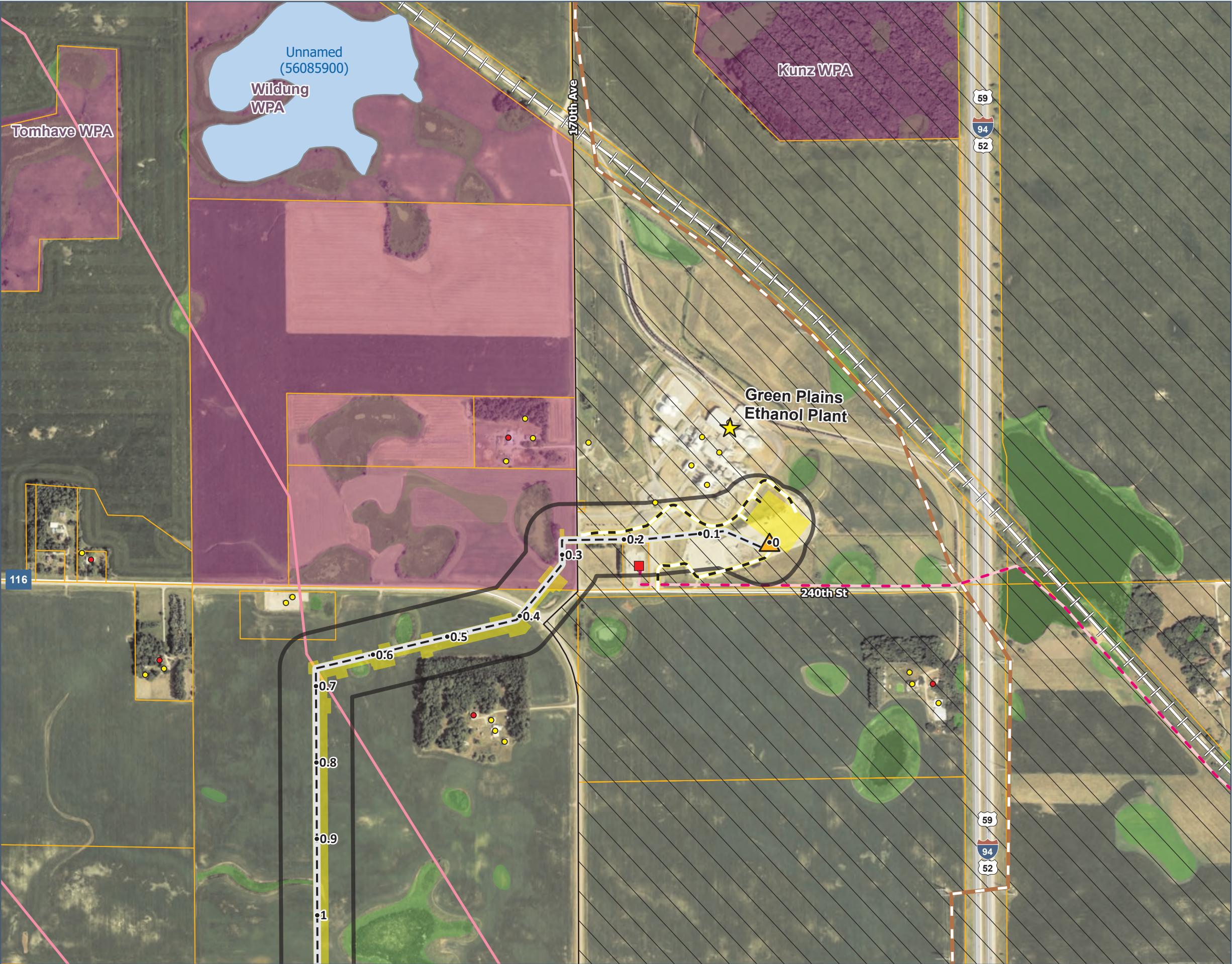
SOUTH ROUTE ALTERNATIVE DETAIL OVERVIEW MAP

Legend

- Grid Index
- Green Plains Ethanol Plant
- RA-South Route Width
- State Boundary
- County Boundary
- City Boundary
- Public Water Basin
- Public Water Watercourse
- Interstate
- MN Highway
- US Highway
- County Road

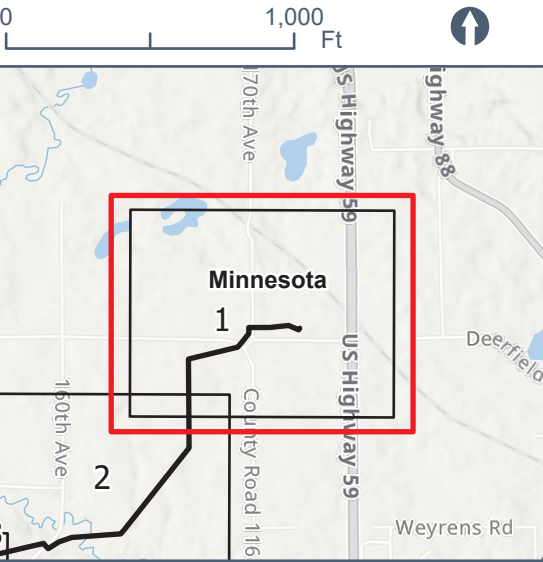
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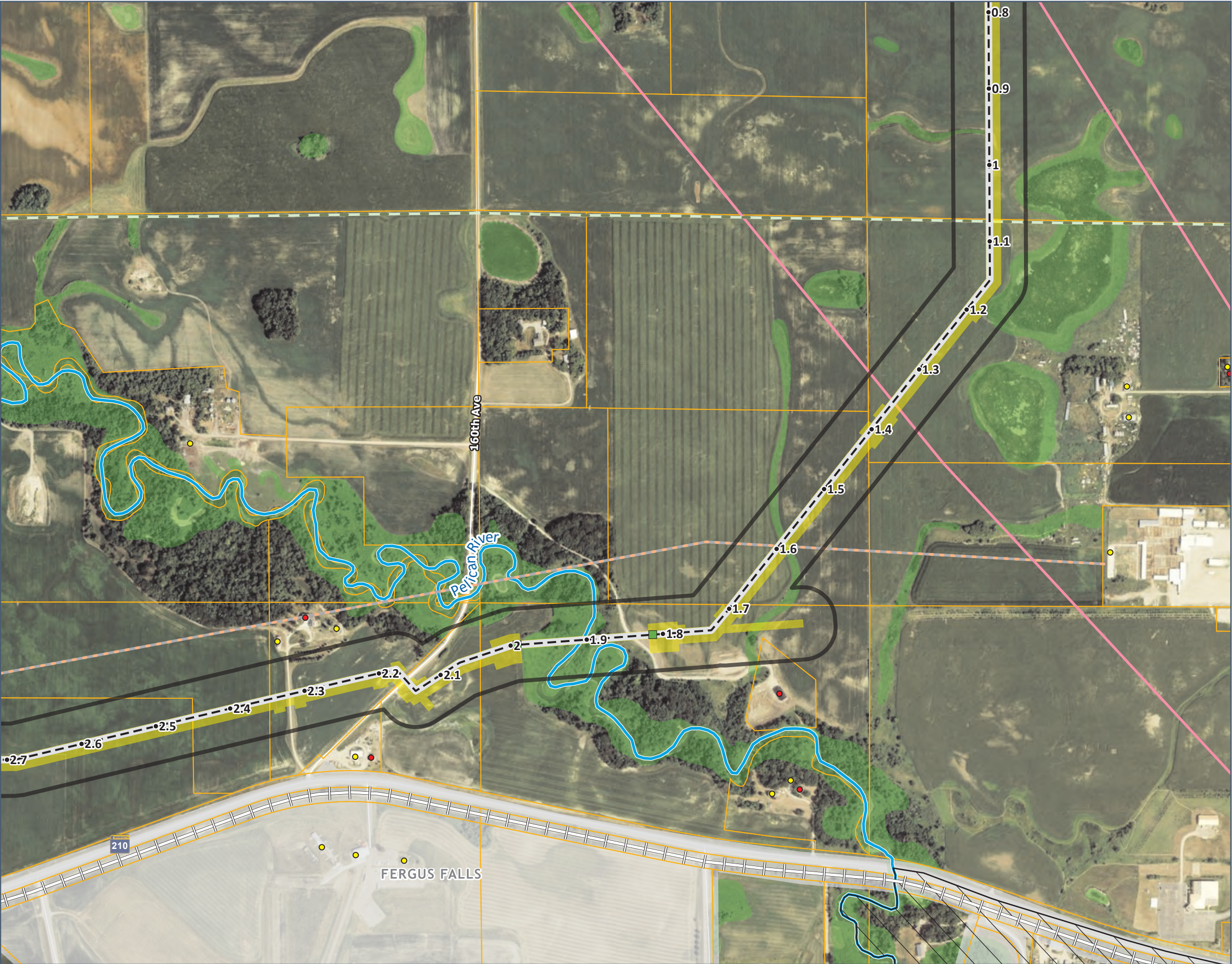


**SOUTH ROUTE
ALTERNATIVE
DETAIL MAP**

- Legend**
- ★ Green Plains Ethanol Plant
 - Milepost
 - - - RA-South
 - ▭ RA-South Route Width
 - ▭ Permanent Right-of-Way
 - ▭ Construction Workspace
 - Access Road
 - ▲ Valve
 - ▭ Parcel
 - ⊥ Active Railroad
 - Pipeline - Refined Products
 - Public Water Basin
 - Existing Substation
 - Waterfowl Production Area
 - Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
- Residence
 - Other*
- Transmission Line**
- 115 kV
 - 345 kV
- MPCA Environmental Justice Areas**
- ▭ 35% of Households with income less than 200 percent of poverty level



*Other includes buildings identified as Business, Garage/Barn, or Industrial



SOUTH ROUTE ALTERNATIVE DETAIL MAP

Page 2 of 19

Legend

- Milepost
- RA-South
- RA-South Route Width
- Permanent Right-of-Way
- Construction Workspace
- HDD
- City Boundary
- Parcel
- Active Railroad
- Pipeline - Natural Gas
- Pipeline - Refined Products
- Public Water Watercourse
- Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

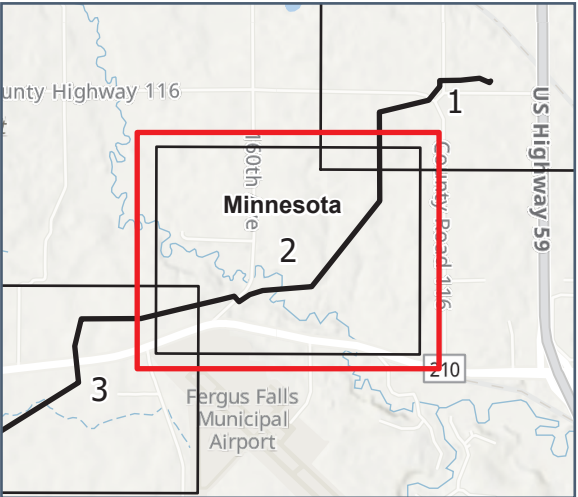
- Residence
- Other*

Transmission Line

- 230 kV

MPCA Environmental Justice Areas

- 35% of Households with income less than 200 percent of poverty level



*Other includes buildings identified as Business, Garage/Barn, or Industrial

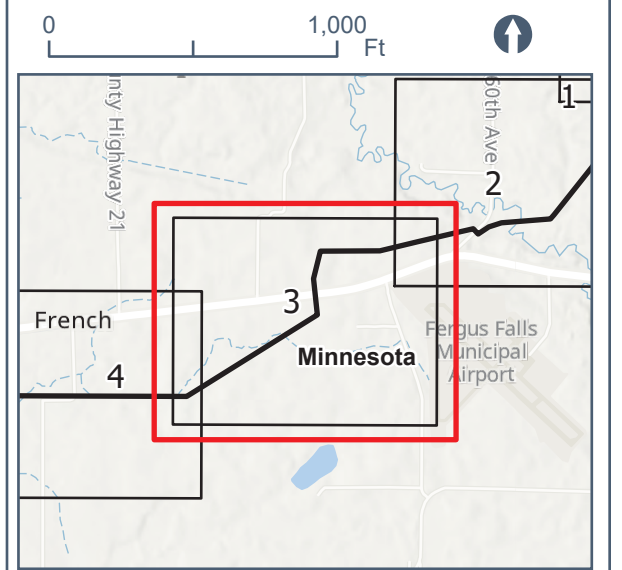
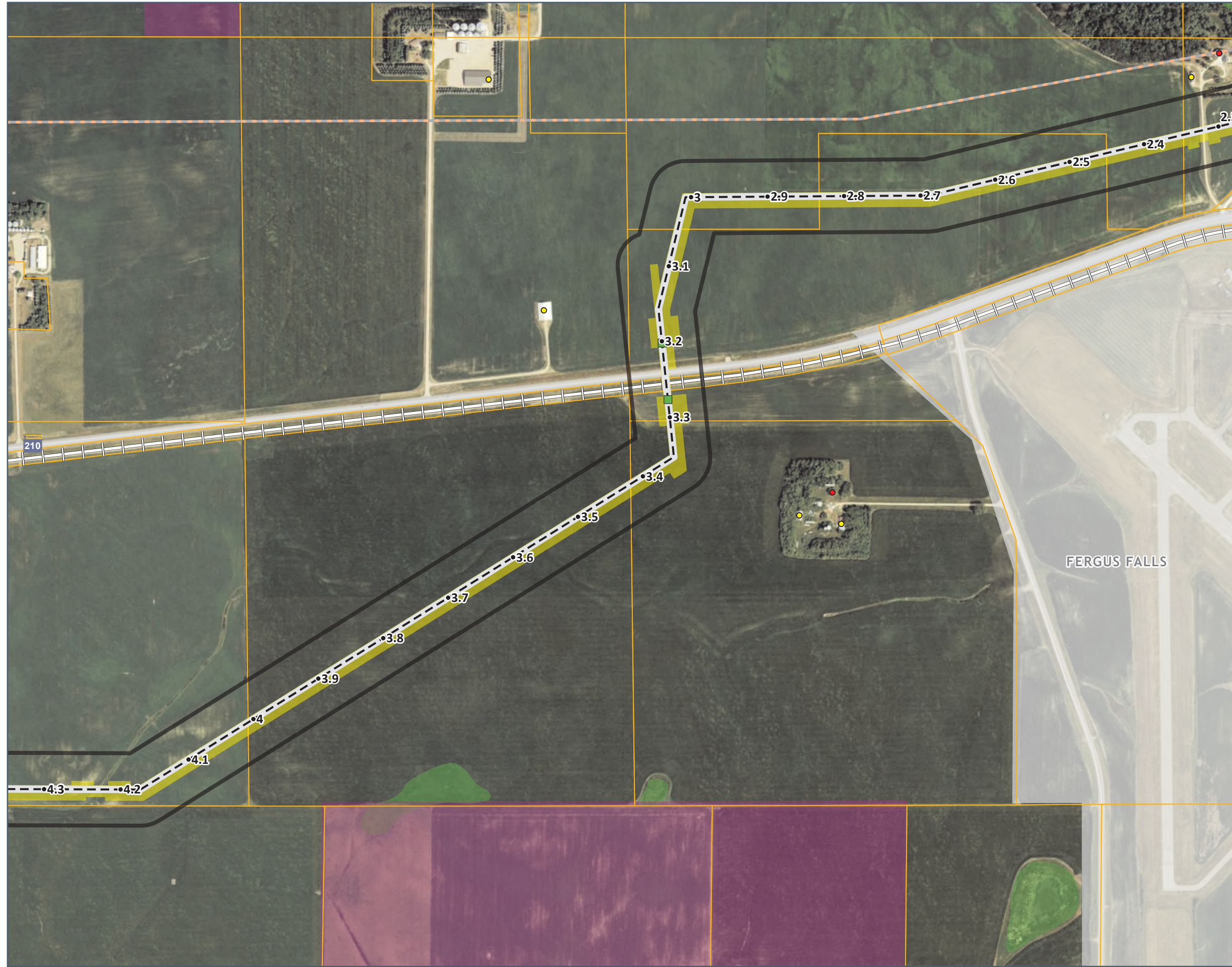
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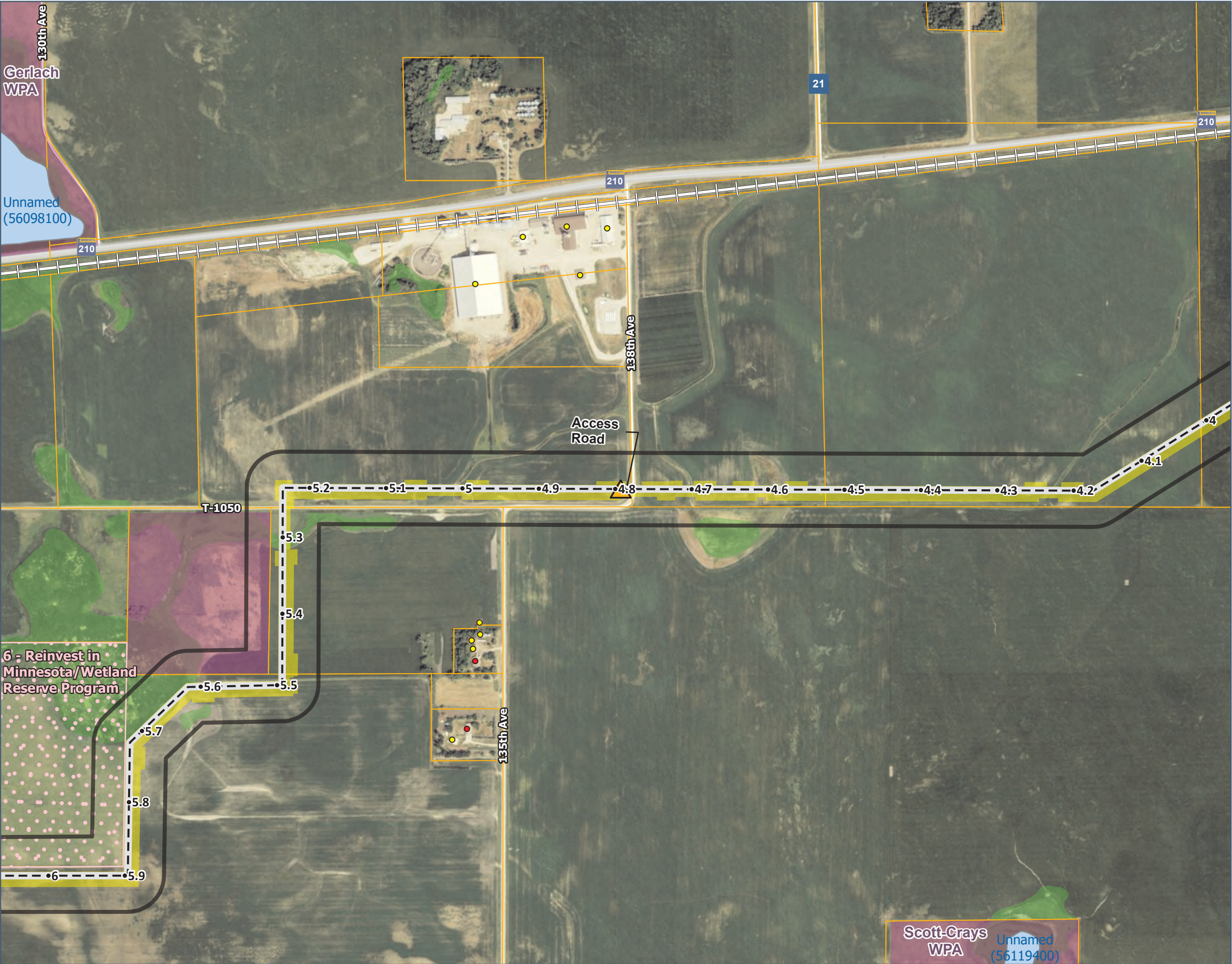
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- Parcel
- Active Railroad
- Pipeline - Natural Gas
- Waterfowl Production Area
- Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

- Residence
- Other*

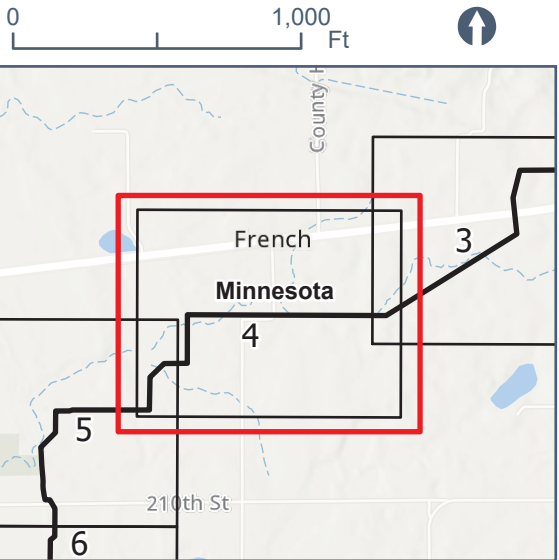


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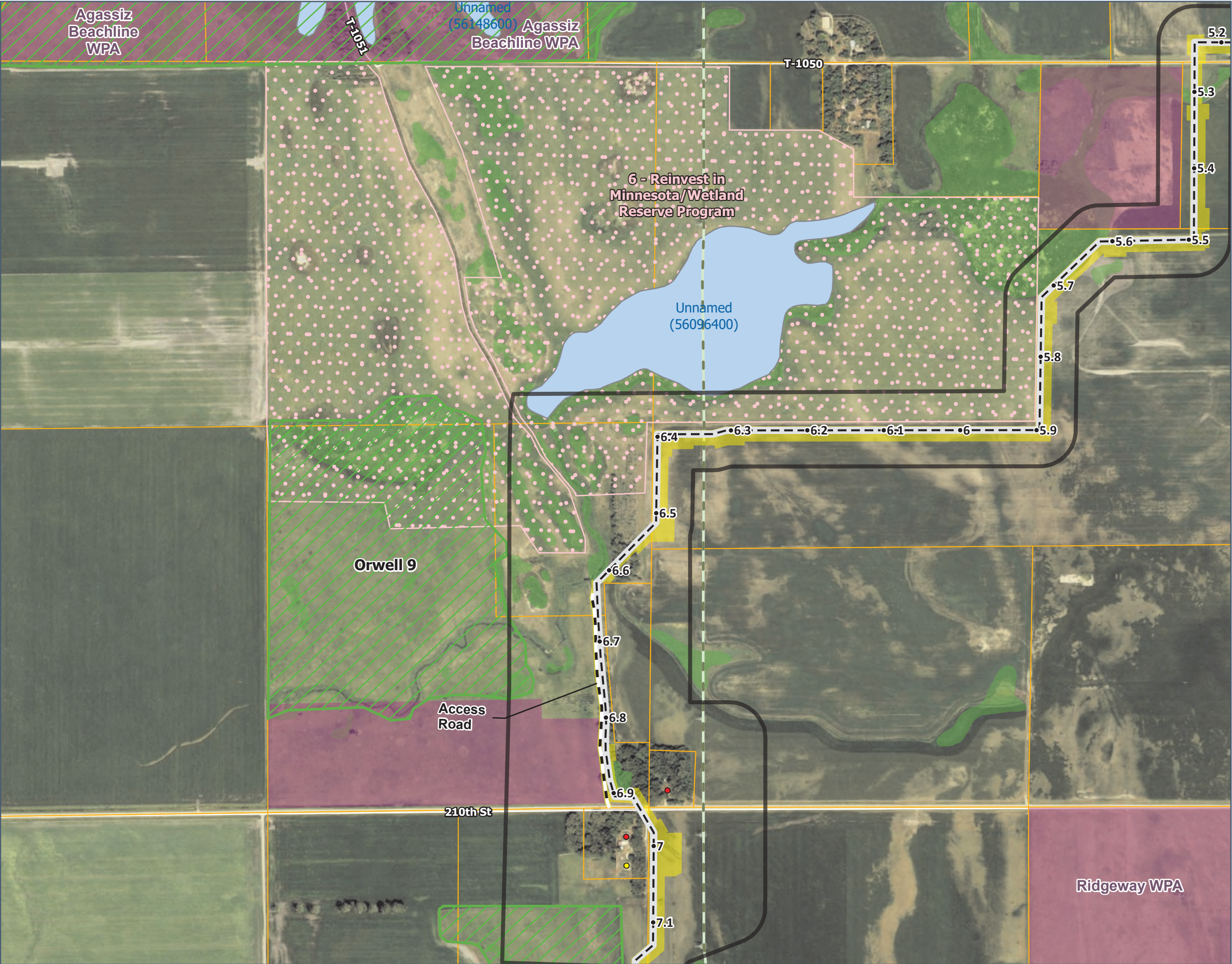


SOUTH ROUTE ALTERNATIVE DETAIL MAP

- Legend**
- Milepost
 - RA-South
 - RA-South Route Width
 - Permanent Right-of-Way
 - Construction Workspace
 - Access Road
 - Valve
 - Parcel
 - Active Railroad
 - Public Water Basin
 - Board of Water & Soil Resources Easement
 - Waterfowl Production Area
 - Undelineated NWI Wetland
 - Structures within 1,600 Ft of Route Width**
 - Residence
 - Other*



*Other includes buildings identified as Business, Garage/Barn, or Industrial

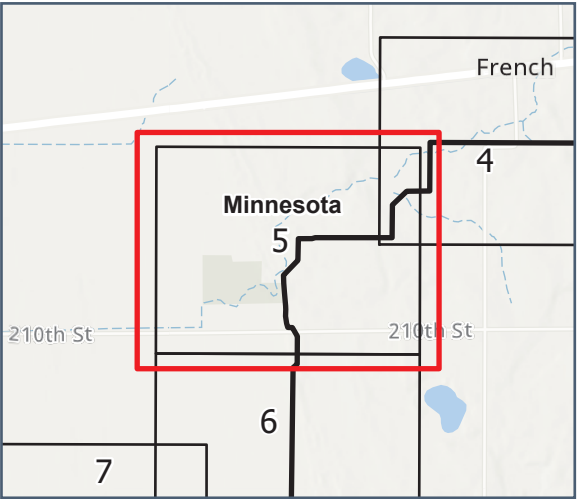


SOUTH ROUTE ALTERNATIVE DETAIL MAP

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Legend

- Milepost
- RA-South
- RA-South Route Width
- Permanent Right-of-Way
- Construction Workspace
- Access Road
- Parcel
- Public Water Basin
- Board of Water & Soil Resources Easement
- Waterfowl Production Area
- Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width
 - Residence
 - Other*
- MBS Site
 - Moderate
- Transmission Line
 - 230 kV



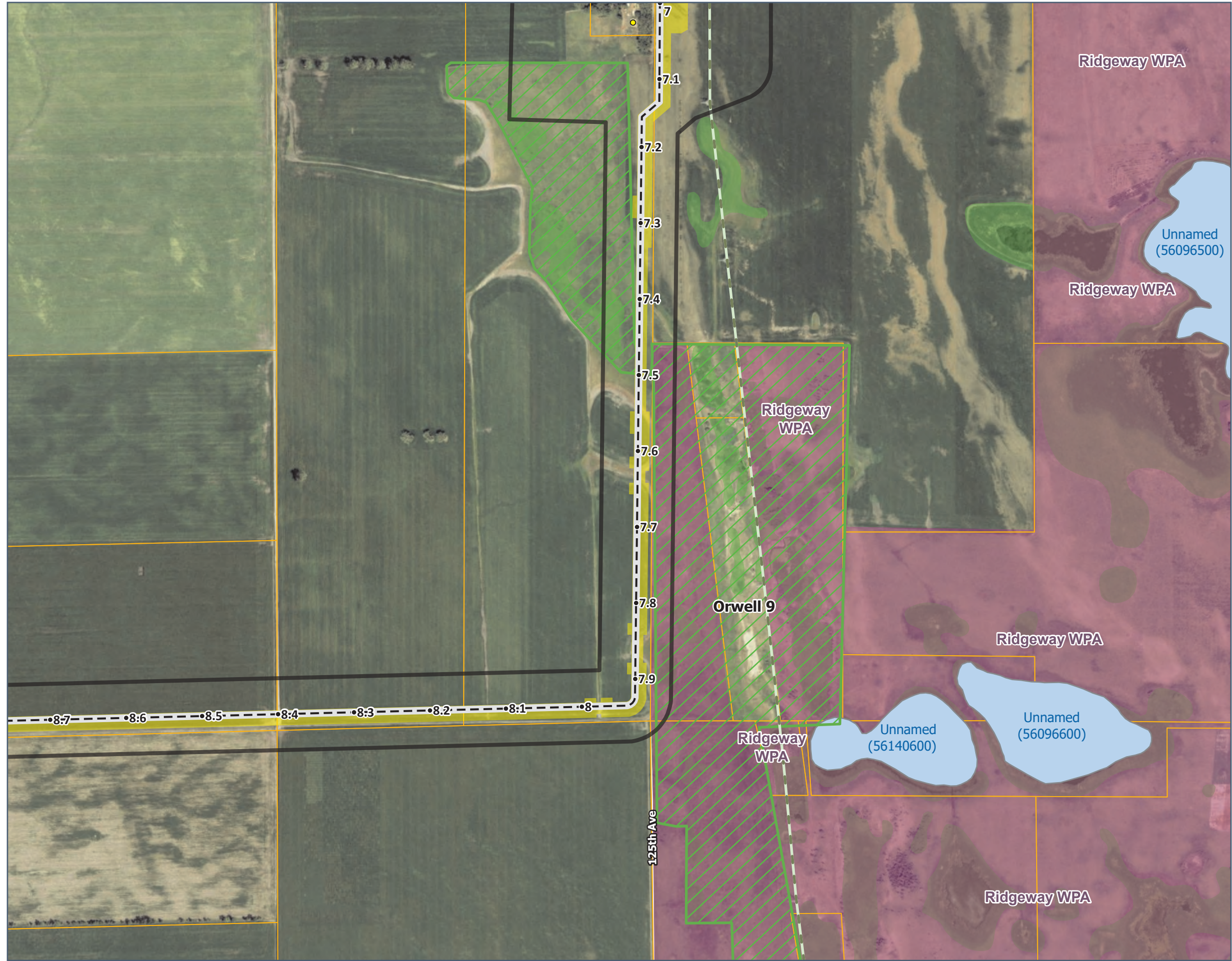
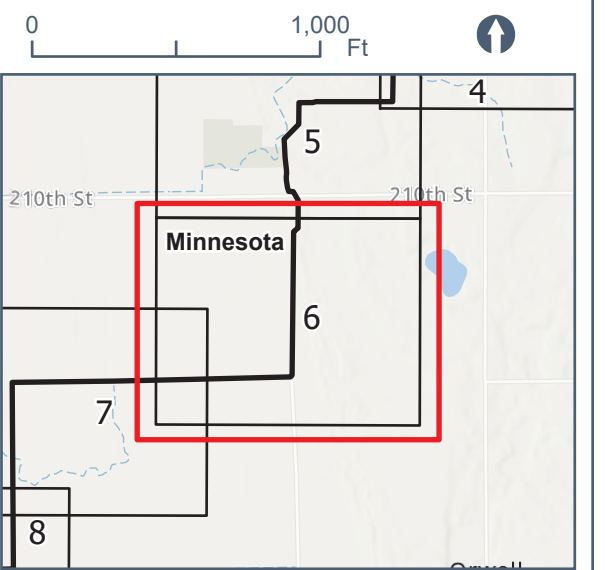
*Other includes buildings identified as Business, Garage/Barn, or Industrial

SOUTH ROUTE ALTERNATIVE DETAIL MAP

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Legend

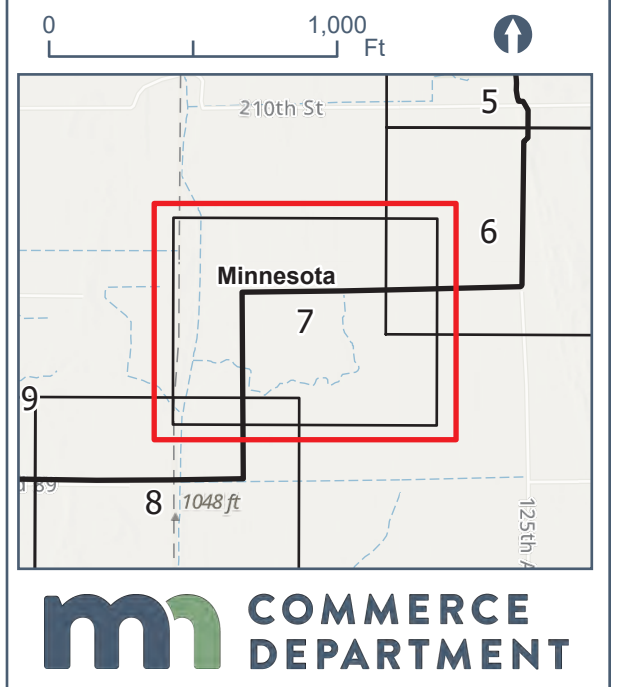
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- RA-South Route Width
- Permanent Right-of-Way
- Construction Workspace
- Parcel
- Public Water Basin
- Waterfowl Production Area
- Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width
 - Other*
- MBS Site
 - Moderate
- Transmission Line
 - 230 kV



*Other includes buildings identified as Business, Garage/Barn, or Industrial

SOUTH ROUTE ALTERNATIVE DETAIL MAP

- Legend**
- Milepost
 - RA-South
 - ▭ RA-South Route Width
 - ▭ Permanent Right-of-Way
 - ▭ Construction Workspace
 - County Boundary
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 - Public Water Basin
 - Undelineated NWI Wetland

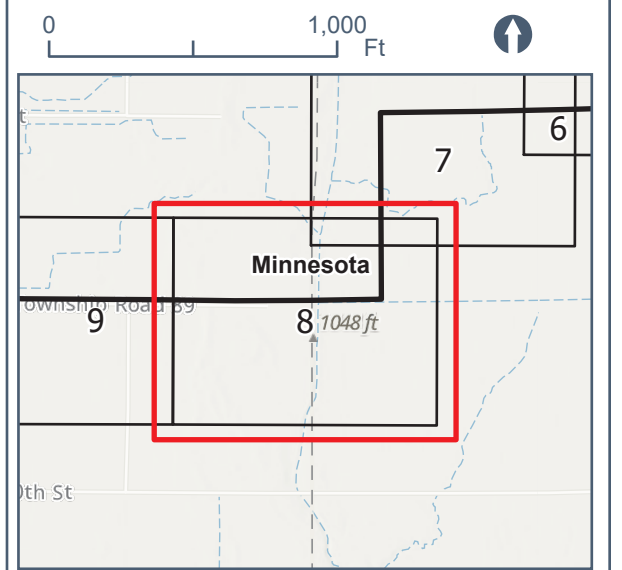


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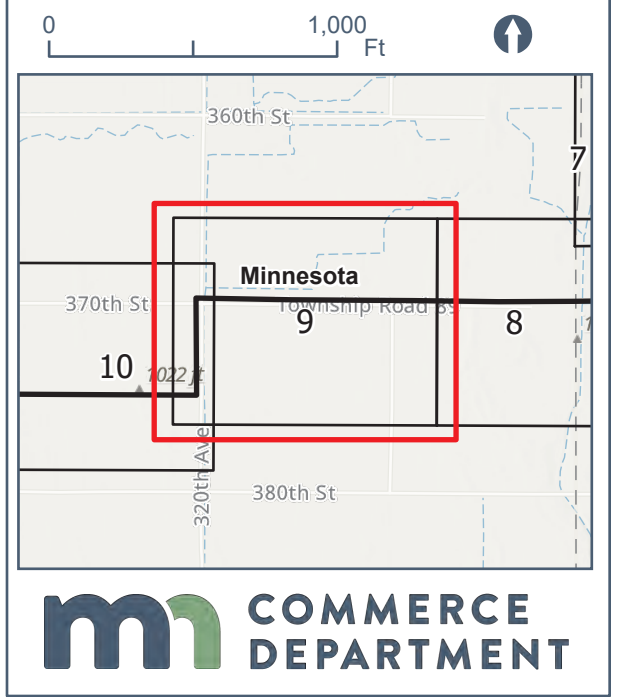
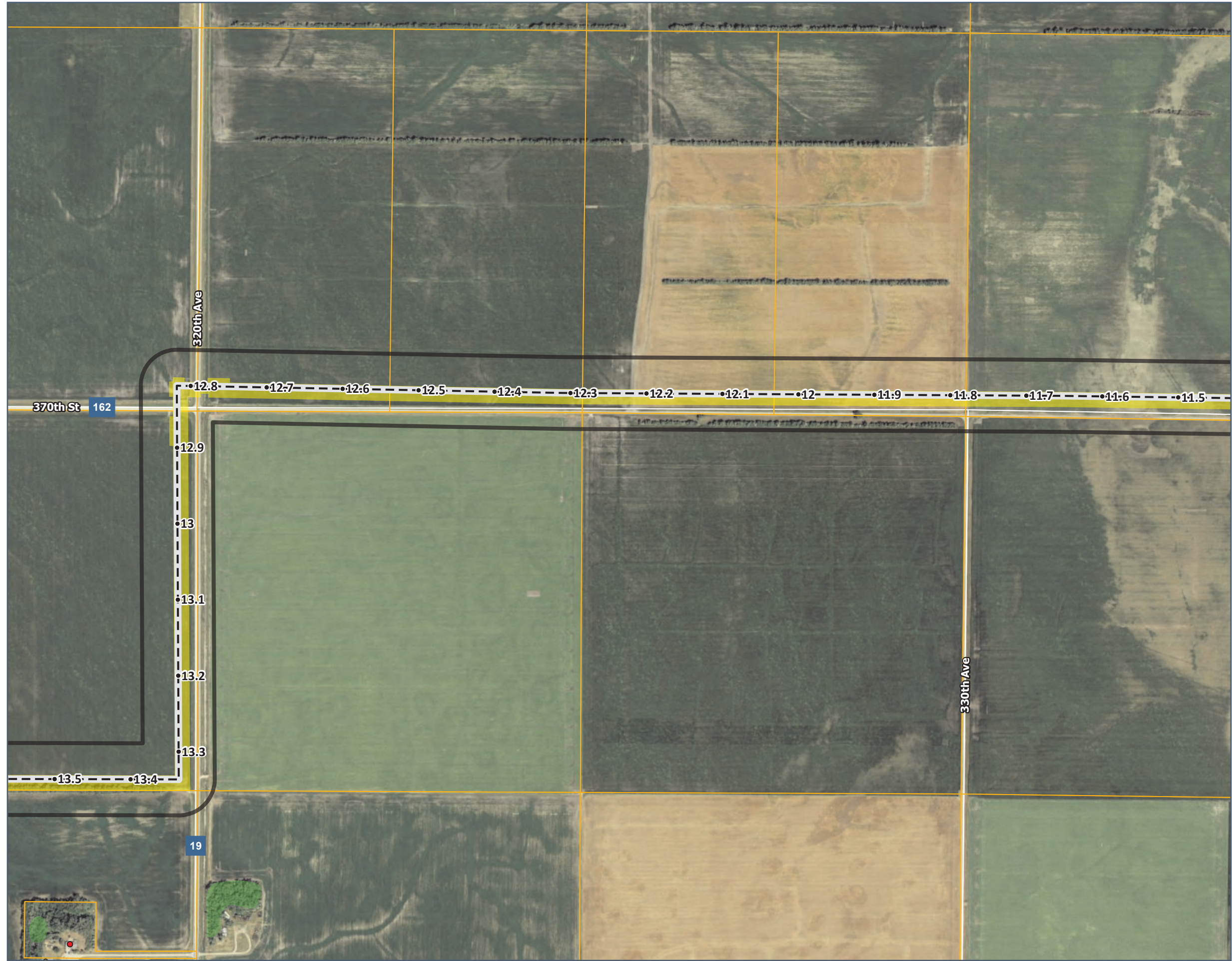


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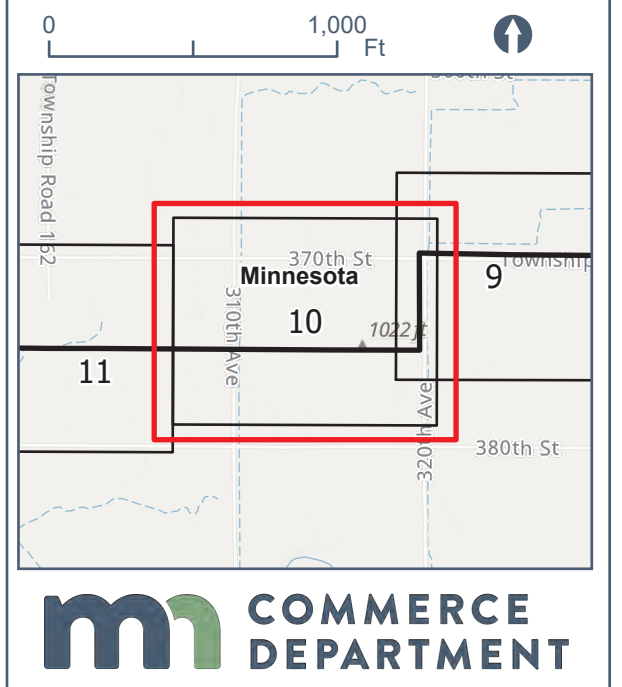
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 - ▮ Construction Workspace
 - ▮ Parcel
 - ▮ Undelineated NWI Wetland
- Structures within 1,600 Ft of Route Width**
- Residence
 - Other*



*Other includes buildings identified as Business, Garage/Barn, or Industrial

SOUTH ROUTE ALTERNATIVE DETAIL MAP

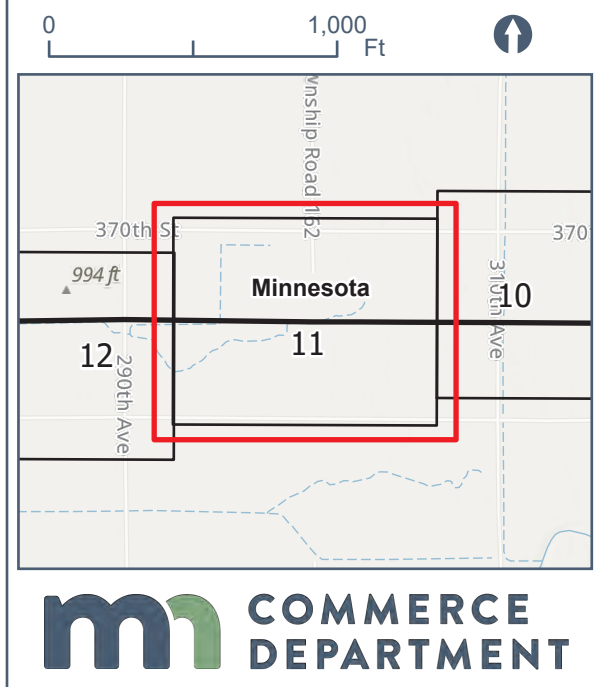
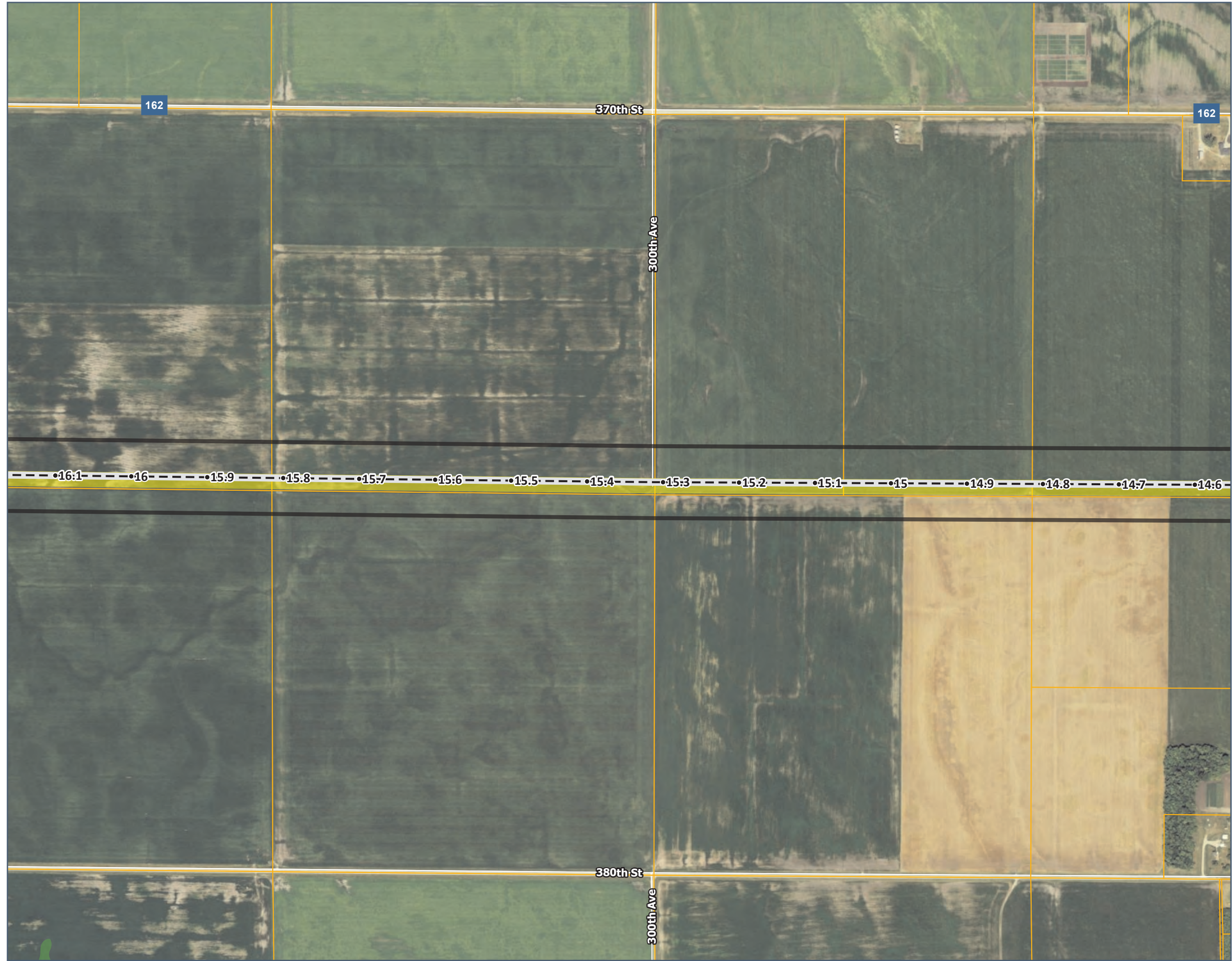
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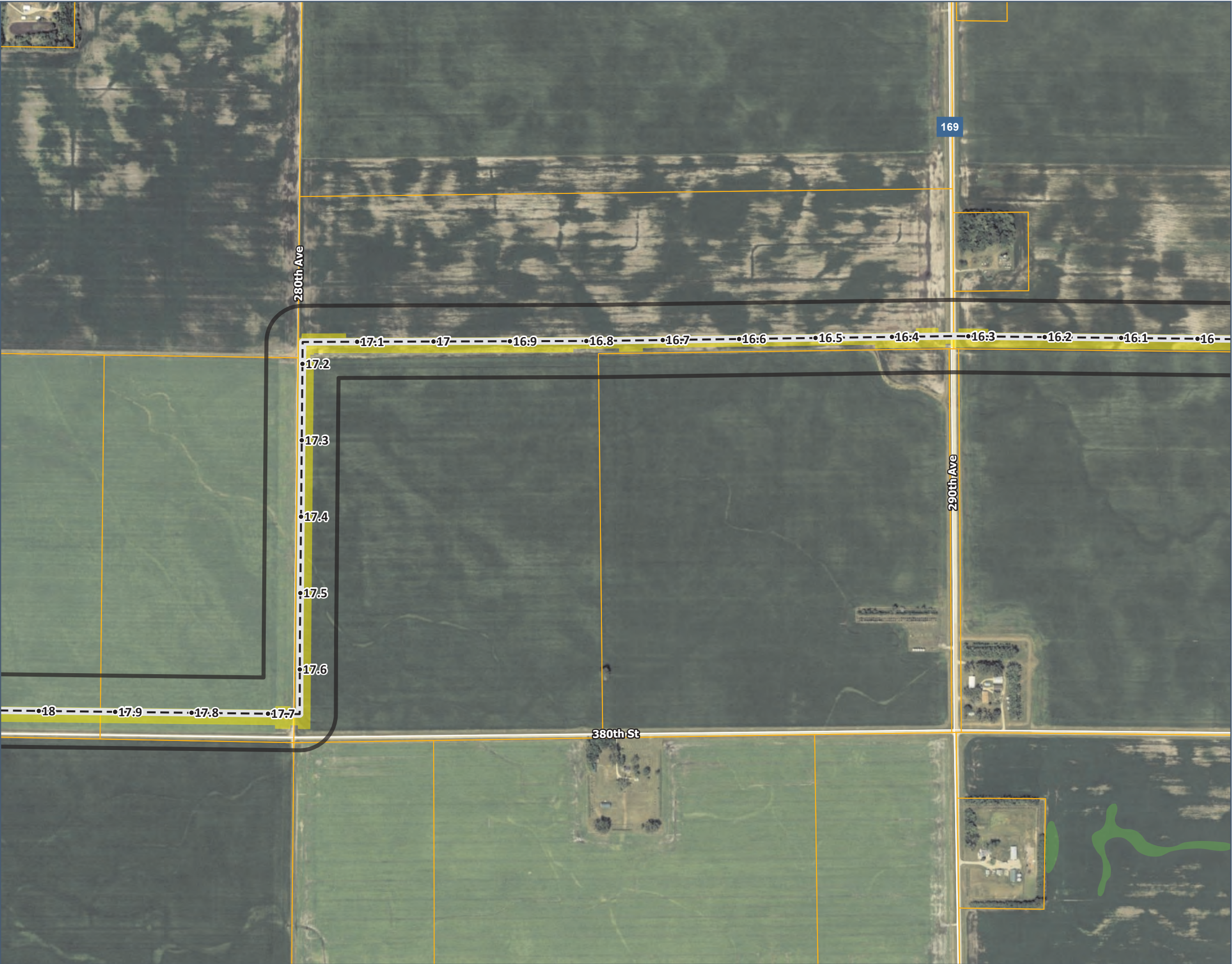
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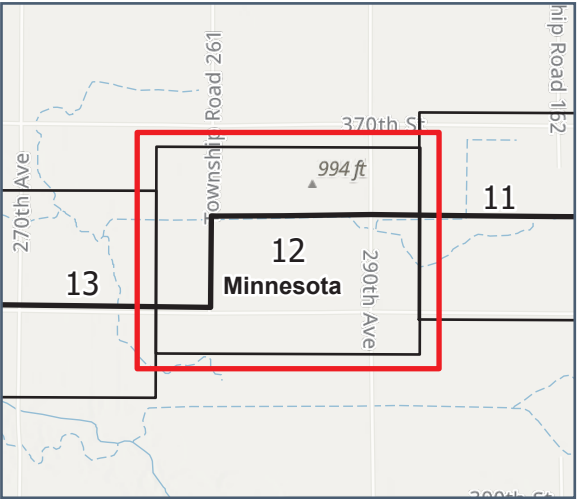


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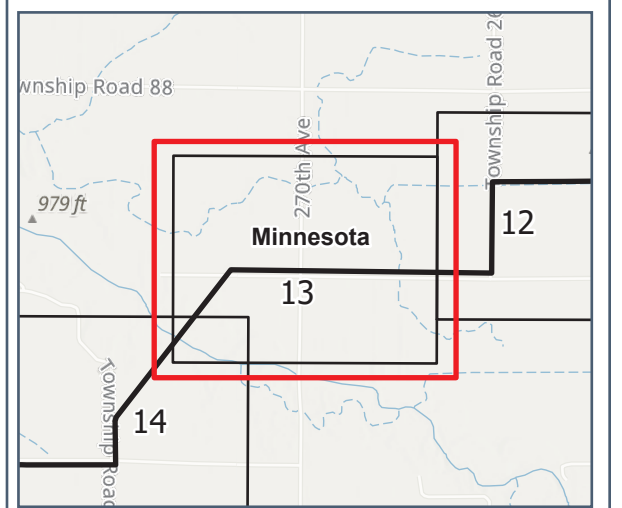
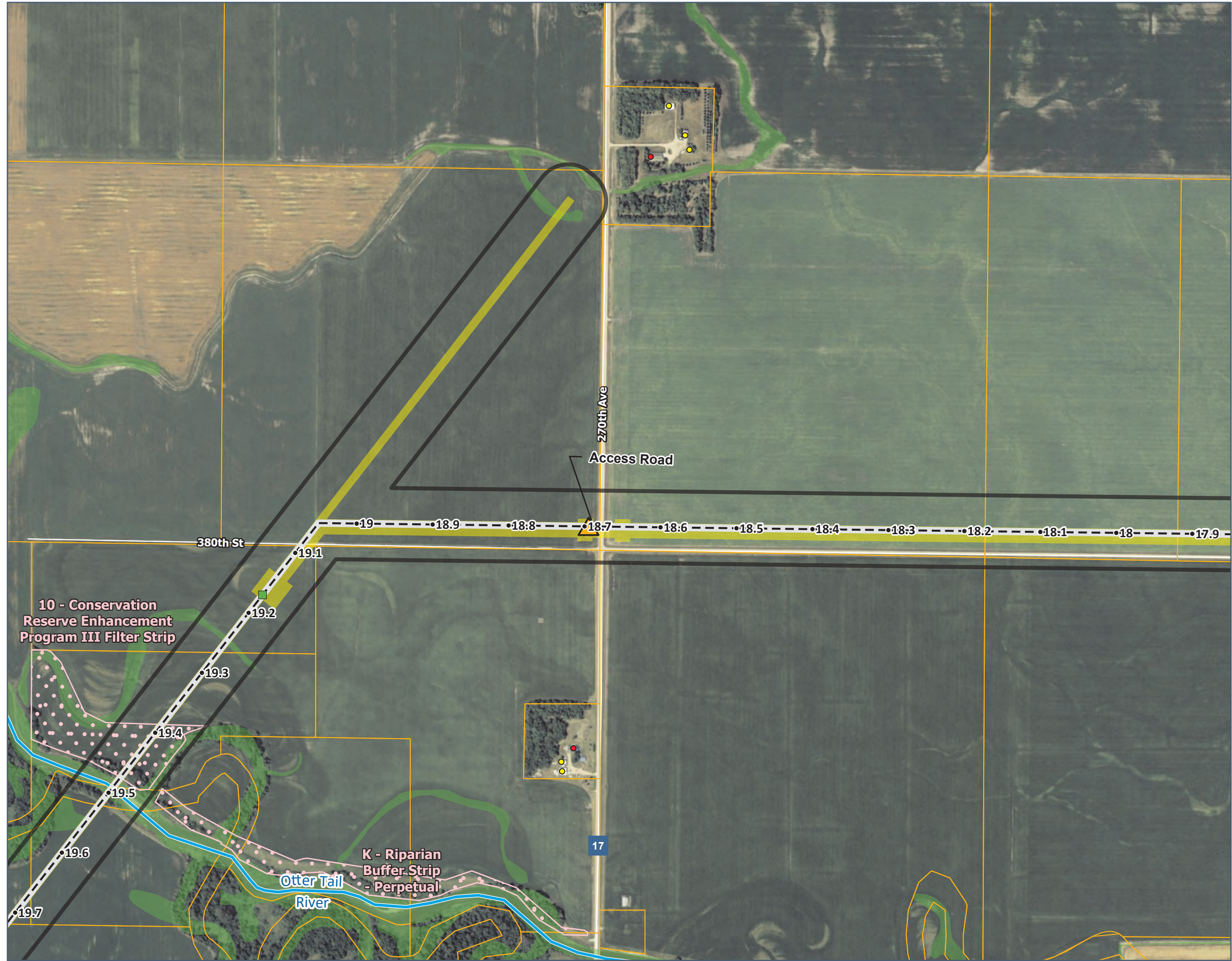


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SOUTH ROUTE ALTERNATIVE DETAIL MAP

Legend

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 - ▭ RA-South Route Width
 - ▭ Permanent Right-of-Way
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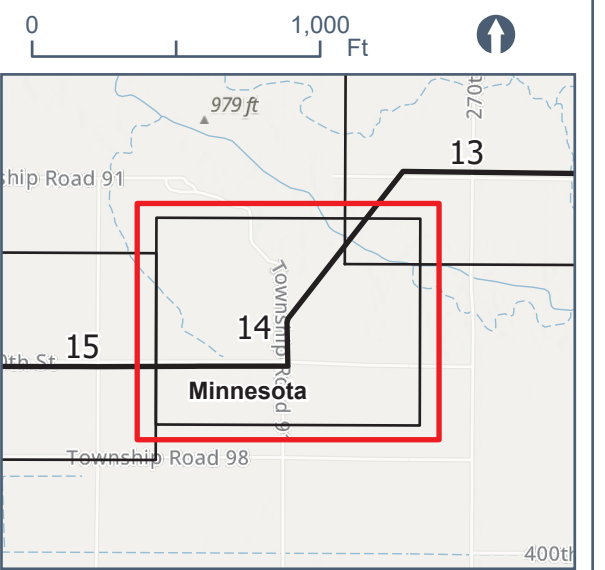


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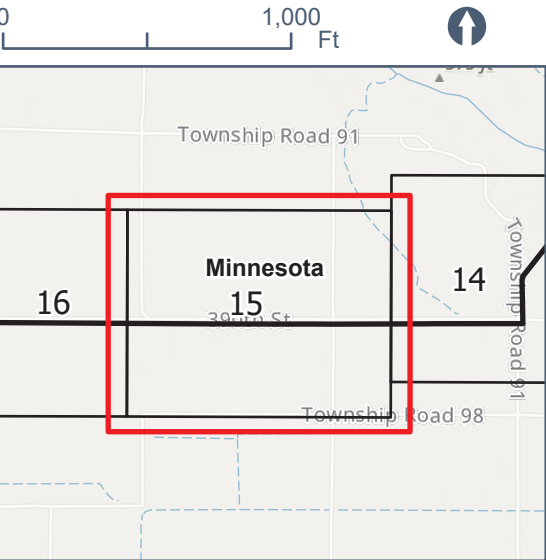
SOUTH ROUTE
ALTERNATIVE
DETAIL MAP

Legend

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- RA-South
- RA-South Route Width
- Permanent Right-of-Way
- Construction Workspace
- Parcel
- Board of Water & Soil Resources Easement

Structures within 1,600 Ft of Route Width

- Residence
- Other*



*Other includes buildings identified as Business, Garage/Barn, or Industrial



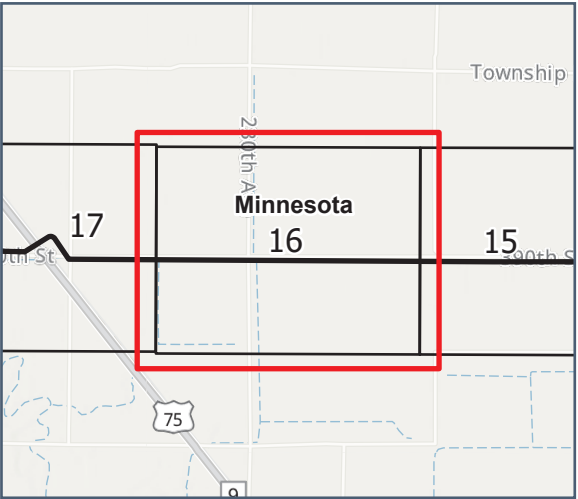
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Legend

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- RA-South
- ▭ RA-South Route Width
- ▭ Permanent Right-of-Way
- ▭ Construction Workspace
- ▭ Parcel
- ⊥ Active Railroad
- ▭ Undelineated NWI Wetland

Structures within 1,600 Ft of Route Width

- Residence
- Other*

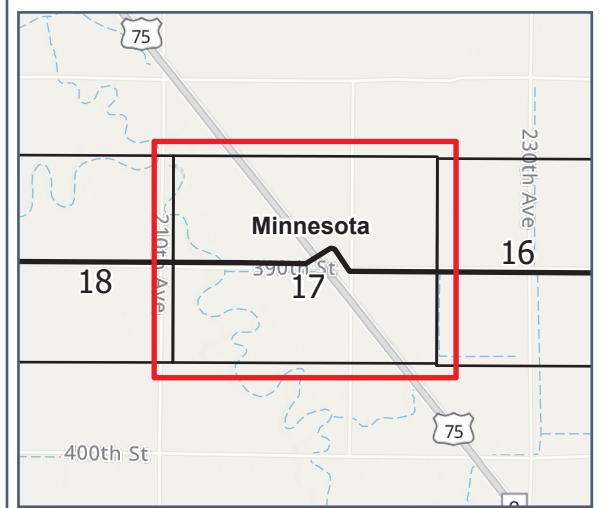


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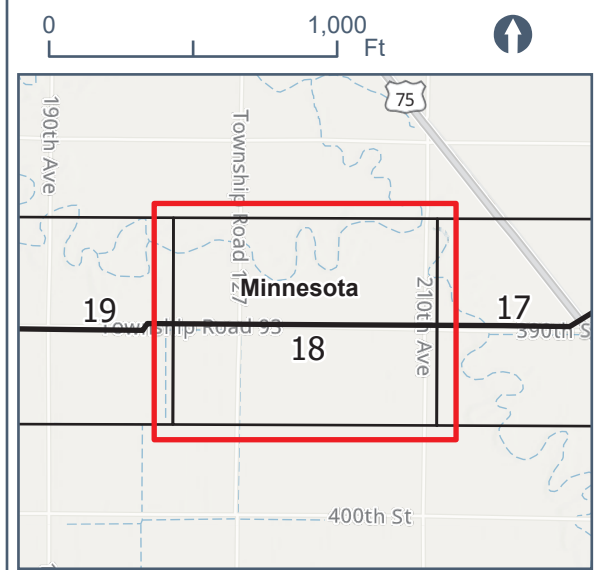
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 - ▭ Construction Workspace
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 - HDD
 - ▭ Parcel
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 - ~ Public Water Watercourse
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 - ▭ RA-South Route Width
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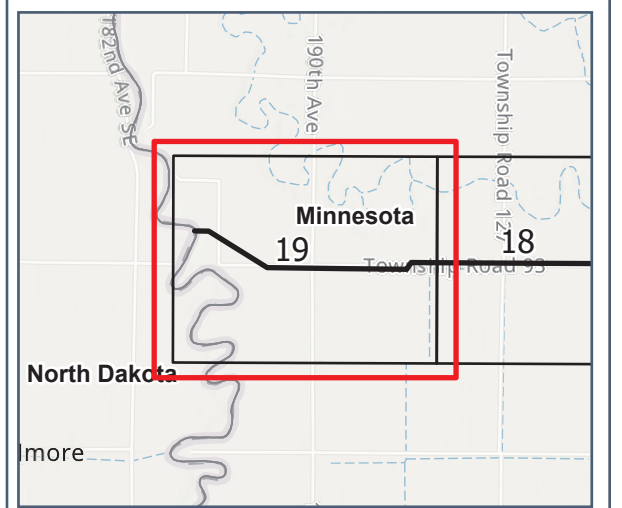


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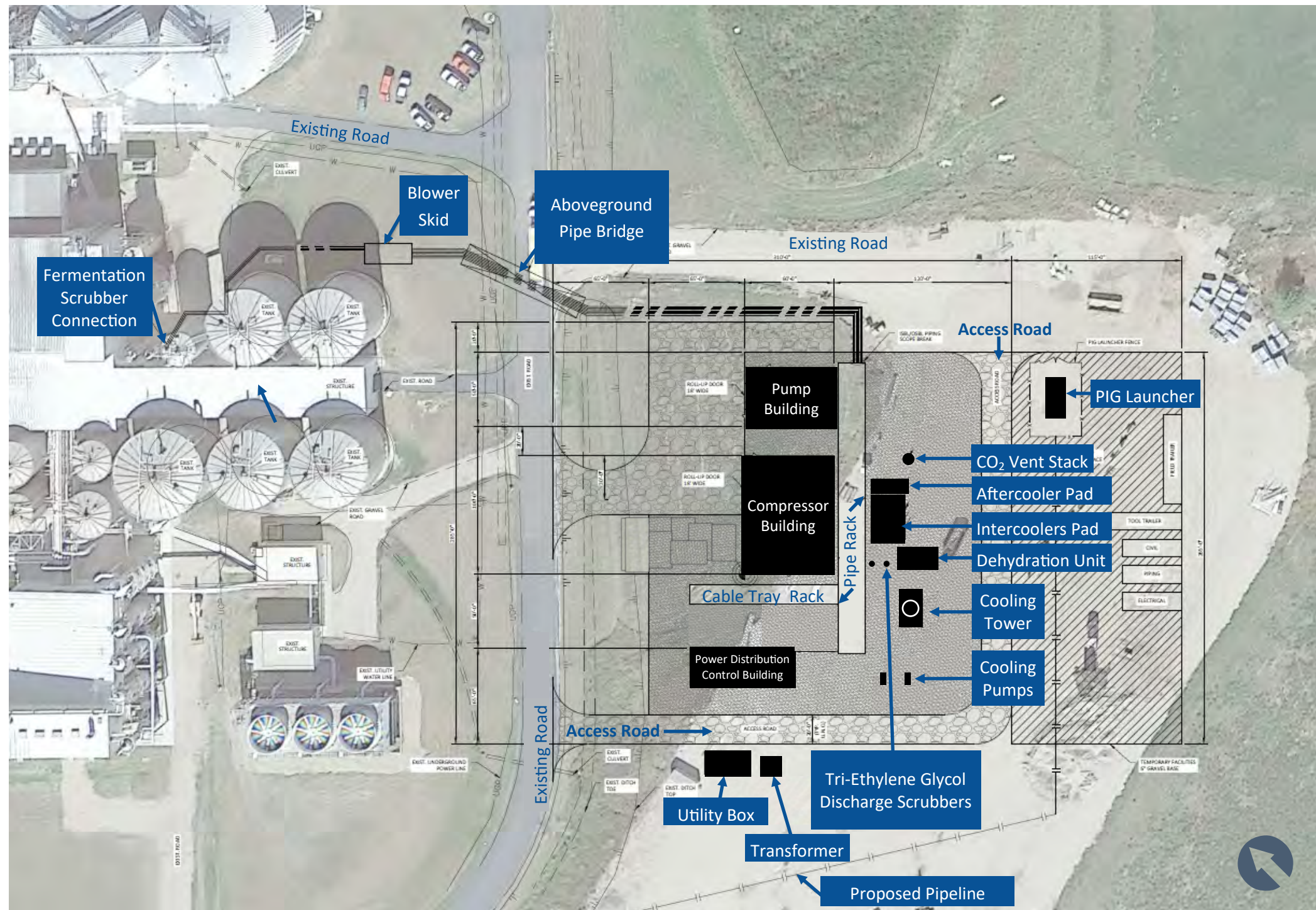
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- Structures within 1,600 Ft of Route Width**
- Residence
 - Other*



*Other includes buildings identified as Business, Garage/Barn, or Industrial

Appendix C

Aboveground Facility Drawings



Appendix D

Minnesota Environmental Construction Plan



Environmental Construction Plan – Minnesota

Summit Carbon Solutions

Project Name:

Summit Carbon Solutions Midwest Carbon Express

MPUC Docket Number:

IP7093/PPL-22-422

Document Control Number:

SCS-0700-ENV-01-PLN-027

Date:

November 8, 2023

REVISION HISTORY

DATE	REVISION	REVISION DESCRIPTION	PREPARED BY:	REVIEWED BY:	APPROVED BY:
2022-09-12	0	Final	BB/AR	JZ	JS
2023-11-08	1	Corrections in section 7.2.1 and to Figures 11 and 12.	BB/AR	JZ	JS

Environmental Construction Plan

This Minnesota Environmental Construction Plan (ECP) would be applicable to any Midwest Carbon Express pipeline that is constructed by Summit Carbon Solutions in the state of Minnesota. The ECP contains typical drawings which are applicable to a variety of pipeline diameters.

As of March 2024, Summit Carbon Solutions has one project before the Minnesota Public Utilities Commission, the Otter Tail to Wilkin Project in Otter Tail and Wilkin Counties. This pipeline has a 4 inch diameter.

Other potential pipeline infrastructure in Minnesota, by county, includes:

- Kandiyohi, Chippewa – 8 inch diameter
- Renville – 6 and 8 inch diameter
- Yellow Medicine – 8 inch diameter
- Redwood – 8 and 10 inch diameter
- Cottonwood, Jackson – 10 inch diameter
- Martin – 6 and 8 inch diameter

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Figure 9: Typical Non-Flowing Waterbody Crossing Open Cut Trenched

Figure 10: Typical Flowing Waterbody Crossing Open Cut Trenched

Figure 11: Typical Waterbody Crossing Open Cut, Flumed

Figure 12: Typical Waterbody Crossing Open Cut, Dam & Pump

Figure 13: Typical Guided Bore Detail

Figure 14: Typical HDD Configuration

Figure 15: "Dry" Wetland 75' Construction R.O.W.

Figure 16: Proposed Typical Water Diversion Drawing Pipeline

Figure 17: Proposed Typical Water Diversion Drawing Truck

Figure 18: Typical Wellpoint Dewatering System

Figure 19: Trench Dewatering

Figure 20: Dewatering Structure

Figure 21: Filter Bag for Dewatering

Acronyms

ATWS	Additional Temporary Workspace
BMP	Best Management Practice
ECD	Erosion Control Devices
EI	Environmental Inspector
HDD	Horizontal Directional Drill
MCE	Midwest Carbon Express
MN APP	Minnesota Agricultural Protection Plan
Minnesota ECP	Minnesota Environmental Construction Plan
MN UDP	Minnesota Unanticipated Discovery Plan
MDNR	Minnesota Department of Natural Resources
Plan	Minnesota Environmental Construction Plan
Project	Midwest Carbon Express Project
MPCA	Minnesota Pollution Control Agency
NPDES	National Pollutant Discharge Elimination System
ROW	Right-of-Way
SCS	Summit Carbon Solutions
SWPPP	Stormwater Pollution Prevention Plan

1 Introduction

The Minnesota Environmental Construction Plan (Minnesota ECP or Plan) will provide the Summit Carbon Solutions' (SCS) Midwest Carbon Express (MCE) Project with procedures to reduce the occurrence of off-site sedimentation and erosion and to increase the success and efficiency of revegetation and restoration methods on lands crossed by the MCE Project in Minnesota (Project). The Minnesota ECP will implement generally recognized best management practices (BMPs) to minimize and mitigate impacts to wetlands, waterbodies, and agricultural areas.

The objective of this Plan is to provide SCS personnel and contractors with instructional information regarding practical approaches to environmental concerns before, during, and after construction. This Plan is primarily focused on pipeline construction; however, it will be applied across the Project footprint inclusive of any aboveground facility in Minnesota. Federal, state, and local agencies having more stringent regulations will supersede this document.

1.1 Environmental Inspector

SCS will employ at least one Environmental Inspector (EI) on each construction spread. The EI will review the Project activities daily for compliance with applicable federal, state, and local regulatory requirements. The EI will have stop work authority when construction activities violate the environmental conditions of applicable federal, state, or local permits or when sensitive resources are threatened. They also have the ability to order corrective action in the event that construction activities violate the provisions of this Plan or any applicable permit requirements.

1.2 Advance Notice

In addition to any other notice required by law, SCS shall, at least one week prior to commencement of construction, notify each landowner of the pending construction.

2 General Mitigation Measures

2.1 Identification of Avoidance Areas

Preconstruction surveys will identify areas to mark or identify the workspace (e.g., wetlands and waterbodies, drain tile and irrigation systems), recreational trails, environmentally sensitive habitats, locations of invasive/noxious species habitats, and sensitive resources. All avoidance areas will have signs posted by the EI, so they are easily recognized by Project personnel.

2.2 Alignment Sheets, Construction Line List, and Permits

Alignment sheets will be prepared by SCS which will depict plan and profile of the pipeline and construction right-of-way (ROW) and include environmental and cultural constraints, restrictions, and/or conditions that will be followed during construction. Notations will be included in the alignments to direct personnel to the appropriate plan, permit, or other document that describes any restrictions as applicable.

SCS will prepare Environmental Plan Sheets that accompany the Stormwater Pollution Prevention Plan (SWPPP) required under the Minnesota Pollution Control Agency (MPCA) National Pollutant Discharge Elimination System (NPDES) State Disposal System Construction Stormwater General Permit (MNR100001). The Environmental Plan Sheets will identify the temporary and permanent erosion and sediment control and stabilization measures for the Project.

In addition, SCS has prepared a Minnesota Agricultural Protection Plan (MN APP). The MN APP presents proposed measures for minimizing impacts on and restoring agricultural lands during pipeline construction. For agricultural areas, if there is a discrepancy, the MN APP will supersede this document.

Negotiations with landowners will result in construction line lists that define landowner stipulations for construction and installation of line pipe on their land. This line list and required stipulations will be included in the construction contract that must be adhered to by the Contractor. SCS' construction inspectors, including EIs, and Agricultural Inspectors will be responsible for ensuring compliance with the terms of the construction contract including the stipulations of the line list.

2.3 Right-of-way Access

Safe and accessible conditions will be maintained at all access points throughout the duration of construction. The Contractor must have all necessary permits, licenses, bonds, and insurance in their possession prior to starting construction and throughout the duration of the Project. The Contractor must confine all activities to the permitted areas as shown on the construction drawings (i.e., Alignment Sheets). Any requested changes to workspaces and any off-ROW activities must be approved by SCS and any applicable agencies prior to the activity occurring.

SCS will post signs to identify approved roads to be used as haul roads or access roads. Vehicles and equipment will enter and exit the ROW only from permitted entrances or access points. Points of potential unauthorized site access may be physically barricaded, gated, or may utilize signs to prevent entrance if this will not interfere with landowners' use.

BMPs will be implemented to minimize vehicle tracking of soil from construction sites such as reducing equipment/vehicle access to the construction workspace where practicable and installing rock access pads or construction pads in accordance with permits and by federal, state, and/or local specifications.

If BMPs are not adequately preventing soil from being tracked onto paved public roads, self-contained street sweeping, or other equivalent means of collecting soil, will be used.

Where required by regulation, improved roads will be returned to their pre-construction condition after construction. The removal of temporary infrastructure in wetlands will comply with the appropriate regulatory permits, authorizations, and certificates. SCS will maintain permanent access roads to certain facilities during Project operation.

2.4 Workspace Design

The width of the construction workspace will vary depending on adjacent features such as utilities, roads, railroads, cultural, and environmental features such as wetlands and waterbodies. The workspace may be reduced (necked down) when crossing wetlands, waterbodies, or sensitive environmental features. Where it is necessary to reduce the workspace, the boundaries of the feature and workspace will be identified and staked in the field. All equipment and vehicles will be confined to the approved construction footprint except where permissions are granted for dewatering purposes by the landowner or land managing agency and approved by SCS.

2.5 Adverse Weather

2.5.1 Wet-Weather Shutdown

In the event of severe wet weather, SCS and the Contractor may cease work on the Project until it is deemed safe to continue work. The Contractor may restrict certain construction activities and work in

cultivated agricultural areas in excessively wet soil conditions to minimize rutting and soil compaction. Work may be suspended during severe wet weather when the following may occur:

- Anticipation of material mixing soil horizons;
- Anticipation of excessive soil compaction;
- Significant surface ponding; and/or
- Type of activity occurring on that day.

2.6 Management of Undesirable Species

SCS will attempt to minimize the potential for introduction or spread of state identified noxious weeds or invasive species along the construction work area. SCS will coordinate with local weed management boards and landowners if areas within the ROW are identified to contain populations of state identified noxious, invasive species, or soil borne pests.

The Contractor will inspect and clean all equipment prior to bringing it to construction ROW to prevent the introduction and spread of invasive species. The duration between final grading and permanent seeding will be minimized to reduce the potential growth of opportunistic nuisance species.

Weed-free hay or straw will be used for mulch and sediment barriers. Where required by weed control boards for specific species that require treatment ahead of construction, the topsoil will be stripped from the full width of the ROW where isolated weed populations exist and will be stored separately from other topsoil and subsoil. These locations will be identified and marked prior to construction activities by an EI. Alternatively, approved herbicides may be used to prevent the growth and spread of weeds during construction by pre-treating areas of infestation on the construction workspace. If SCS fails to control weeds resulting from construction activities within 45 days after receiving written notice from a landowner, SCS will be responsible for reimbursing all reasonable costs of weed control incurred by owners of adjacent land. Herbicides will not be used within 100 feet of a wetland, waterbody, or native prairie remnant unless approved by the appropriate land management and state agency and needed to control a known infestation.

2.7 Topsoil Management

2.7.1 Topsoil Segregation

When segregating topsoil, the Contractor will strip all topsoil on agricultural lands. Topsoil depth will be determined onsite. Topsoil and subsoil will be separated when stripping the topsoil for construction in most areas. When separated, topsoil piles will be stabilized to reduce loss from erosion by utilizing measures such as sediment barriers, mulch, temporary seeding, or tackifiers, where necessary. Full topsoil stripping and segregation across the ROW will occur in uplands or as dictated by landowner requirements. In unsaturated wetlands, topsoil will be segregated up to a maximum of 12 inches per United States Army Corps of Engineers requirements. Topsoil removal and segregation will not occur in wetlands which are saturated at the time of construction. Typical plan and profile views of topsoil management are provided in Figures 1 and 2 in Appendix A.

Topsoil cannot be used for padding the pipe, temporary erosion control methods such as slope breakers or trench plugs, roads, or as fill material.

Topsoil removal will not be required where the pipeline is installed by plowing, jacking, boring, or other methods that do not require the opening of a trench.

2.7.2 Storage

Topsoil stockpile heights must not exceed 35 feet and slope must be 2:1 or flatter. Where applicable, topsoil and subsoil piles will be placed so that at least a 1-foot of separation will be maintained between the piles to prevent mixing. If a 1-foot separation gap cannot be maintained, approval from the EI may be given to utilize a physical barrier such as a silt fence, geotextile fabric, or thick layer of mulch. Topsoil may be tackified in excessive wind conditions. Once an area or stockpile is disturbed, it should be mulched and/or seeded per temporary stabilization guidelines within 7 days if it will not be re-disturbed within 14 days.

2.8 Temporary Stabilization and Sediment Control

Temporary BMPs will be implemented to minimize erosion and control sediment. Permanent measures are discussed in Section 2.9.

Erosion Control Devices (ECDs) will be installed during or immediately following removal of vegetation, as seasonal conditions warrant. If disturbance activities occur at the base of a sloped area near wetlands, waterbodies, water conveyances, or roads, ECDs will be installed, as needed, prior to any ground disturbing activity to prevent erosion and siltation of waterbodies and wetlands downslope. Temporary ECDs will be placed at the base of slopes in the vicinity of a wetland or waterbody, as needed, and at site-specific locations identified in Project SWPPPs until the area is revegetated.

The Contractor will maintain ECDs as required by permits, regulations, and plans. ECDs will be inspected at least once every 7 calendar days and within 24 hours of a rainfall event of 0.5 inch or greater. ECDs unable to function properly will be repaired or replaced within a reasonable time, as specified in Project SWPPPs, or as soon as conditions allow. The inspection frequency may be reduced to at least once per month if the entire site is temporarily stabilized or runoff is unlikely due to weather conditions (e.g., site is covered with snow, ice, or the ground is frozen). A waiver of inspection requirements is typically available until one month before thawing conditions are expected to result in a discharge if all of the following conditions are met:

- The Project is located in an area where frozen conditions are anticipated to continue for extended periods of time;
- Land disturbance activities have been suspended; and
- The beginning and ending dates of the waiver date are documented.

Once a definable area is stabilized, the area will be marked, and no further inspection requirements will apply to that portion of the site. Typical designs of temporary erosion and sediment control BMPs are provided in Figures 3 to 7 in Appendix A.

Stabilization¹ of all exposed areas, including spoil piles, must be initiated immediately² to limit soil erosion when construction activity has permanently or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. Stabilization must be completed no later than 14 calendar days after the construction activity has ceased.

In areas within 1 mile of, and draining to, a special³ or MPCA impaired water, stabilization measures will be initiated immediately and completed within 7 calendar days whenever construction activity has permanently or temporarily ceased on any portion of the site. Areas of the Project where this timing restriction applies will be clearly defined on the Environmental Plan Sheets accompanying the SWPPP.

On portions of the Project where work will be occurring during applicable “work in water restrictions” for Public Waters (refer to Section 4.4), all exposed soil areas within 200 feet of the water’s edge, and that drain to that water, will be stabilized within 24 hours during the restriction period. Stabilization of all exposed soils within 200 feet of the Public Water’s edge, and that drain to that water, will be initiated immediately and completed within 7 calendar days whenever construction activity has permanently or temporarily ceased on any portion of the site outside of the restriction period.

2.8.1 Mulch

Mulch used for the Project will be free of noxious weeds and invasive species and will be made of hay, straw, wood fiber hydro-mulch, erosion control fabric, or a functional equivalent approved by the EI. The Contractor will select wildlife-friendly erosion control fabric that contains biodegradable netting (Category 3N or 4N natural fibers⁴) and will avoid the use of plastic mesh. All hydro-mulch and liquid tackifier products used will be on the Minnesota Department of Transportation product list. Hydro-mulch and liquid tackifier products containing plastic/polypropylene fiber additives and Malachite Green (colorant) will not be used. Mulch will be applied uniformly on slopes identified by an EI and, if the EI allows, on dry, sandy areas that have a risk of washing away through erosion. At least 90 percent of the ground will be covered with mulch unless stipulated by permit conditions. Mulch will not be applied in wetlands.

2.8.2 Sediment Barriers

To help mitigate the flow and deposition of sediments into sensitive habitats, sediment barriers will be utilized and will consist of materials such as silt fence, staked hay or straw bales, wattles, compacted soil, or sandbags.

¹ Stabilization means that the exposed ground surface has been covered by appropriate materials such as mulch, staked sod, riprap, erosion control blanket, mats, or other material that prevents erosion from occurring. Grass seeding, agricultural crop seeding, or other seeding alone is not stabilization. Mulch materials must achieve approximately 90 percent ground coverage (Minnesota Rules 7090).

² Initiated immediately means taking an action to commence soil stabilization as soon as practicable, but no later than the end of the work day, following the day when the land-disturbing activities temporarily or permanently cease (Minnesota Rules 7090).

³ Special waters are listed in the National Pollutant Discharge Elimination System State Disposal System Construction Stormwater General Permit (MNR100001) under item 23.3 through 23.6.

⁴ Category 3N or 4N as described in Table 3885-2 (3885.2A Erosion Control Blanket Requirements) in Minnesota Department of Transportation Standard Specifications for Construction, 2018 Edition (<http://www.dot.state.mn.us/pre-letting/spec/2018/2018-spec-book-final.pdf>).

The Contractor will properly install and maintain redundant sediment control measures immediately after clearing and prior to initial ground disturbance at wetlands and waterbodies located within 50 feet of the Project and where stormwater flows to a wetland or waterbody. The Contractor will install perimeter sediment controls at least 5 feet apart unless limited by lack of available space. Redundant controls will not be installed adjacent to road ditches, judicial ditches, county ditches, stormwater conveyance channels, storm drain inlets, sediment basins, and agriculturally farmed wetlands. Sediment barriers will be installed at the following locations:

- At the base of slopes where wetlands, waterbodies, or roads are located at a lower elevation;
- At the edge of the construction ROW adjacent to a wetland, waterbody, or road;
- Between topsoil/spoil stockpiles and streams or wetlands, as needed and if adequate separation cannot be achieved;
- Dewatering or discharge locations were required; and
- As directed by the EI.

The Contractor properly will install and maintain redundant sediment control measures immediately after clearing and prior to initial ground disturbance at Minnesota-designated special waters located within 100 feet of the Project and where stormwater flows to the surface water.

The Contractor will be responsible for inspecting, maintaining, and replacing temporary sediment barriers throughout construction. The Contractor will remove sediment barriers only after the area has successfully revegetated as required by permit conditions (i.e., a minimum 70 percent perennial vegetation cover or vegetation similar to natural terrain is established) or if replaced with a permanent sediment barrier, if needed.

2.8.3 Trench Plugs

Temporary trench plugs will be used to prevent trenchline erosion and decrease the rate of flow and volume of trench water at the base of slopes. Trench plugs will also be utilized on either side of a wetland or waterbody crossings. Temporary trench plugs may consist of leaving an unexcavated portion of the trench in place, putting in subsoil, sandbags, or equivalent. Permanent trench breakers are discussed in Section 2.9.1.

2.8.4 Slope Breakers

Temporary slope breakers will consist of soil berms, silt fence, staked straw bales, sandbags, or similar materials approved by SCS that typically span the width of the ROW. The Contractor will install temporary slope breakers on slopes identified by an EI and on all disturbed lands with the following recommended spacing:

Slope (%)	Spacing (feet)
5 – 15	300
>15 – 30	200
>30	100

At the end of each temporary slope breaker, an outfall will direct surface flow into a stable, well-vegetated area or an energy-dissipating device off of the construction ROW as permitted by landowner agreements.

The outfalls will be installed to prevent sediment from discharging into wetlands, waterbodies, or sensitive areas. A typical depiction of slope breakers is found in Figure 5 in Appendix A.

2.9 Permanent Stabilization

Typicals of permanent erosion control measures described below are similar to that described above for temporary measures.

2.9.1 Trench Breakers

Permanent trench breakers will be installed, as necessary, on steep slopes where trench line erosion has the risk of occurring and at slopes adjacent to wetlands and waterbodies. The location of trench breakers will be selected based on field conditions at the time of construction and will consider the degree and length of slope, presence of down-slope sensitive resource areas such as wetland and waterbodies, and proximity to other features such as roads and/or railroads. Trench breakers must be installed at the entry and exit from every designated Public Water, except for at horizontal directional drill (HDD) crossings. Trench breakers will consist of sandbags or another inert material. Foam trench breakers shall not be used. Topsoil will not be used for permanent trench breakers.

2.9.2 Mulch

Outside of active agricultural land and wetlands, mulch will be applied and properly anchored on all slopes immediately after seeding to stabilize the soil and mitigate the effects of erosion. Mulch will be applied on slopes identified by an EI and on dry, sandy areas that may blow or wash away. The application of mulch will cover at least 90 percent of the ground surface.

Mulch shall be anchored immediately to minimize loss by wind or water. Anchoring methods include the following:

- Mechanical – Use a disk, crimper, or similar type tool set straight to punch or anchor the mulch material to the soil. Straw mechanically anchored shall not be finely chopped but to be left at a length of approximately 6 inches.
- Mulch netting – netting shall be used in accordance with the manufacturer's recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes. The Contractor will select wildlife-friendly erosion and sediment control BMPs that contain biodegradable netting (Category 3N or 4N natural fibers) and will avoid the use of plastic mesh.
- Synthetic binders – synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Tack, or equal may be used according to manufacturer's recommendations. Synthetic binders will not be used within 100 feet of a wetland or waterbody unless specifically approved by the EI on a case-by-case basis.
- Wood cellulose fiber.

2.9.3 Slope Breakers

Permanent slope breakers will be constructed across the ROW, where necessary, to limit erosion. Slope breakers divert surface runoff to adjacent stable vegetated areas or to energy-dissipating devices. In cultivated or residential areas, permanent slope breakers will not be installed. The Contractor will follow the recommended spacing as stated in Section 2.8.4 for construction of the permanent breakers.

2.10 Dust Control

Dust control is used to help mitigate the effects of wind erosion and fugitive dust emissions during construction. Fugitive dust is especially a concern on the ROW near residential areas, farm dwellings, roads, or when strong wind conditions are present. The ground may be sprayed by watering trucks or sprinklers to control the dust. Water will not be applied in quantities to cause run off from the ROW.

The Contractor will take appropriate precautions to prevent fugitive emissions caused by sand blasting from reaching any residence or public building. Curtains of suitable material will be placed, if necessary, to prevent wind-blown particles from sand blasting operations reaching residences, roads, or public buildings.

2.11 Noise Control

Construction equipment will be properly muffled and maintained to avoid producing excessive noise near noise sensitive areas. Particular attention will be exercised when working near noise sensitive areas including residential areas, schools, churches, cemeteries, hospitals, camping facilities, and outdoor amphitheatres and playgrounds. SCS will abide by applicable local noise ordinances regarding noise near residential and commercial/industrial areas. The Contractor will seek to minimize noise in the immediate vicinity of herds of livestock or poultry operations, which are particularly sensitive to noise.

2.12 Cultural Resources

SCS will conduct pre-construction cultural surveys to identify culturally significant sites and properties listed or eligible for listing in the National Register of Historic Places. Areas identified as culturally or historically important will be avoided to the extent practical by rerouting the pipeline corridor, reducing ROW workspace, HDD, or other means.

A Minnesota Unanticipated Discovery Plan (MN UDP) has been prepared and describes the procedures in the unlikely event that unanticipated discoveries occur during the course of Project construction and provides direction and guidance to Project personnel as to the proper actions to be followed in the event of an unanticipated discovery. Training will be provided for all construction personnel. This training will cover procedures for unanticipated discovery. In the event of an unanticipated discovery, the Contractor will immediately halt all construction activities within a 100-foot radius; notify the EI; and implement the procedures listed in the MN UDP. Where required, SCS will monitor the construction spread using a cultural resource monitor working under the direction of a professional who meets the standards of the Secretary of the Interior's Historic Preservation Professional Qualification Standards (48 FR 44716, September 29, 1983).

2.13 Winter Construction

Should winter construction be required, then SCS will develop winter construction procedures that will be described in a Winter Construction Plan. If constructing the pipeline in frozen conditions through agricultural lands is necessary, the relevant mitigation measures outlined in the MN APP will be followed to protect the productivity of agricultural lands.

3 Uplands and Agricultural Areas

3.1 Clearing and Grading

Areas to be cleared and graded will be flagged, this includes the ROW, ancillary facilities, roads, and additional temporary workspace (ATWS). Qualified inspection personnel will inspect the clearing and grading activities to ensure the Contractor stays within the authorized limits of disturbance.

Agricultural areas with crops present will be mowed or disced to ground level unless the landowner requests the crops be removed. Bushes and trees will be felled or sheared to prevent damage to adjacent trees and structures. Bushes and trees may be disposed of or chipped and spread on the ROW as mulch if approved by the landowner. Burning will be conducted in accordance with all permits, regulations, and approvals.

In addition, agricultural areas that have terraces will be surveyed to determine pre-construction contours and ensure restoration will be successful when establishing original contours and drainage patterns.

Tree stump removal and grading activities will be limited to directly over the trench or where needed for a safe work area.

For HDDs and bores of waterbodies where there will not be a travel lane within the ROW (e.g., use of a bridge), there will be no clearing over the HDD path. SCS may trim vegetation using hand tools where necessary to access a water source and/or to place the HDD guidewires.

Some clearing may be required along HDDs of waterbodies where a bridge or mats will be installed to allow the transport of construction vehicles and equipment. In this case, clearing will be limited to the width of the travel lane needed to access the bridge or mats. Limited grading may also occur to allow for the safe installation of the bridge. All clearing and grading work will be conducted in accordance with applicable permits.

3.2 Trenching

As described in the MN APP, the pipeline will be constructed with a minimum depth of cover of 54 inches as required by Section 216G.07 of the Minnesota Statutes. Where existing tile systems are present, and where landowners have, prior to construction, consulted with SCS on specific future planned tile⁵ systems that may be impacted by construction, the pipeline will be installed at a depth that will achieve at least a 12-inch separation between the pipeline and overlying tiles as described in the MN APP or have an agreed upon separation distance with the landowner. The minimum depth of cover over the pipeline will be increased to 60 inches at waterbody and drainage ditch crossings as well as private road crossings (as measured at the bottom of the road ditch, with a minimum of 60 inches of cover below the road surface). Additional conditions may be implemented if requested by local, state, or federal agencies in areas adjacent to wetlands or waterbodies or in sensitive habitat. Civil surveys will occur post-installation of the pipeline to ensure that the depth of cover meets state and federal requirements.

⁵ Locations where the proposed tile installation is made known in writing to SCS by the Landowner either: 1) within 60 days after the signing of an Easement; or 2) before the issuance of a Route Permit to SCS; whichever is sooner.

To allow the passage of wildlife, livestock, and to facilitate the natural drainage pattern, spoil piles will have gaps that align with the breaks of the strung pipe. Plugs of subsoil in the ditch will be left or bridges may also be constructed to allow the passage of wildlife and livestock.

SCS does not anticipate that Blasting will be required in Minnesota. Should this activity be required, SCS will develop a Blasting Plan that contains the necessary procedures (see Section 4.6).

Trenching procedures will be followed closely to ensure the length of time the trench is left open is minimized to the extent practicable. Except at boreholes and tie-ins, the Contractor will limit the amount of excavated open trench in uplands to a maximum of 15 days of anticipated welding production per spread, or 15 miles per spread. For locations along the Project where the USACE Section 404 Utility RGP applies (i.e., waters of the U.S.), this will be limited to 5,280 linear feet of open trench. Within each spread, site-specific activities, such as HDD, bores, and valve work may be performed independent of open trench work.

3.3 Backfilling

Backfilling will commence after the trench is dewatered in accordance with state regulations and the BMPs stated in Section 7.2. The trench will be backfilled using the excavated material from the trenching process (subsoil first followed by topsoil) and then stabilized as soon as possible. Stream bottoms will be restored to pre-construction condition during the backfilling process, with no impediments to normal water flow. Final grading will occur to ensure that the pre-construction contours are matched with the surrounding topography and the disturbed area is stabilized.

3.4 Clean Up

Cleanup will immediately follow the backfilling operation as weather conditions allow. Waste will be disposed of in a manner that meets regulations and the conditions listed in Section 10. Temporary erosion and sediment control structures will be removed in stabilized areas and permanent structures will be installed, if necessary.

Temporary workspace will be returned to pre-construction conditions except for trees and shrubs that exceed 15 feet in height within 15 feet of the pipeline. The pipeline ROW will be returned to pre-construction conditions except where aboveground facilities or ROW access roads are required for safe pipeline operations.

If any excess subsoil remains after the backfilling process, it will be removed and disposed of at an approved location to ensure contours are restored to the pre-construction condition. Subsoil will not be placed on topsoil. Following the cleanup procedure, seed bed preparation will begin. Restoration and seeding methods are listed in Section 8.

3.5 Interference with Irrigation Systems

SCS will work with landowners to locate and address issues with irrigation systems within the construction footprint until restoration is achieved. Water flow will be maintained during construction unless impractical and if so, coordinated with and documented with the landowner, including any associated damage payments.

3.6 Drain Tiles

SCS will work with landowners to locate drain tile systems within the ROW prior to construction. Drain tiles will be marked and will receive appropriate erosion and sediment control BMPs for those with

potential to receive stormwater discharge due to the Project's activities. If drain tiles are out of the construction workspace, SCS will install sediment control measures along the edge of the ROW if access to the inlet site is unauthorized by the landowner.

Tile disturbed or damaged by pipeline construction will be repaired to its original or better condition. Any underground drain tile damaged, cut, or removed will be marked by placing a highly visible flag in the trench spoil bank directly over or opposite such tile. This marker will not be removed until the tile has been permanently repaired and the repairs have been approved and accepted by the county inspector or landowner. If proper notice to the county inspector is provided, construction will not be delayed due to an inspector's failure to be present on the site. Any underground drain tile damaged, cut, or removed and found to be flowing or which subsequently begins to flow will be temporarily repaired as soon as practicable, and the repair will be maintained as necessary to allow for its proper function during construction of the pipeline. The temporary repairs will be maintained in good condition until permanent repairs are done. If tile lines are dry and water is not flowing, temporary repairs are not required.

Any underground drain tile damaged, cut, or removed and found to be flowing or which subsequently begins to flow will be temporarily repaired as soon as practicable, and the repair will be maintained as necessary to allow for its proper function during construction of the pipeline. The temporary repairs will be maintained in good condition until permanent repairs can be completed. If tile lines are dry and water is not flowing, temporary repairs are not required.

As described in the MN APP, tile disturbed or damaged by pipeline construction will be repaired to its original or better condition. Permanent repairs will be completed within 21 days after the pipeline is installed. As described in Section 3.2, where underground drain tile is encountered in the Project profile, the pipeline will be installed at a depth that will achieve at least 12-inch separation between the pipeline and overlying tiles or as agreed upon with landowner.

3.7 Terraces

SCS will work with landowners to ensure restoration of terraces to their pre-construction condition. If requested by the landowner, SCS may hire a local contractor to restore the terraces.

Civil surveys will be conducted to document the terraces and contours before disturbance occurs. The pre-construction drainage along the terrace channel will be maintained and additional BMPs may be installed if necessary. SCS will perform post-construction monitoring and inspection to ensure restoration methods of the terraces are sufficient and that they are to their pre-construction elevation and condition. If the terraces require further work, SCS will either compensate the landowner or arrange for a local contractor to perform the work.

4 Waterbodies

Waterbodies will be surveyed ahead of construction, and along with existing hydrology and USGS information categorized as perennial (year-round water flow), intermittent (contain flow during wet seasons), or ephemeral (contains flow during or immediately after rain or snowmelt event). SCS will obtain permits as necessary involving waterbodies and comply with the conditions and commitments set forth by the agency or permit.

4.1 Workspace

Additional work areas will be minimized and limited in size when located adjacent to the waterbody banks. To ensure any riparian cover is maintained, markers will be placed by an EI at the banks of waterbodies until post-construction seeding has completed.

4.2 Bridges and Culverts

Temporary bridges and culverts may be used when crossing waterbodies (see Figure 8 in Appendix A). Soil will not be used to construct or stabilize equipment bridges. Equipment crossing a bridge will be limited to one piece of clearing equipment at a time per waterbody crossing. Bridges will be designed in a way to limit erosion, sediment into a waterbody, and to withstand the highest expected flow of the time the bridge is in place. At public waters, bridge headers will be placed at least 5 feet back from Top of Bank on either side of the waterbody. Bridges will be removed as soon as practicable after permanent seeding, except for if that period falls within an in-stream timing restriction for work within the ordinary high-water mark). Once the bridge is removed, SCS will conduct additional grading to restore the banks to as near as practicable to pre-construction conditions as needed. Additional seeding and/or installation of erosion and sediment control measures will also be implemented as required.

Fording of waterbodies is prohibited (i.e., civil survey, potholing, or other equipment are not permitted to ford waterbodies prior to bridge placement).

4.3 Clearing and Grading

SCS will comply with regulations and permit constraints to reduce the workspace needed to cross waterbodies. The Contractor will properly install and maintain redundant sediment control measures immediately after clearing and prior to initial ground disturbance at waterbodies located within 50 feet of the Project and where stormwater flows to a waterbody and at special waters located within 100 feet of the Project and where stormwater flows to the surface water. SCS will follow applicable permit conditions for any limitations related to length of linear open trench allowable at any given time.

For HDD and bore crossing of waterbodies where there will not be a travel lane within the ROW (i.e., use of a bridge), there will be no clearing over the HDD/bore path. SCS may trim vegetation using hand tools where necessary to access a water source and/or to place the HDD guidewires.

Some clearing may be required along HDDs of waterbodies where a bridge or mats will be installed to allow the transport of construction vehicles and equipment. In this case, clearing will be limited to the width of the travel lane needed to access the bridge or mats. Limited grading may also occur to allow for the safe installation of the bridge.

4.4 Time Window for Construction

All in-stream work activities (installation of dams, sheet piling, etc.) will be minimized to the extent practicable on an area and time duration basis. In-stream trenching will be conducted during periods permitted by the appropriate regulatory agencies and applicable permits and certifications.

SCS will adhere to the following work-exclusion dates for Minnesota Public Water Inventory cool- and warm-water fisheries that require in-channel work,⁶ or will seek a waiver from the Minnesota Department of Natural Resources (MDNR):

- Northwest Region: Non-Trout Streams: March 15 – June 15; and
- South Region: Non-Trout Streams: Ice-Out (approx. March 1) – June 15.

Unless otherwise specified in applicable permits or certifications and with exception for bore or HDD crossings, in-stream construction activities (specifically trenching, pipeline installation, backfill, and restoration of the streambed contours) for open cut (non-isolated) crossing methods will occur within the following timeframes:

- Minor Waterbodies (all waterbodies less than or equal to 10 feet wide at the water's edge at the time of crossing): 24 hours.
- Intermediate Waterbodies (all waterbodies greater than 10 feet wide but less than 100 feet wide at the water's edge at the time of crossing): 48 hours.
- Major Waterbodies (all waterbodies greater than 100 feet wide at the time of crossing): As specified by SCS or in the applicable permits.

These timeframes apply regardless of the presence or absence of flow. These timeframes also apply to dry crossing methods as a guideline and can be extended based on site-specific conditions with approval from SCS and the EI in conformance with the required regulatory authorizations and all applicable federal, state, and local regulations governing this activity.

4.5 Crossing Methods

4.5.1 Nonflowing Open Cut

Waterbody features that have no flow or when flow is unlikely between initial disturbance and final stabilization, the nonflowing open cut method will be utilized. Figure 9 in Appendix A depicts the construction method in plan and profile view for the nonflowing open cut crossing method. If sufficient flow appears during the time of construction of the crossing, then the Flowing Open Cut method will be used.

4.5.2 Flowing Open Cut

Where water flow is expected during construction across the waterbody, the flowing open cut construction method will be used (see Figure 10 in Appendix A). This method entails staging the crossing equipment outside the waterbody, make up the pipe for the crossing in adjacent uplands, trenching across the waterbody, carrying the made-up pipe into the trench, and then backfilling the trench and restoring the stream banks. The Contractor will complete in-stream construction activities as expediently as practicable.

4.5.3 Flowing Dry Flume

Where required, the flowing dry flume method will be utilized at flowing streams (see Figure 11 in Appendix A). Flumes will be installed before trenching activity. Sandbags and plastic sheeting diversion

⁶ In-channel work that results in the alteration of the course, current, or cross-section of the public water; this restriction does not apply to the trenchless crossing method or water appropriation activities.

structure, or an equivalent structure will be utilized to create a seal and to divert stream flow through the flume. Flumes will be constructed in a way to prevent erosion and scour from occurring.

4.5.4 Flowing Dry Dam and Pump

The dam and pump method will be utilized at waterbody crossings where required (see Figure 12 in Appendix A). Sheet piling will be used to create a dam to provide a dry workspace. There will be sufficient pumps to be able to maintain the stream flow around the excavation area at the time of construction. Back up pumps will be available at the site of the crossing. Pumps will be equipped with a 3/16-inch mesh screen to prevent the buildup of sediment and fish entrapment. Dams will be constructed to prevent sediment and other pollutants from entering the waterbody. Monitoring will occur throughout the construction of the crossing to ensure the crossing techniques are properly operating.

4.5.5 Bore

This trenchless method is used for installation of small diameter pipelines under waterways, roadways, railways, existing structures, and in congested areas. A typical configuration of a bore crossing is provided in Figure 13 in Appendix A. The bore uses a smaller footprint than a conventional HDD rig and is launched from either a small pit or the surface of the ground. Construction workspace on either side of the feature to be crossed will be utilized to establish the small pit, if needed, and to provide area to string and stage the pipe and equipment. In some instances, based on length, depth, and diameter, pressurized water or drilling mud may be used to hold the hole open. The same contingency and monitoring measures will apply as for the conventional HDD, below.

4.5.6 Horizontal Directional Drill

Where required, the HDD method will be utilized for designated major and sensitive waterbodies. The Contractor will construct each directional drill waterbody crossing in accordance with a site-specific plan. A typical configuration of an HDD crossing is provided in Figure 14 in Appendix A. Construction of the HDD method includes staging the drilling equipment on one or both sides of the stream/river and the made-up pipe string for the crossing length on the other side. After the hole has been drilled, and the pipe string has been welded up and hydrostatically tested, the pipe will be pulled back through the hole using the drill rig to pull the welded-up pipe section. Water for mud make up and hydrotesting of the HDD pipe segment may be acquired from the stream/river crossed or an alternate source.

Drilling fluids and additives utilized during implementation of a directional drill will be non-toxic to the aquatic environment and humans. The Contractor will develop a contingency plan to address an inadvertent return during a directional drill. The contingency plan will include instructions for monitoring during the directional drill and mitigation in the event that there is a release of drilling fluids. Containment, response, and clean-up equipment will be available at both sides of an HDD crossing location and one side of a guided or road bore prior to commencement to assure a timely response in the event of an inadvertent release of drilling fluid. The Contractor will dispose of all drill cuttings and drilling mud either by spreading over the construction right-of-way in an approved upland location or hauling to an approved landfill or other approved site.

4.6 Blasting

SCS does not anticipate that blasting will be required in Minnesota. If blasting is needed, SCS will ensure that the Project will be in compliance with local, state, and federal regulations during the blasting process. The Contractor will produce a site-specific Blasting Plan to include procedures, safety, use, storage, and transportation of equipment. The Contractor and its blasting supervisor will be licensed and thoroughly

familiar with and comply with the rules and regulations of Occupational Safety and Health Administration and all federal, state, county and local regulations governing blasting operations. Blast materials will be contained and collected to ensure proper disposal of the materials. Containers used will be covered to prevent impacts to stormwater runoff.

4.7 Clean Up

Debris and trash will be sorted, removed, and/or disposed of properly as discussed in Section 10. Bridges will be removed during cleanup or following permanent restoration methods. Additional grading may be required to restore the banks to pre-construction conditions or a stable angle of repose. Once cleanup is complete, additional seeding and erosion control methods may be utilized to ensure restoration is accomplished.

4.8 Permanent Restoration

Waterbody banks will be restored to pre-construction contour as practical or to a stable angle if the EI agrees that the pre-construction contour was unstable. If the slope was considered unstable, the Contractor will reshape the banks to prevent slumping. For public waters, SCS will return the bank to pre-construction contours, unless otherwise directed by a site-specific restoration plan. If SCS cannot restore to pre-construction contours at a public water, SCS will consult with the MDNR before proceeding further. Topsoil will be replaced on top of the subsoil. Waterbody banks will be stabilized by installing permanent ECDs and revegetation during final clean up. Permanent slope breakers will be installed across the construction ROW at the base of slopes when slopes are greater than 5% and are less than 50 feet away from a waterbody or as needed to prevent sediment transportation into a waterbody. Typical BMPs to restore stream banks are provided in Figures 3, 4, and 5 in Appendix A. Mechanical stabilization measures (e.g., riprap, bioengineering techniques, etc.) could be required in certain areas where the final soil grade would be unstable and result in erosion and inadequate vegetative stabilization or where required by site-specific waterbody restoration plans, provided that appropriate agency approvals and authorizations have been obtained. However, the use of mechanical stabilization should be limited to only those areas where conventional means (e.g., seeding, erosion control fabric, etc.) would not be sufficient or successful. Any use of rip rap will be in compliance with applicable regulations and authorizations.

Minnesota's Buffer Law requires perennial vegetative buffers of up to 50 feet adjacent to lakes, rivers, and streams and buffers of 16.5 feet adjacent to ditches. Project post-construction vegetation maintenance will be limited adjacent to waterbodies to promote the growth of the riparian filter strip (buffer). However, vegetation along a 10-foot-wide corridor centered over the pipeline will be maintained to facilitate visual inspection of the pipeline and allow corrosion and leak surveys to occur. Vegetation between HDD entry and exit points will not be routinely cleared or mowed.

5 Wetlands

Wetland delineations will occur before construction and captured with GPS for mapping on the construction alignment drawings.

5.1 Workspace

The construction ROW may be reduced to a width of 75 feet or less within a wetland. ATWS will be sited outside of wetlands to the extent practicable and based on site-specific conditions. Ancillary facilities such as pump stations, pipe yards, construction yards, and contractor camps will not be located within a

wetland. Markers will be placed at wetland boundaries until post-construction seeding and stabilization is completed.

5.2 Clearing and Grading

SCS will comply with regulations and permit conditions to reduce the impact when crossing wetlands. The Contractor will properly install and maintain redundant sediment control measures immediately after clearing and prior to initial ground disturbance at wetlands located within 50 feet of the Project and where stormwater flows to a wetland. Vegetation clearing will be limited to cutting trees across the ROW in forested wetlands but leaving stumps in place except over the ditch line. Grading of wetlands will be dictated by the soil saturation as described below. Burning of vegetative material is not allowed in wetlands.

5.3 Wetland Crossing Methods

For all methods described below, only that equipment necessary to clear/grade the wetland, trench, and install the pipeline will work in the wetland. Where a wetland cannot support construction equipment (e.g., in wetlands with saturated soils), all construction activities will be accomplished from construction mats or using low ground pressure equipment, thus limiting disturbance to the wetland. ECDs will be installed at the base of slopes adjacent to wetlands, and where run-off from construction in the wetland could impact adjacent wetlands or upland. Temporary trench breakers will be installed on each side of the wetland to ensure overland flow does not enter the wetland. SCS will follow applicable permit conditions for any limitations related to length of linear open trench allowable at any given time.

5.3.1 Standard

Wetlands that have saturated soils, but do not have standing water will utilize the standard wetland crossing method. This method will use pre-assembled and positioned pipe lined up adjacent to a trench and pushed into the pre-cut trench.

5.3.2 Dry Crossing

The dry crossing method will be utilized when crossing wetlands that have no standing water and no water present below the surface so that topsoil can be segregated easily. Pipe-stringing may occur within the wetland or adjacent to the wetland depending on site conditions and designated workspace. Figure 15 in Appendix A depicts the dry crossing method.

5.3.3 Flooded Push/Pull Crossing

Wetlands that cannot be crossed by conventional wetland construction methods because of the depth of water will utilize the push-pull wetland construction method. This method entails having pre-positioned and assembled weight-coated (if required) pipe with floats pushed or pulled through a pre-cut trench that has standing water. Once the pipe is in position, the floats are removed, and the pipe is sunk into the trench. Topsoiling is not possible with saturated wetland soils or where there is standing water, and the ROW is limited to that necessary to dig the trench and store spoil. Equipment required to weld the pipe and push or pull the pipe will be set up outside the boundaries of the wetlands. The pipe is then floated into the trench.

The Contractor will limit the amount of construction equipment operating within a saturated wetland to the extent needed to construct the trench and restore the ROW. If equipment is required to be operated

within a wetland with standing water, the Contractor will use low ground pressure construction equipment or another approved method.

5.3.4 HDD and Bore Crossing

For HDD and bore crossings that include wetlands between entry and exit, if there will not be a travel lane within the ROW (i.e., use of a bridge), there will be no clearing over the HDD/bore path. SCS may trim vegetation using hand tools where necessary to access a water source and/or to place the HDD guidewires.

Some clearing may be required along HDDs and bores of waterbodies and wetlands where a bridge or mats will be installed to allow the transport of construction vehicles and equipment. In this case, clearing will be limited to the width of the travel lane needed to access the bridge or mats. Limited grading may also occur to allow for the safe installation of the bridge.

5.4 Clean Up

Once the pipe has been installed and the trench backfilled with the proper sequence of soils (if segregated), mats will be removed (if used) and final grading and seeding will occur. Mulch will not be used in wetlands. Seeding requirements are listed in Section 8.1.2.

5.5 Wetland Permanent Restoration

Wetland edges will be restored to the pre-construction contour to maintain the hydrology of the wetland and will be stabilized by installing permanent ECDs and revegetation during final clean up.

Trench breakers will be installed at wetland boundaries where the pipeline trench may cause a wetland to drain, or the trench bottom will be sealed to maintain wetland hydrology.

The use of mulch, lime, and fertilizers will not be utilized unless approved by the appropriate land management and state agency. In addition, the use of pesticides and herbicides will be prohibited within 100 feet of a wetland, waterbody, or a native prairie remnant unless approved by the appropriate land management and state agency and needed to control a known infestation.

Routine vegetation mowing or clearing will not occur within the permanent ROW in a forested wetland. However, vegetation along a 10-foot corridor centered over the pipeline will be maintained to facilitate pipeline inspection and allow corrosion and leak surveys to occur. Trees will not be cleared unless the roots may compromise the integrity of the pipeline coating. Post-construction mowing and clearing of wetland areas will be limited. Vegetation between HDD entry and exit points will not be routinely cleared or mowed.

6 Highway, Road, And Rail Crossings

Conventional bore or HDD methods will be used to cross highway, road, and rail crossing features (see description of activities in Sections 4.5.5 and 4.5.6). Because watercourses, such as ditches, often occur parallel to these features, HDDs/bores may be extended to bore under multiple features. Bore methods involve construction of a bore pit on each side of the feature (e.g., highway, road, railroad, watercourse) and boring a carrier pipe underneath the feature(s) without use of pressurized drilling fluid. The specific equipment utilized to execute the bore is dictated by the length of the bore and soil conditions. Water and bentonite clay can be introduced if soil conditions dictate to lubricate the drill head and carrier pipe and allow it to move through the ground more freely. With this construction practice at no time is pressurized water or drilling mud being used to hold the hole open as it will during an HDD, and therefore

there is no risk for an inadvertent release at these locations. If drilling mud is needed at these locations, any release will travel back along the path of the pipe and into the bore pit. Refer to Section 4.5.5 for a description of the HDD crossing method.

7 Water Management

7.1 Water Appropriations

7.1.1 Water Withdraw Procedures

Water may be withdrawn from agency approved surface waters such as rivers, streams, lakes, or ponds, or through agreements with municipalities for their source water, and private surface or ground water wells to use for Project related activities. SCS will obtain applicable permits and comply with the conditions set by those permits. To prevent fish entrainment, a 3/16-inch mesh screen will be installed on the intake hose and sized per permitting requirements.

The following procedures will be implemented during the intake of water of the Project:

- Intake pumps will be placed in an upland area at least 100 feet away from the wetland or waterbody, or within an enclosed structure at the edge of the waterbody, to prevent erosion or the transport of sediments into the feature.
- Intake screens will be designed with 3/16-inch mesh to reduce impingement and entrainment of aquatic life and sizes/design will be as per permit requirements.
- Refueling will follow the conditions listed in Section 9.2.2.
- Erosion and sediment control devices will be installed, as necessary, at test manifolds.

Typical arrangements for water intake into trucks and into the pipeline for hydrotesting are provided in Figures 16 and 17 in Appendix A.

7.1.2 Intake Flow Rates

Waterbody flow rates and volumes will be maintained to protect aquatic life and to minimize sediment intake. Downstream uses will not be impacted from the Project's water intake and use. If a water source has low flow at the time of withdrawal, a backup source will be utilized.

The withdrawal rate and total volume of the water appropriated will be monitored and recorded by using a flow meter or equivalent device. The flow rate and total volume withdrawn will not exceed the specified amount in the applicable permits. If water sampling is required by permit conditions, SCS will obtain samples during appropriation and test for the parameters listed in the permit conditions.

7.1.3 Reporting

SCS will submit reports and notifications to the applicable federal, state, or local agencies as required by permit conditions.

7.2 Construction Trench Dewatering

7.2.1 Procedures

The Contractor may use a well point system for dewatering when traditional dewatering techniques are or would not be adequate. This system will consist of a series of small diameter wells installed via hydro-jetting that are connected by a header pipe to a well point pump (see Figure 18 in Appendix A). The well

point system will be installed within the construction workspace following topsoil segregation. Adequate temporary erosion and sediment control BMPs will be installed to prevent the migration of subsoil slurry produced during the well point installation process.

For dewatering open excavations, including the trench, the Contractor will use a hose which is attached to a portable pump. The number and size of pumps used during trench dewatering will depend on the volume of water needed to be removed from the trench. Pumps used during dewatering will be placed within secondary containment if within 100 feet of a wetland, waterbody, water supply well, or sensitive habitat (see Section 9.2.1). Pumps will be controlled and monitored to ensure that the discharge does not overwhelm the dewatering structure. The hose will be a floating suction hose or have a floating intake to prevent sediment from being sucked from the bottom of trench (see Figure 19 in Appendix A).

All water pumped from an open excavation be directed through a discharge hose to a dewatering structure or a filter bag as described below and in construction typicals presented as Figures 20 and 21 in Appendix A. Ideally, these will be placed in well-vegetated uplands. The placement of the dewatering structure will be coordinated with the EI to ensure that structures are placed to avoid sensitive resources. The EI will consult pre-construction environmental resource survey data for lands adjacent to and outside of the construction workspace when siting the dewatering structure. Dewatering structures will be placed to avoid sensitive habitats or other environmental resources that may be affected by the discharge. Erosion and sediment control BMPs will be installed at the discharge point to mitigate impacts to waterbodies, wetlands, or sensitive habitats. The EI will monitor the installation of erosion and sediment BMPs at trench dewatering outfalls to ensure proper construction and configuration to minimize the potential of water containing sediment from reaching a waterbody or wetland.

Discharges will be monitored to ensure they are not causing flooding damage to agricultural land, crops, and pastures or result in visible turbidity, material discoloration, or other nuisance conditions,⁷ or violations of other applicable water quality standards beyond the treatment area. If the Contractor observes that such conditions exist, the Contractor will stop the discharge and will implement alternative or supplemental actions. Discharge of trench water will occur in a manner to prevent scouring, erosion, or sediment transport from the discharge location.

7.2.2 Sampling and Reporting

If required by trench dewatering permits, daily monitoring logs will be maintained by the Contractor to record the volume, duration, and flow rate. SCS will submit the flow data collected by the Contractor to the applicable agencies. Reporting, if required, will be as outlined in permits received.

7.3 Hydrostatic Test Procedures and Discharges

Prior to hydrostatic testing the pipeline, SCS will prepare the pipe by removing accumulated construction debris, mill scale, dirt, and dust using a cleaning pig⁸ that is moved by compressed air. Cleaning water and debris removed from the pipe will be disposed of off-site in accordance with applicable permits.

⁷ Minnesota Administrative Rules 7050.0210, subp. 2.

⁸ Internal maintenance and inspection device (commonly referred to as a "pig"), which is designed to travel through the pipeline to detect certain internal and external anomalies in the pipe such as corrosion, dents, and scratches or to clean the pipeline and remove liquids.

7.3.1 Discharge Procedures

Hydrostatic testing will be conducted in accordance with applicable appropriation and discharge permits and leases obtained by SCS. Discharge of hydrostatic test water may apply through overland flow in an upland area or returned to the source after use. State requirements will be followed regarding movement or reuse of water prior to finalization of a hydrotest plan.

Discharge locations will be determined and approved by applicable agencies prior to use. Energy dissipation devices may be used to help mitigate the possibility of erosion while discharging, suspended sediments in the waterbody or wetland, or scour. Devices used for energy dissipation may include:

- **Splash Pup**
 - A splash pup consists of a piece of large diameter pipe (usually over 20-inch outside diameter) of variable length with both ends partially blocked that is welded perpendicularly to the discharge pipe. As the discharge hits against the inside wall of the pup, the velocity is rapidly reduced, and the water is allowed to flow out either end. A variation of the splash pup concept, commonly called a diffuser, incorporates the same design, but with capped ends and numerous holes punched in the pup to diffuse the energy.
- **Splash Plate**
 - The splash plate is a quarter section of 36-inch pipe welded to a flat plate and attached to the end of a 6-inch discharge pipe. The velocity is reduced by directing the discharge stream into the air as it exits the pipe. This device is also effective for most overland discharge.
- **Plastic Liner**
 - In areas where highly erodible soils exist or in any low flow drainage channel, it is a common practice to use layers of Visqueen (or any of the new construction fabrics currently available) to line the receiving channel for a short distance. One anchoring method may consist of a small load of rocks to keep the fabric in place during the discharge. Additional best management practices, such as the use of plastic sheeting or other material to prevent scour will be used as necessary to prevent excessive sedimentation during dewatering.
- **Straw Bale Dewatering Structure**
 - Straw bale dewatering structures are designed to dissipate and remove sediment from the water being discharged. Straw bale structures are used for on land discharge of wash water and hydrostatic test water and in combination with other energy dissipating devices for high volume discharges (see Figure 20 in Appendix A). A dewatering filter bag may be used as an alternative to straw bale dewatering structures (see Figure 21 in Appendix A).

7.3.2 Sampling and Reporting

Flow will be measured and monitored as required to ensure the volume discharged does not exceed permit conditions. When discharging the hydrostatic test water, the rate of flow will be in accordance

with applicable water quality requirements and will be monitored and logged into discharge monitoring reports. The total volume discharged will be recorded and submitted to applicable agencies to comply with permits, as required. Sampling parameters will be in compliance with permit conditions.

7.4 Management of Infested Waters

To minimize the spread of invasive aquatic species in Minnesota, SCS will implement the following procedures when working in waterbodies in compliance with Minnesota Statute 84D.10 Subd. 4, and consistent with the *Recommended Uniform Minimum Protocols and Standards for Water Craft Interception Programs for Dreissenid Mussels in the Western United States* (Zook and Phillips, 2012 as cited by Minnesota Statutes 84D.01), MDNR, and best management practices⁹.

At all waters, regardless of current infestation status, SCS will commit to the following BMPs:

- Equipment intended for use at the Project site will be free of invasive species prior to being transported to the worksite. Equipment (e.g., hoe stick and bucket, pumps, hoses) used in any state watercourses, regardless of designated infestation status, will be inspected for invasive aquatic species prior to and following in-water work.
- Pumps, hoses, and other equipment with water intakes will be drained of water after use. SCS will remove plants, mud, debris, and organisms from the exterior of the equipment (e.g., hoe stick and bucket). Hoses will be flushed with clean water and thoroughly drained to further mitigate potential transmittal of infestations.
- For crossings of completely frozen waterbodies during winter, if no liquid water comes in contact with equipment, no decontamination will occur.
- Decontamination water will be allowed to infiltrate in an upland area at least 300 feet from any watercourse, or within 300 feet of the aquatic invasive species source in accordance with applicable permits.
- Felt-soled waders will not be allowed for use in any state watercourse because felt can easily trap, and thus potentially transport, invasive species.
- If personnel enter any state watercourse, personnel will scrub clothes, waders, boots, and other personal gear with a stiff brush to remove debris.
- SCS will notify the MDNR if any aquatic invasive species are identified in a watercourse not previously designated as an infested water.

At locations known to be infested, or if aquatic invasive species are identified during inspection of the equipment, SCS will implement one or more of the following decontamination procedures before use in another waterbody:

- clean with heated high-pressure washer;
- heated water contact from the pressure water will be maintained for the duration prescribed in the Table 1 below;

⁹ https://www.dnr.state.mn.us/invasives/preventspread_watercraft.html

- rinse or soak equipment (e.g., pumps) with heated water at the temperature and duration prescribed in the table below;
- dry for 5 days prior to using at another waterbody; or
- freeze for 6 to 8 hours prior to using at another waterbody.

Table 1: Temperature and Duration for Decontamination using Heated Water

Water Temperature (degrees Fahrenheit)	Duration
Pressure Washing Activities	
140	10 seconds
130	20 seconds
120	40 seconds
100	80 seconds
Soaking Decontamination Activities and Pre-Treatment	
130	10 minutes
115	15 minutes
These guidelines were provided by the MDNR (G. Montz, MDNR Aquatic Invertebrate Biologist) on March 27 and March 30, 2020.	

Infested waters cannot be appropriated, diverted, or transported without a permit from the MDNR. In all cases where infested waters are used or appropriated, SCS will discharge back to the source water or infiltrate the discharge to control potential spread of aquatic invasives.

8 Reclamation and Revegetation

Reclamation and seeding measures described below do not apply to actively farmed crop land. For actively farmed crop land, refer to SCS' MN APP.

8.1 Site Preparation and Seeding

8.1.1 Site Preparation

A subsoiler, plow, or other implement shall be used to reduce soil compaction and allow maximum infiltration. Maximizing infiltration will help control both runoff rate and water quality. Subsoiling will be done when the soil moisture is low enough to allow the soil to crack or fracture. Subsoiling will not be done in slip prone areas where soil preparation should be limited to what is necessary for establishing vegetation.

Before seeding commences, a firm seed bed will be prepared. The site will be graded as needed to permit the use of conventional equipment for seedbed preparation and seeding. Debris including large stones, logs, and stumps will be removed from the seed bed per landowner agreements. Topsoil will be spread across the workspace as required to establish vegetation.

8.1.2 Seeding

Project seed mixes will be developed based on Minnesota Board of Water and Soil Resources seed mixes. The species and types of seeds will be determined by consultations with the local Natural Resources Conservation Service, the MDNR for seeding at public waters, and landowner preferences and will be

sourced in advance of the Project. Seeding will be conducted either in the spring, late summer, or dormant periods to allow the greatest chance of successful growth. Seed mixes will be previously tested and approved by the manufacturer to meet the requirements of regulations and be certified weed free.

Seeding will be applied uniformly with a cyclonic seeder, drill, cultipacker seeder, or hydroseeder, when feasible. Seed that has been broadcast will be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used, the seed and fertilizer will be mixed on site and the seeding shall be done immediately and without interruption. Hydroseeding will not occur within 100 feet of a waterbody.

8.1.3 Temporary Cover

If it is not possible to plant the selected species during the first year of reclamation and restoration, temporary cover may be used until the next seeding period.

8.1.4 Mulching

Mulch material shall be applied and anchored immediately after seeding to minimize loss by wind or water. Dormant seeding shall be mulched.

8.1.5 Winter Seeding

Winter seeding will occur during early or late winter when it is possible for a seed to firmly be set in the soil surface. An agency approved seed mix will be used if winter seeding is necessary. If a winter seed mix cannot be used or is not available, temporary cover will be utilized over the disturbed areas.

8.2 Management and Monitoring

SCS will monitor areas where stabilization and restoration methods are implemented in accordance with requirements in state permits and landowner agreements. Monitoring will identify areas where remedial measures are required to establish a stable surface for reclamation to be successful. This may include re-grading, re-seeding, re-mulching, and additional monitoring.

8.3 Roads

Temporary roads used for the Project will be removed and the area will be restored to its pre-construction condition.

9 Spill Prevention, Containment, and Response

Spill prevention and containment applies to the use and management of hazardous materials on the construction ROW and all ancillary areas during construction. This includes the refueling or servicing of all equipment with diesel fuel, gasoline, lubricating oils, grease, and hydraulic and other fluids. The Contractor will develop a contingency plan to address an inadvertent return during a directional drill; these plans will identify BMPs for an inadvertent return and requirements following the incident.

If applicable, the Contractor will provide site-specific data that meets the requirements of 40 CFR (Code of Federal Regulations) Part 112 for every location used for staging fuel or oil storage tanks and for every location used for bulk fuel or oil transfer.

9.1 Roles and Responsibility

9.1.1 Environmental Inspector

The EI will monitor the notification procedure that the Spill Coordinator will follow, monitor containment procedures, and ensure cleanup is accomplished according to agency requirements.

9.1.2 Authorized Personnel

Personnel authorized to handle hazardous materials or substances will be trained accordingly to ensure safe handling practices are utilized and the requirements of this section are followed.

9.1.3 Spill Coordinator

A Spill Coordinator will be assigned to inform SCS about spill related incidents. The following incidents must be reported to SCS immediately:

- material released that creates a sheen in water;
- any spill of oil, oil products, or hazardous material that reaches a waterbody or wetland; and/or
- incidents on public highways.

9.1.3.1 Spill Notifications

A SCS representative will be identified to serve as a contact in the event of a spill during construction activities. In the event of a spill, the Spill Coordinator will immediately notify the SCS representative who will then report to the appropriate regulatory agencies. For all construction related spills, SCS will:

- Report spills immediately to the Minnesota Duty Officer by contacting 800-422-0798 or 651-649-5451.
- Complete Spill Report Forms required from agencies and SCS within 24 hours of the occurrence of a spill.

If a spill occurs on or reaches a navigable water of the United States, SCS will notify the National Response Center at 1-800-424-8802. For spills that occur on public lands that meet the necessary reporting thresholds, into other surface waters, or into sensitive areas, the appropriate governmental agency's district office will also be notified.

9.2 Spill Prevention

9.2.1 Handling/Storage of Fuels and Hazardous Liquids

Each construction spread will consist of a staging area within a contractor yard to store bulk fuel and storage tanks. Bulk fuel and storage tanks will not be placed within the construction ROW and will be stored in compliance with state and federal laws.

Hazardous materials such as fuels, lubricating oils, or chemicals will typically not be stored within 100 feet of a wetland, waterbody, designated municipal watershed area, or sensitive habitat. All equipment will be parked overnight at least 100 feet from a waterbody or in an upland area at least 100 feet away from a wetland unless an EI confirms there is no reasonable alternative. If this is determined to be necessary, the following precautions will apply:

- kiddie pools will be placed underneath vehicles and equipment to capture potential leaks;
- adequate amounts of absorbent materials and containment booms will be kept on hand to enable the rapid cleanup of any spill which may occur; and
- adequate lighting will be provided for these locations and activities.

Secondary containment systems will be utilized to prevent spills when storing fuels and when pumps are operating within 100 feet of a wetland, waterbody, water supply well, or sensitive habitat. Secondary containment structures will be lined with suitable plastic sheeting, provide a containment volume of at least 150 percent of the storage vessel, and allow for at least 1 foot of freeboard.

9.2.2 Refueling

Fueling will not occur within 100 feet of a wetland, waterbody, designated municipal watershed area, or sensitive habitat unless the EI confirms there is no reasonable alternative. If this is determined to be necessary, the following precautions will apply:

- adequate amounts of absorbent materials and containment booms will be kept on hand to enable the rapid cleanup of any spill which may occur; and
- adequate lighting will be provided for these locations and activities.

All equipment handling fuels will be inspected regularly to ensure it is in good operating condition. Equipment will not be washed in streams or wetlands to prevent incidental contamination. The procedure for the disposal of fuel, oil, or hazardous material is described in Section 10.2.

9.2.3 Inspection and Maintenance

The Contractor will ensure that all equipment is properly maintained and free of leaks prior to use on the Project and prior to working near waterbodies, wetlands, or sensitive habitats. Regular maintenance and inspections of the equipment will be conducted to reduce the potential for spills or leaks. Emergency equipment will be inspected weekly and maintained regularly.

9.3 Equipment

The following equipment will be kept where fuel is stored during construction to ensure the cleanup of a spill is handled efficiently and successfully:

- Adequate absorbent materials and containment booms will be on hand for each construction crew.
- Spill Kits containing absorbent and barrier materials such as straw bales, absorbent clay, absorbent pads, sawdust, spill containment barriers, plastic sheeting, skimmer pumps, and holding tanks to contain a potential spill will be located near each waterbody or wetland crossing and fuel storage areas.
- Fueling vehicles will contain materials necessary to control spills and will only travel on approved access roads.

9.4 Contingency Plans

Emergency response procedures will be developed for incidents including but not limited to spills, leaks, fires, or other accidents involving hazardous material. The Contractor will identify response contractors in

their Contingency Plans, if applicable. The procedures will address activities that take place on the construction ROW or that may involve travel to or from the construction ROW.

9.5 Spill Response

In the event of a spill of a hazardous material, Contractor personnel will follow the procedures listed below if it is deemed safe to do so:

- Notify the identified SCS representative after making regulatory notifications;
- Identify the product hazards relating to the spilled material and implement appropriate safety procedures;
- Implement spill contingency plans and mobilize appropriate resources;
- Isolate or shut down the source of the spill;
- Block manholes and culverts to limit the travel of the spill;
- Initiate containment procedures to limit the spill as much as possible;
- Commence recovery and cleanup of the spill; and
- Ensure hazardous material is disposed of properly.

9.6 Spill Containment

Berms will be constructed with available equipment to physically contain the spill on land. Personnel entry and travel on contaminated soils will be minimized. If necessary, sorbent materials will be applied. Spills on pavement shall be absorbed with sawdust or kitty litter and disposed of with the trash. Contaminated soils, sorbent materials, and vegetation will be removed and disposed of at an approved facility as stated in Section 10.2.

If a spill has the potential to flow into a waterbody, berms, or trenches will be constructed to contain the spill prior to entry into the waterbody. If a spill reaches the water, the deployment of booms, skimmers, and sorbent materials will be utilized to contain the spill. The spilled product will be recovered, and the contaminated area will be cleaned up in consultation with the appropriate regulating agencies.

9.7 Remediation

SCS will follow applicable regulations and guidelines following a spill to remediate and restore the site. Remediation of a site will vary depending on size, location, hazardous material involved, and current weather. The Contractor will make appropriate calls and reports to applicable agencies to ensure compliance is met on the site.

10 Waste Management

10.1 Non-Hazardous Waste Disposal

Construction debris will be removed from the construction ROW and disposed of at regulated facilities that abide by state and federal regulations. Waste will be disposed of at a licensed waste disposal facility. Waste that contains or has previously contained oil, grease, solvents, or other petroleum products will be segregated for handling and disposal of hazardous wastes.

The Contractor will be responsible for ensuring all trash is removed from the ROW on a daily basis unless approved or directed by SCS. The Contractor will remove all trash and waste from Contractor yards, and

Pipe Stockpile Sites, and staging areas when work is completed at each location. Extraneous vegetative, rock, and other natural debris will be removed before the completion of cleanup.

Woody debris will be mowed, chipped, grinded, or hauled off site to an approved location and will be managed in accordance with applicable permits and regulations. Woody debris may also be used as mulch, to stabilize slopes, or to stabilize construction ROW access entry or exit points. Burning within 100 feet of a wetland or waterbody is prohibited without site-specific approval from an EI and permitting regulations.

If concrete coating of the pipe is required, the Contractor will collect and retain all the concrete washout water and solids in a leak proof containment. Concrete wash water, grindings, or slurry will not come in contact with the ground or be disposed of on the ground surface as prohibited in MPCA Construction Stormwater General Permit MNR100001.

10.2 Hazardous Waste Disposal

The Contractor will ensure that all hazardous and potentially hazardous waste are transported, stored, and handled in accordance with all applicable regulations. Workers exposed to or required to handle dangerous materials will be trained in accordance with the applicable regulatory agency and the manufacturer's recommendations on Safety Data Sheets.

Hazardous waste will be disposed of at licensed waste disposal facilities. All hazardous wastes being transported off-site will be manifested. The transporter will be licensed and certified to handle hazardous waste on the public highways. The vehicles as well as the drivers must conform to all applicable vehicle codes for transporting hazardous waste. The manifest will conform to 49 CFR Sections 172.101, 172.202, and 172.203 and applicable state agency requirements. If suspected toxic or hazardous waste materials or containers are encountered during construction, the Contractor will stop work immediately to prevent disturbing or further disturbing the waste material and will notify SCS immediately. The Contractor will not start work until clearance is granted by SCS.

10.3 Water Disposal

Water will be discharged at approved locations and tested according to applicable permit regulations. Water that exceeds limitations of parameters will be treated to be at or under the limitations and discharged or transported at an approved facility. Cleaning water generated will be hauled and disposed of at an approved facility.

10.4 HDD Mud and Fluid Disposal

The Contractor will dispose of HDD drill cuttings and drilling mud at a SCS-approved location. If the HDD mud is disposed on landowner-approved lands, testing of the HDD mud may be required by the landowner or state agency prior to disposal.

Appendix A – Typicals

Figure 1: Typical 100' Construction R.O.W. Conventional Lay

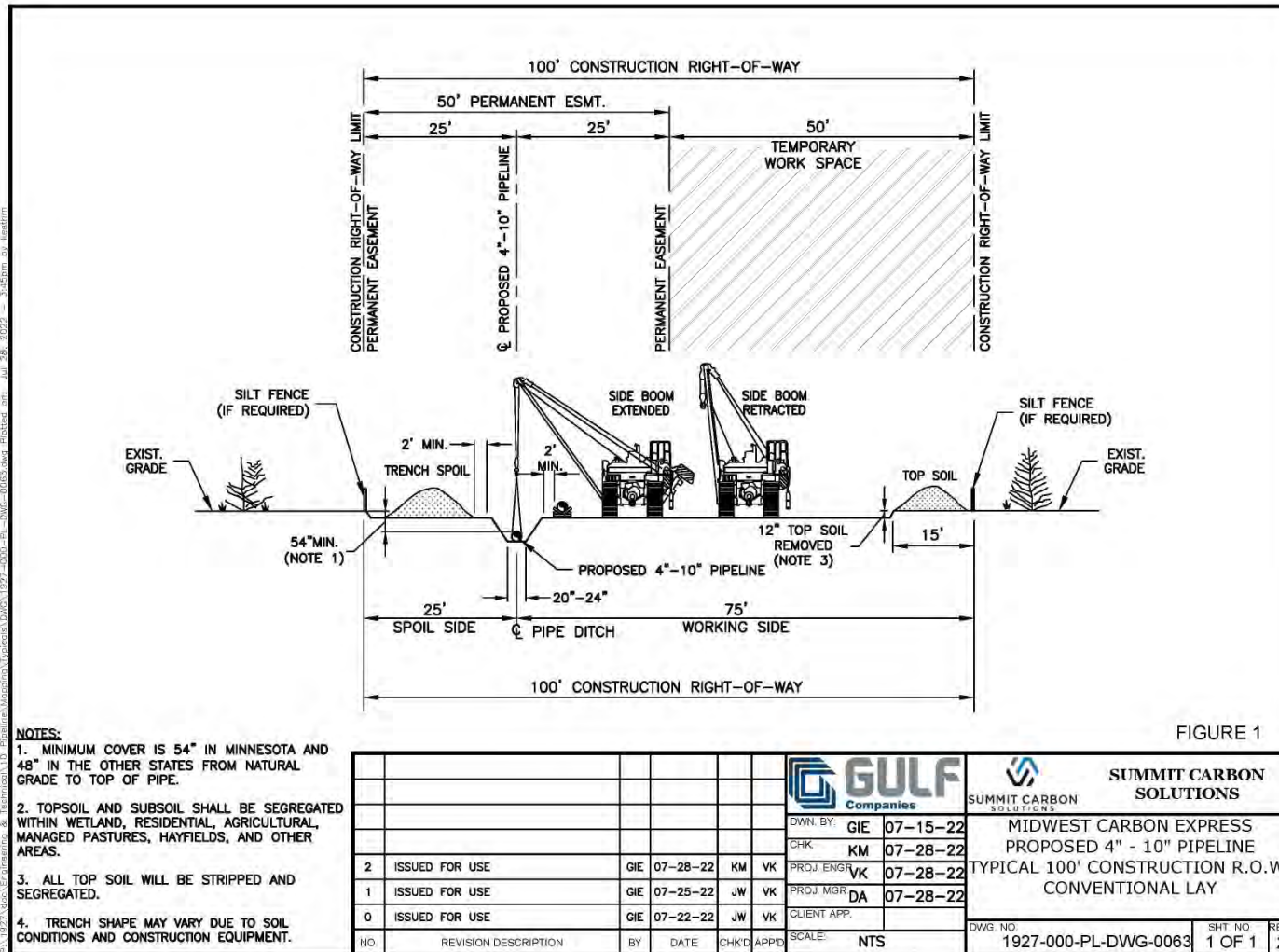


FIGURE 1

Figure 2: Standard Wetland 75' Construction R.O.W.

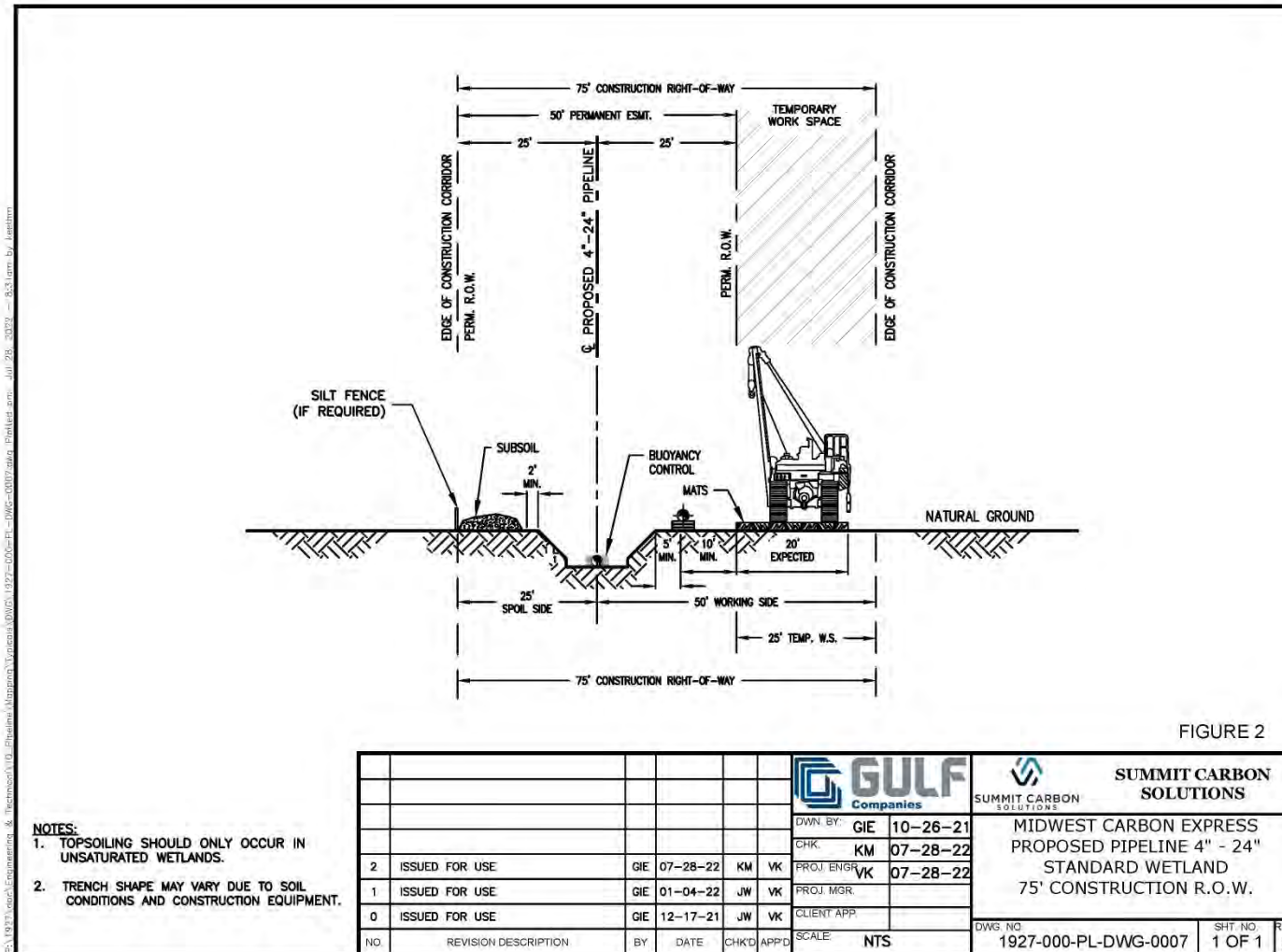


Figure 3: Typical Riprap Detail

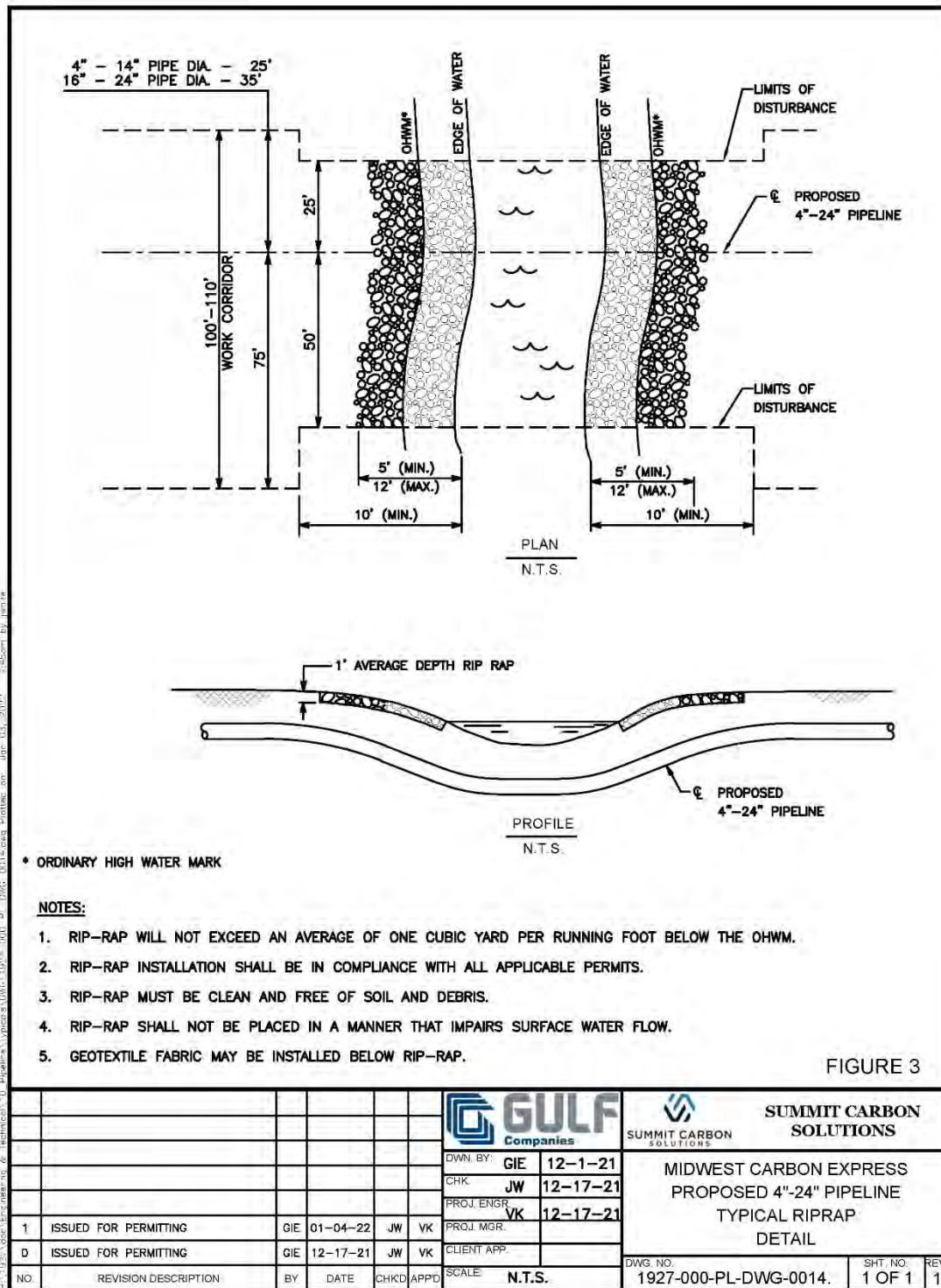


Figure 4: Erosion Control Matting of Stream Banks and Severely Sloping Road Banks

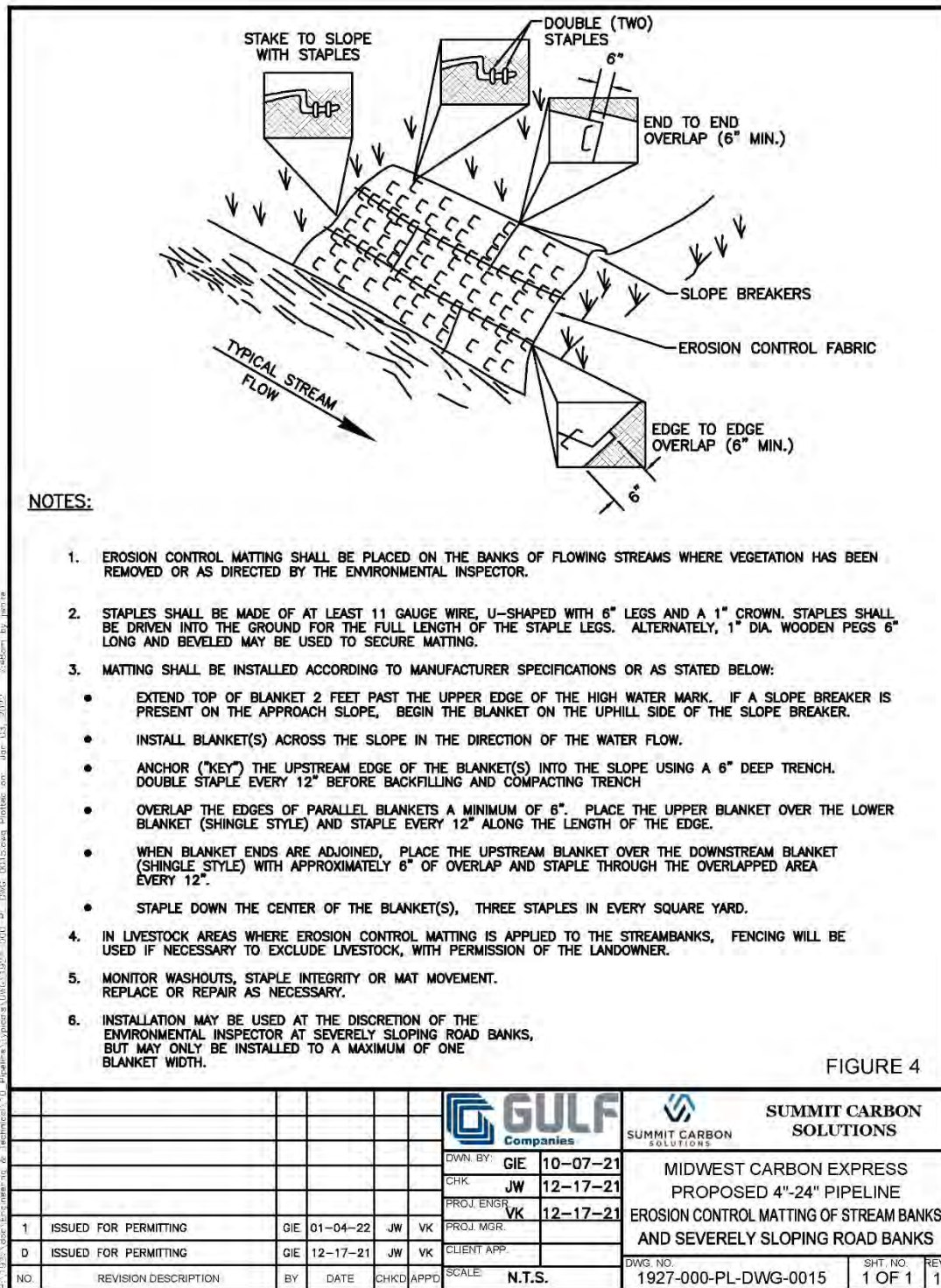


Figure 5: Typical Slope Breaker Installation and Maintenance

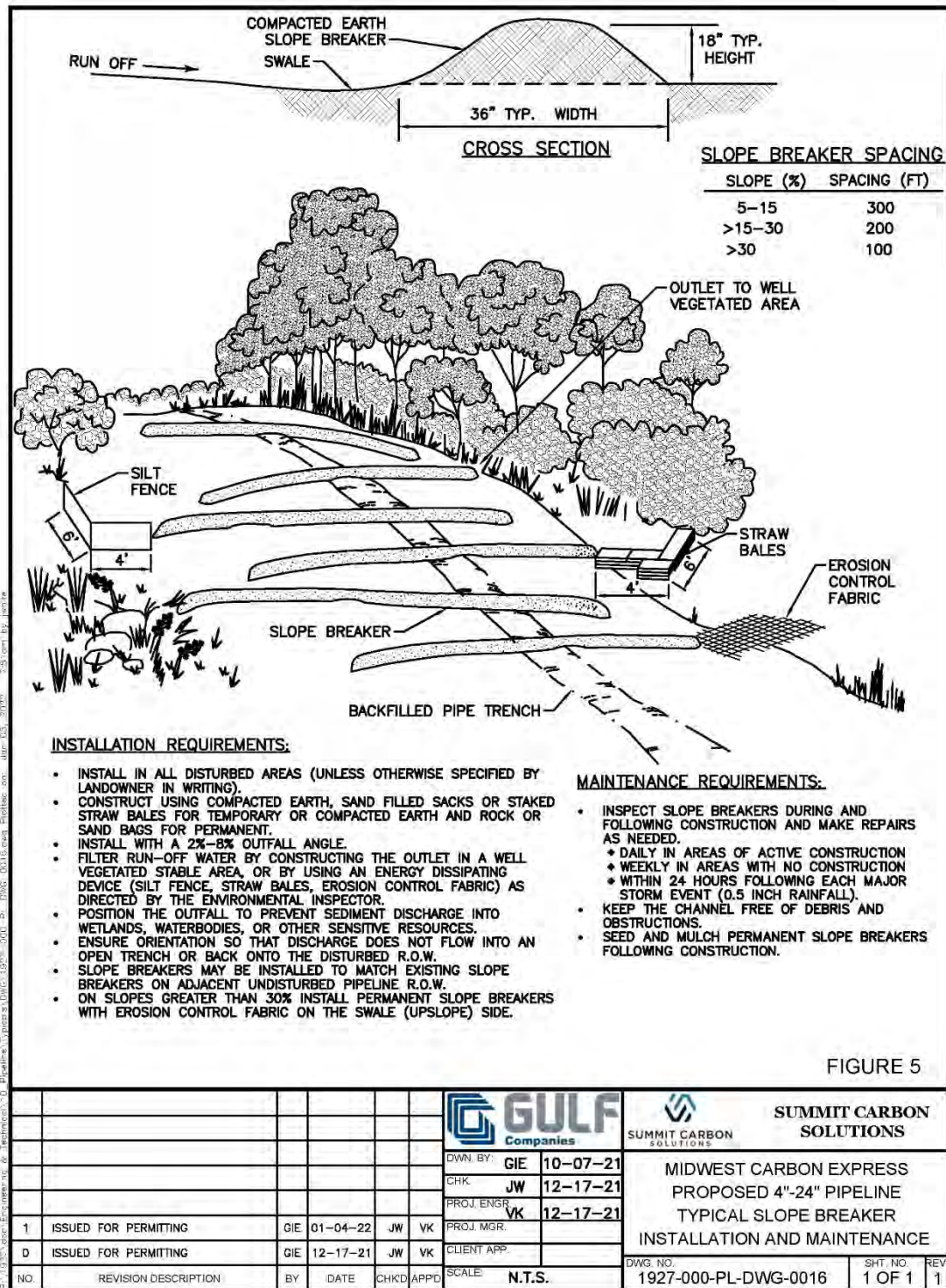
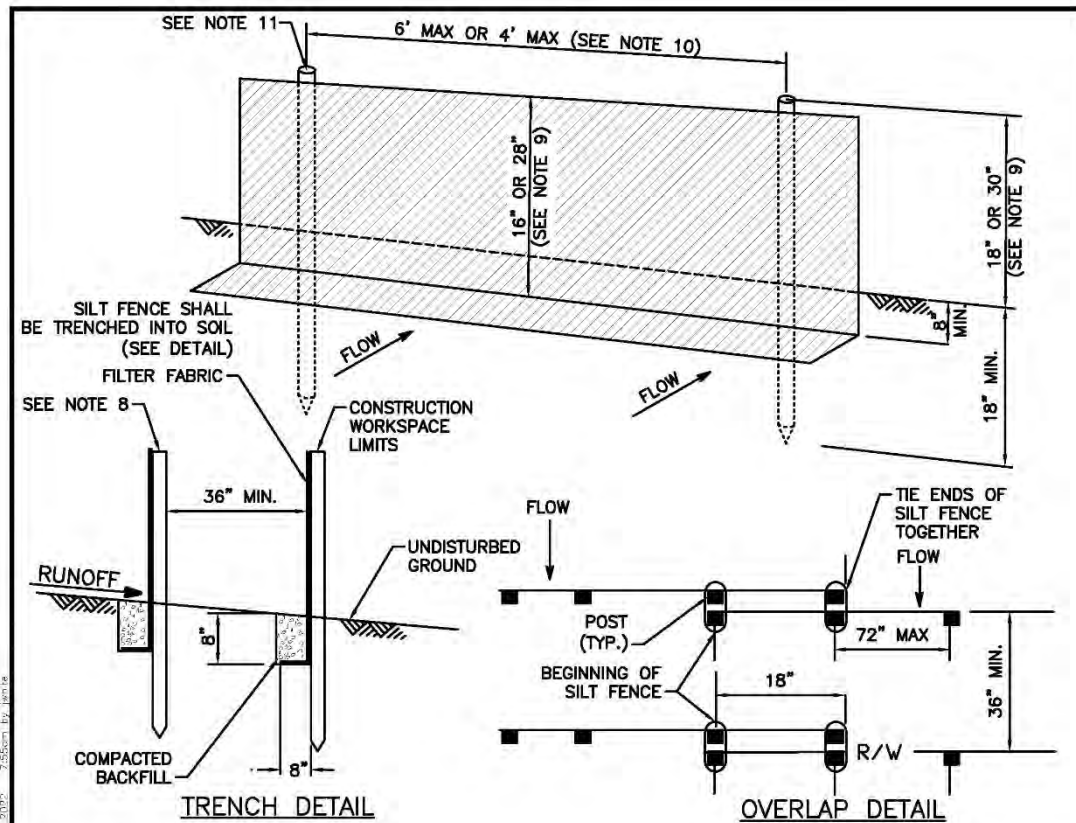


Figure 6: Silt Fence and Sediment Barrier Installation and Maintenance

**NOTES:**

1. SILT FENCE SHALL BE INSTALLED TO FILTER SEDIMENT FROM SURFACE RUNOFF.
2. INSTALLATIONS SHALL BE PERIODICALLY CHECKED, THE SEDIMENT SHALL BE REMOVED WHEN IT REACHES ONE-THIRD THE HEIGHT OF THE SILT FENCE.
3. SILT FENCE SHALL BE LEFT IN PLACE UNTIL PERMANENT VEGETATIVE COVER IS ESTABLISHED.
4. SILT FENCE SHALL BE REPLACED WHENEVER IT HAS DETERIORATED TO SUCH AN EXTENT THAT IT REDUCES THE EFFECTIVENESS OF THE SILT FENCE.
5. AREA DISTURBED AS A RESULT OF REMOVING THE SILT FENCE SHALL BE RESTABILIZED BY BACKFILLING, COMPACTING, AND SEEDING IN ACCORDANCE WITH THE REVEGETATION PLAN.
6. SILT FENCE SHALL BE PLACED TO FOLLOW (RUN PARALLEL TO) THE CONTOURS.
7. ON UPSLOPE INSTALLATIONS, BOTH ENDS OF THE SILT FENCE SHALL BE TURNED AND EXTENDED UPSLOPE.
8. FOR SILT FENCES PROTECTING SENSITIVE AREAS, A SECOND SILT FENCE SHALL BE INSTALLED A MINIMUM OF 3 FEET AWAY, INSIDE THE IMPACTED WORKSPACE. SILT FENCE PROTECTING SENSITIVE AREAS SHALL BE TYPE C.
9. FOR SILT FENCES USED TO PROTECT SENSITIVE AREAS, THE FABRIC MUST BE 28\"/>

FIGURE 6

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Figure 7: Straw Bale and Sediment Barrier Installation and Maintenance

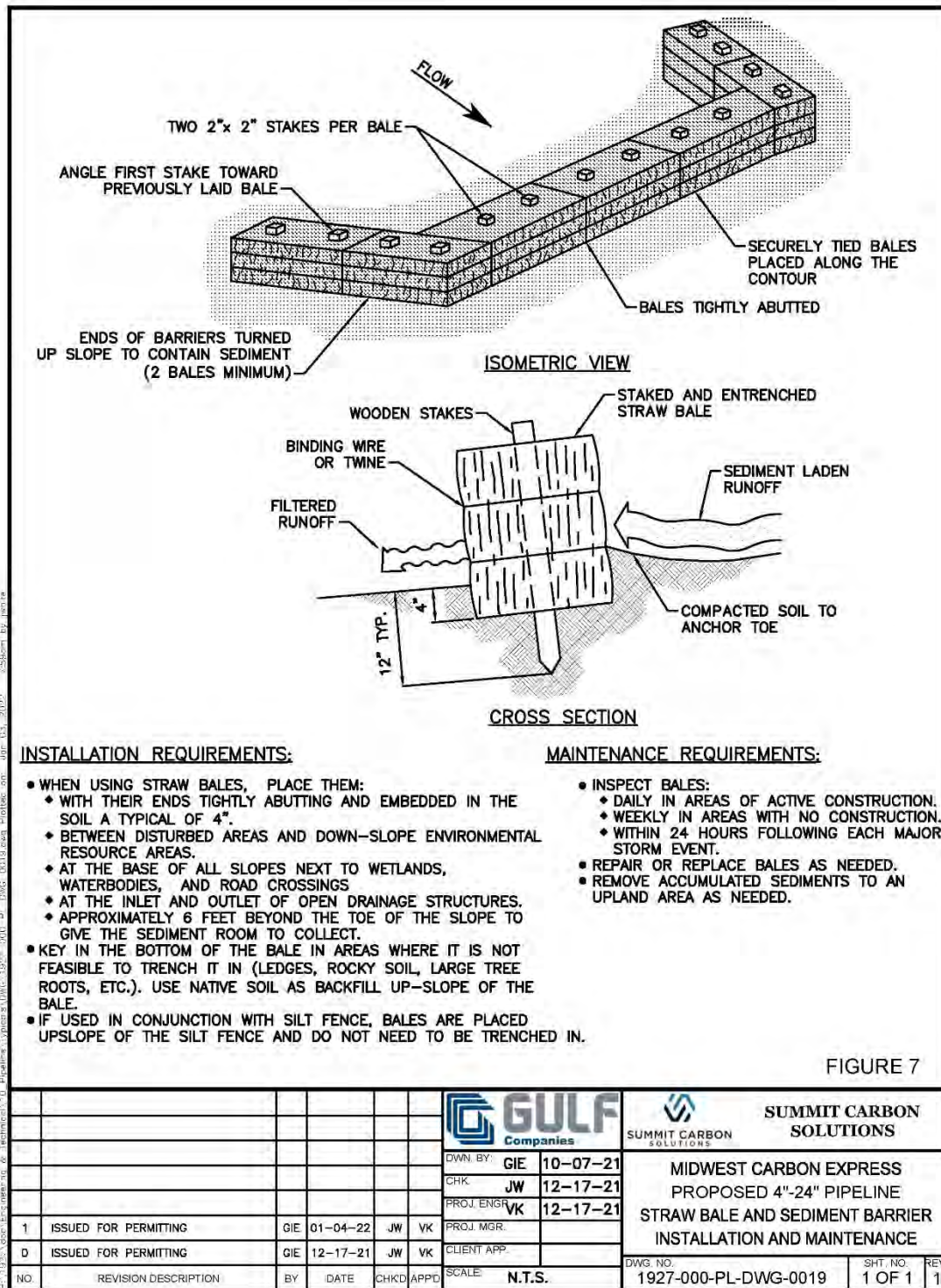


Figure 8: Typical Waterbody Equipment Bridge (Equipment Mats)

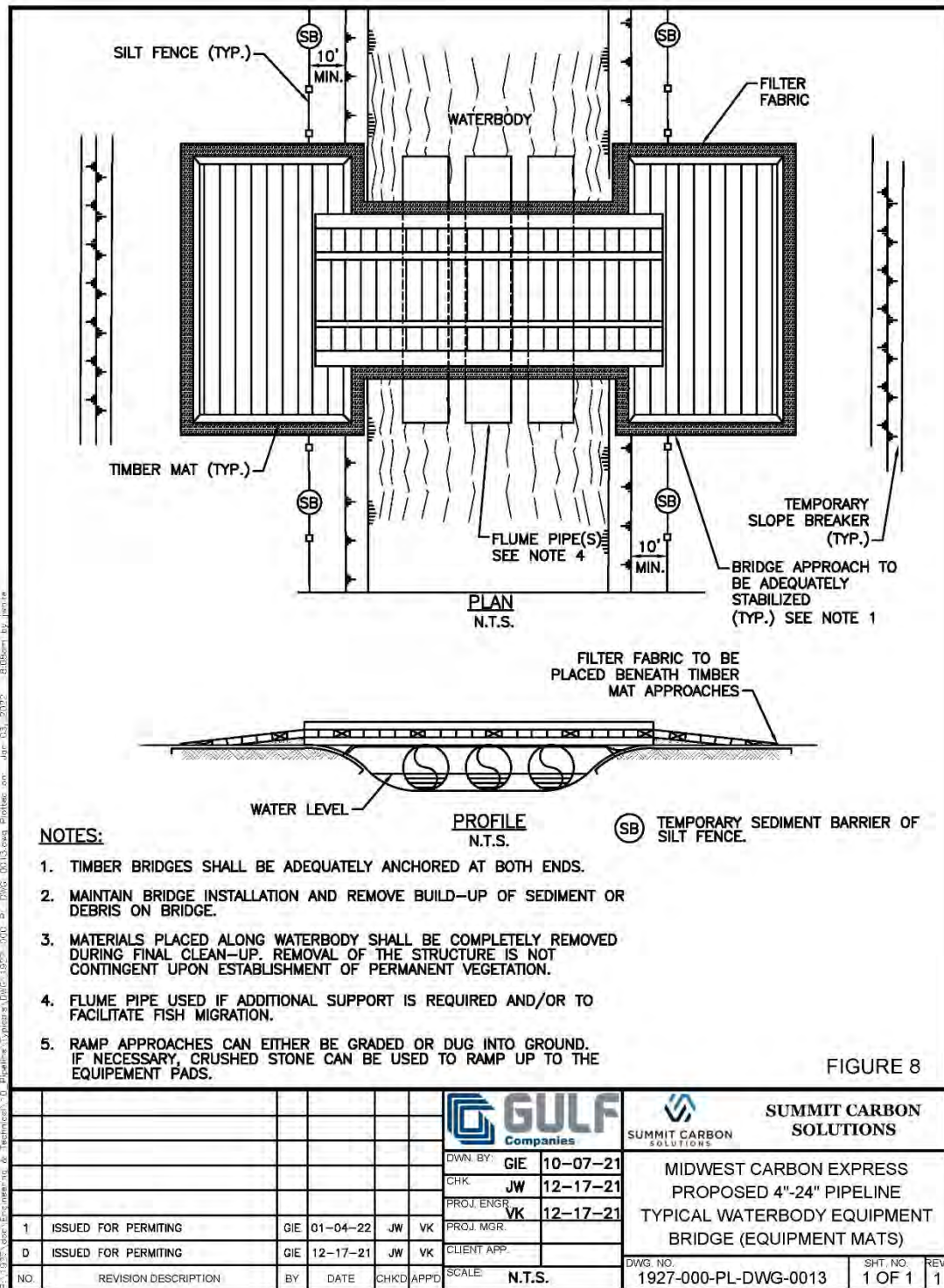


Figure 9: Typical Non-Flowing Waterbody Crossing Open Cut Trenched

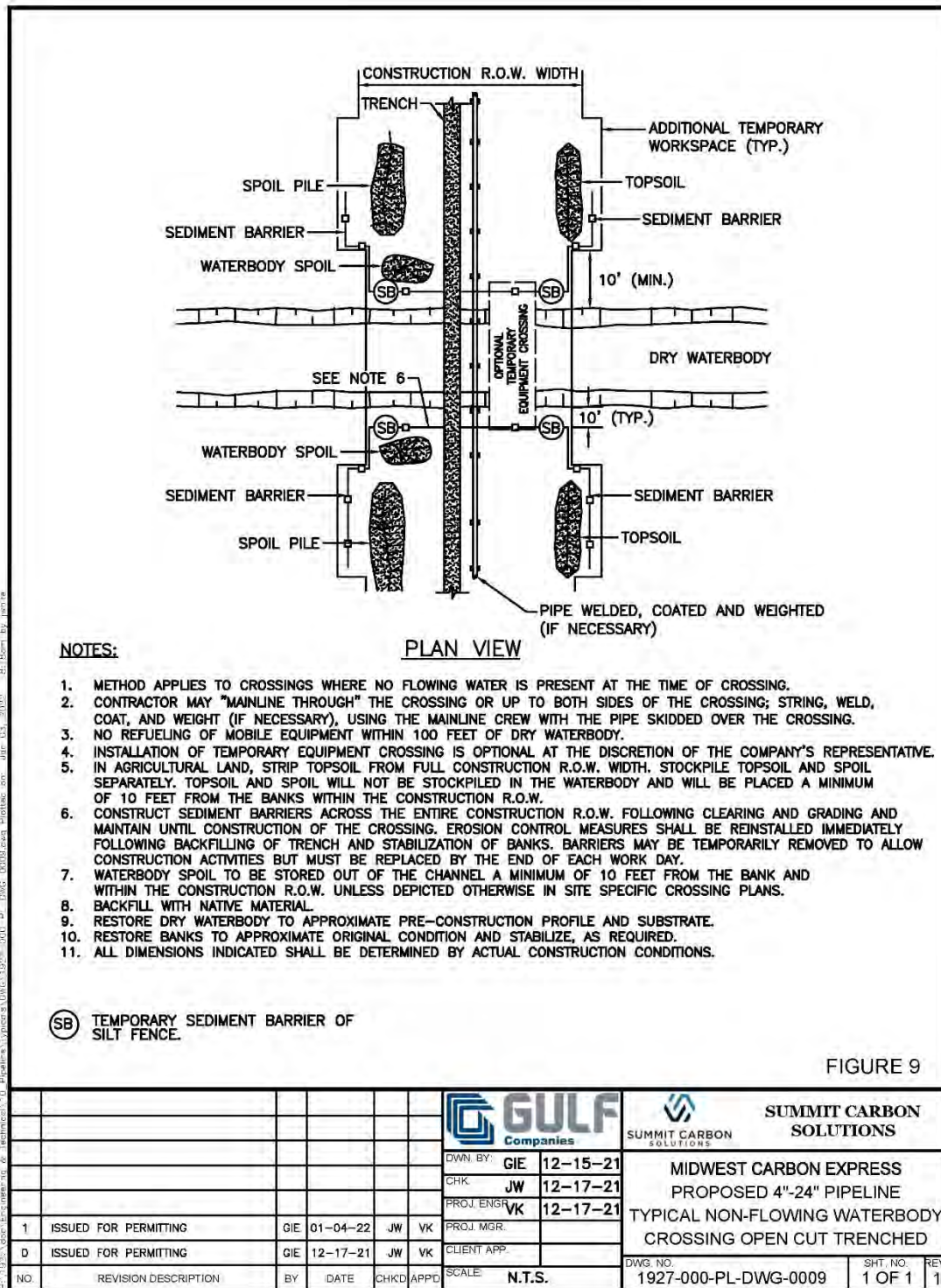
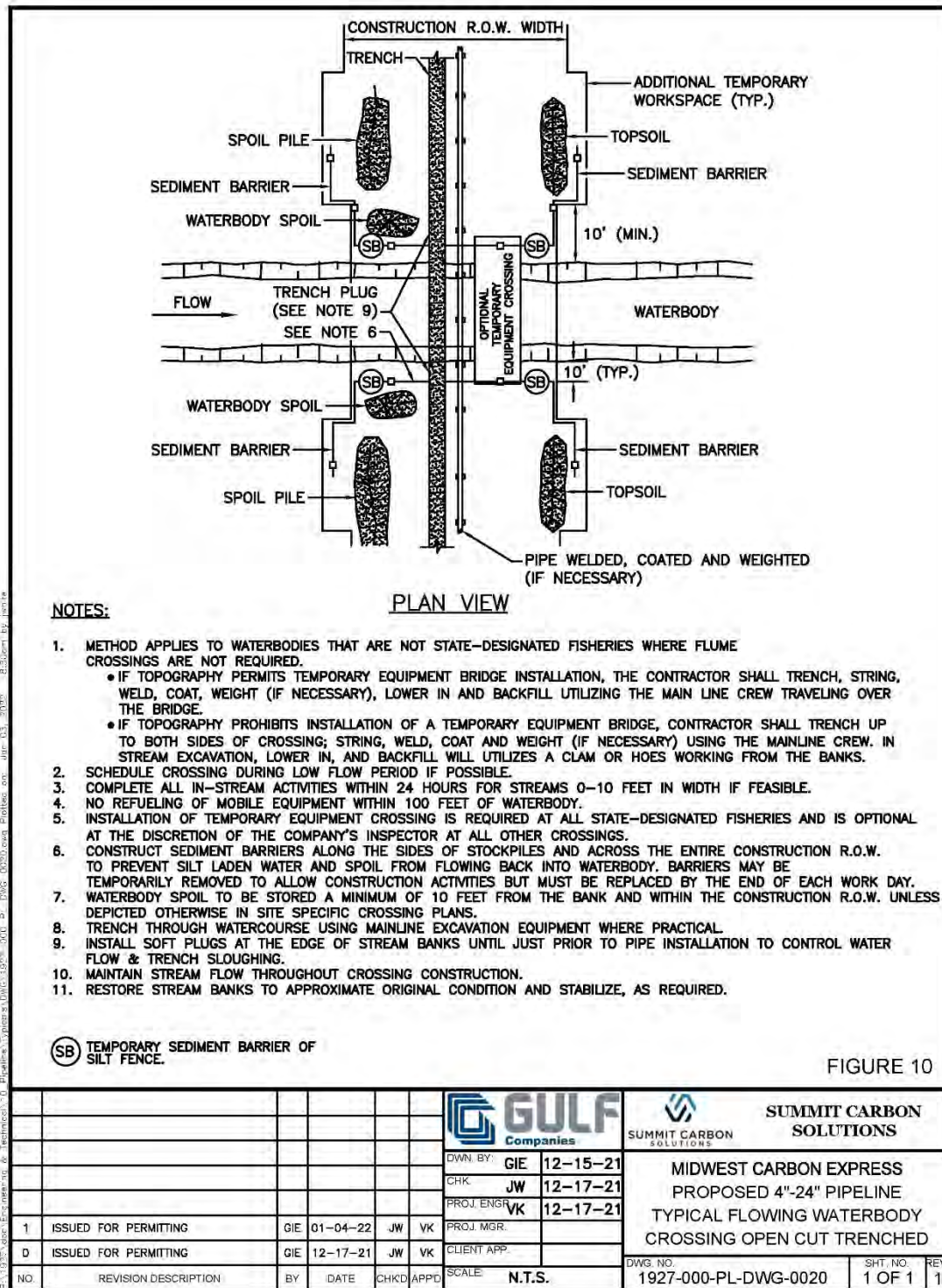


Figure 10: Typical Flowing Waterbody Crossing Open Cut Trenched



Appendix E

Minnesota Agricultural Protection Plan

Appendix 5 – Minnesota Agricultural Protection Plan



Agricultural Protection Plan - Minnesota

Summit Carbon Solutions

Project Name:

Summit Carbon Solutions Midwest Carbon Express

MPUC Docket Number:

IP7093/PPL-22-422

Document Control Number:

SCS-0700-ENV-01-PLN-021

Date:

September 12, 2022

REVISION HISTORY

DATE	REVISION	REVISION DESCRIPTION	PREPARED BY:	REVIEWED BY:	APPROVED BY:
9/12/2022	0	Final	AR/BB	BB	JS

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Appendix A - Mitigation Measures for Organic Agricultural Land

Appendix B - Construction Typical

Figure B-1: Typical 100' Construction ROW Conventional Lay with Double Ditch Method

Figure B-2: Typical 100' Construction ROW Conventional Lay

Figure B-3: Typical Construction Permanent Drain Tile Repair

Figure B-4: Typical Construction Temporary Drain Tile Repair

Acronyms and Abbreviations

ATWS	Additional Temporary Workspace
BMPs	Best Management Practices
CFR	Code of Federal Regulations
EERA	Department of Commerce Energy Environmental Review and Analysis
INS	Invasive and Noxious Species
MDA	Minnesota Department of Agriculture
Minnesota ECP	Minnesota Environmental Construction Plan
Plan	Minnesota Agricultural Protection Plan
SCS	Summit Carbon Solutions, LLC
TWS	Temporary Workspace
USDA	U.S. Department of Agriculture

1 PURPOSE AND APPLICABILITY

This Minnesota Agricultural Protection Plan (Plan) was developed by Summit Carbon Solutions, to provide the Midwest Carbon Express (MCE) Project with measures for minimizing impacts on and restoring agricultural lands crossed by the MCE Project in Minnesota during and after pipeline construction. Any material amendments to this Plan must be approved by the Minnesota Department of Agriculture (MDA). Prior to construction, SCS will provide copies of this Plan to all landowners of property and persons in possession of the property that will be disturbed by the construction. Copies will also be provided to County Board of Commissioners, County Engineer, and County Inspectors in each affected county.

The construction standards described in this document apply only to construction activities occurring partially or wholly on privately owned Agricultural Land. Furthermore, Best Management Practices (BMPs) identified in the SCS' Minnesota Environmental Construction Plan (Minnesota ECP) may be utilized on Agricultural Land in conjunction with mitigation measures outlined in this Plan. Mitigation measures identified in this plan do not apply to urban land, road and railroad right-of-way, or mined and disturbed land not used for agriculture. The identified mitigation measures will be implemented as long as they do not conflict with federal, state, and local permits, approvals, and regulations.

Unless the Easement or other agreement, regardless of nature, between SCS and the Landowner specifically requires the contrary, the mitigation measures specified in this Plan will be implemented in accordance with the conditions discussed below.

Appendix A sets forth additional mitigation measures that will be applied specifically to Organic Agricultural Lands, such as Certified Organic farms or farms that are in active transition to become Certified Organic. Organic Agricultural Land is defined as farms or portions thereof, as described in the National Organic Program, Title 7 Code of Federal Regulations (CFR) § 205.

2 GENERAL PROVISIONS

All mitigation measures are subject to change by Landowners, provided such changes are negotiated in advance of construction and acceptable to SCS. If any provision of this Plan is held to be unenforceable, no other provision will be affected by that holding, and the remainder of the Plan will be interpreted as if it did not contain the unenforceable provision.

SCS will consider any federal, state, and local permit to be the controlling authority. To the extent a mitigation measure contemplated by this Plan is determined to be unenforceable in the future due to requirements of other permits issued, SCS will inform the regulatory authority and will develop reasonable alternative measures. SCS will implement the mitigation measures and BMPs described in this Plan to the extent they do not conflict with the requirements of federal, state, and local rules, regulations, or permits, and approvals obtained by SCS. Certain provisions of this Plan require SCS to consult and/or reach agreement with the Landowner of a property. SCS will engage in a good faith effort to secure the agreement. Tenants will not be consulted except where a Landowner has designated in writing that a Tenant has decision making authority on their behalf.

SCS will retain qualified contractors to perform mitigation measures; however, SCS may negotiate with Landowners to implement the mitigation measures that Landowners wish to perform themselves. SCS will not be held liable for mitigation measures performed by Landowners.

SCS has developed a Minnesota ECP to ensure that appropriate systems are in place to achieve compliance with this Plan, in addition to other plans and permits. The Minnesota ECP describes the roles and responsibilities of the personnel involved with implementing the various environmental requirements, describes the reporting structure that will be employed to document compliance during construction, and presents a series of training events to communicate the environmental requirements to the construction personnel.

The County Board of Commissioners shall designate an inspector (County Inspector) who shall conduct on-site inspections in compliance with provisions and standards in accordance with Minnesota Statutes 2021, Chapter 216G, Section 07, Subdivision 7. Each County Board of Commissioners may contract for the services of a licensed professional engineer for the purposes of inspection. The reasonable costs of the inspection shall be paid by SCS, and such reasonable costs shall be reimbursed by SCS within thirty (30) days following invoicing from the County.

SCS will employ Agricultural Inspectors whose role is to verify compliance with the requirements of this Plan during construction of the pipeline. The Agricultural Inspectors will be employed by and report to SCS and will be a part of SCS' environmental inspection team. The Agricultural Inspectors will:

- be a full-time member of SCS's environmental inspection team;
- provide construction personnel with training on provisions of this Plan before construction begins;
- provide construction personnel with field training on specific topics, such as protocols for topsoil stripping;
- observe construction activities on agricultural land on a continual basis;
- be responsible for verifying SCS' compliance with provisions of this Plan during construction;
- work collaboratively with other SCS inspectors and lands agents in achieving compliance with this Plan;
- document instances of noncompliance and work with construction personnel to identify and implement appropriate corrective actions as needed; and
- have the authority to stop construction activities that are determined to be out of compliance with the provisions of this Plan.

The Agricultural Inspectors will ideally have an agricultural background and will have received specific training on the implementation of the Plan. In addition, the Agricultural Inspectors will have demonstrated practical experience with pipeline construction and restoration on Agricultural Land.

SCS will provide each Landowner with a telephone number and address that can be used to contact SCS, during and following the completion of construction, regarding the agricultural mitigation work that is performed on their property or other construction-related matters. If the contact information changes following construction, SCS will provide the Landowner with updated contact information. SCS will respond to Landowner telephone calls and correspondence within a reasonable time.

Mitigation measures identified by SCS pursuant to this Plan, unless otherwise specified in this Plan or in an Easement or other agreement with an individual Landowner, will be initiated within 45 days following completion of Final Cleanup on an affected property, weather permitting or unless otherwise delayed at the request of the Landowner or by a federal, state, or local regulatory authority. If implementation of

mitigation measures requires additional time, SCS will make temporary repairs, as needed, to minimize the risk of additional property damage or interference with the Landowner's access to or use of the property.

3 SEQUENCE OF CONSTRUCTION EVENTS AND SCHEDULE

Pipeline construction is anticipated to commence as soon as practicable following the receipt of required permits and approvals.

The sequence of events for pipeline construction will begin with advance notification of affected persons and governmental agencies. Following notification, activities will generally be undertaken in the following sequence:

- Complete final surveys, stake right-of-way boundaries and workspace;
- Access road and mat installation;
- Grubbing and clearing of the construction corridor;
- Front-end grading;
- Right-of-way topsoil stripping, segregation, and storage;
- Stringing of pipe and other supplies along the construction corridor;
- Pipeline bending and welding where necessary;
- Weld inspection, repairs (if necessary), and field coating;
- Excavation of the pipeline trench;
- Temporary repairs to tile lines, if encountered and necessary;
- Lowering of the pipeline within the trench;
- Permanent repairs to tile lines, if encountered and necessary;
- Backfill of the trench and rough grading;
- Hydrostatic testing of the pipeline, final tie-in;
- Replace topsoil, final grading, and full restoration;
- Revegetation and post restoration monitoring (if necessary); and
- Removal of erosion control measures.

4 POINTS OF CONTACT

SCS' designated point of contact for inquiries or claims from affected persons is:

Mike Bradburn, Norfleet Land Services
Minnesota ROW Project Manager
Email: Mike.Bradburn@norfleetland.com
Telephone: 1-855-950-6352

Any change in the point of contact will be promptly communicated in writing to affected persons. The above point of contact will remain available for at least one year following project completion and, for affected persons with unresolved damage claims, until such time as those claims are resolved.

SCS general contact information:

Email: info@summitcarbon.com

Telephone: 515-531-2635

Address: 2321 North Loop Drive #221, Ames, Iowa 50010

In addition to any other notice required by law, SCS shall, at least one week prior to commencement of construction, notify each affected person of the pending construction.

5 DEFINITIONS

The following terms used in this Plan have the following definitions.

Term	Definition
Active Cropland	Land actively managed for growing row crops, small grains, or hay.
Additional Temporary Workspace (ATWS)	Temporary construction workspace needed when encountering environmental features that require special construction methods.
Affected Person	Any person with a legal right or interest in the property, including, but not limited to, a landowner, a contract purchaser of record, a person possessing the property under a lease, a record lienholder, and a record encumbrancer of the property.
Agricultural Inspector	As defined above in General Provisions section.
Agricultural Land	<p>Any land devoted to agricultural use, including, but not limited to, land used for crop production, cleared land capable of being cultivated, hay land, pasture land, managed woodlands and woodlands of commercial value, truck gardens, farmsteads, commercial agricultural-related facilities, feedlots, rangeland, livestock confinement systems, land on which farm buildings are located, and land used to implement management practices and structures for the improvement or conservation of soil, water, air, and related plant and animal resources.</p> <p>Land that is actively managed for agricultural purposes, including: cropland, hay land, or pasture; silvicultural activities (i.e., tree farms); and land in government set-aside programs such as Conservation Reserve Program and Conservation Reserve Enhancement Program. Agricultural Land may also include land that is otherwise fallow but would likely be cultivated within 5 years of construction completion.</p>

Term	Definition
Construction Right-of-Way/ Workspace	<p>The terms “construction right-of-way,” “temporary construction right-of-way,” “construction workspace,” and “temporary workspace” define the primary workspace area required for installation of the pipeline and associated facilities. For clarity, SCS will generically use “construction workspace” instead of “temporary construction right-of-way,” “temporary construction workspace,” or “construction right-of-way” as the terminology for 1) the permanent right-of-way; and 2) temporary construction area, which includes the following defined terms: Temporary Workspace and Additional Temporary Workspace. All construction equipment and vehicles will be confined to this approved construction workspace. The width of the Temporary Workspace and Additional Temporary Workspace varies by pipeline diameter, features crossed, and topography.</p> <p>Land located adjacent to and contiguous with the proposed permanent right-of-way.</p>
County Inspector	As defined in Minnesota Statutes 216G.07, Subdivision 7, an inspector who shall conduct on-site inspections of the construction to determine whether the pipeline is constructed in compliance with the appropriate Minnesota Statutes.
Drainage Structures	Any permanent structure used for draining agricultural lands, including tile systems and buried terrace outlets.
Easement	The agreement(s) and/or interest in privately owned Agricultural Land held by SCS by virtue of which it has the right to construct and operate together with such other rights and obligations as may be set forth in such agreement.
Final Clean-up	Construction activity that occurs after backfilling the trench, but before restoration of fences and required reseeding. Final Cleanup activities include: replacing topsoil, removal of construction debris, removal of excess rock, decompaction of soil as required, final grading, and installation of permanent erosion control structures.
Landowner	Person(s) holding legal title to Agricultural Land from whom SCS is seeking, or has obtained, a temporary or permanent Easement. The term “Landowner” shall include any person(s) authorized in writing by the actual Landowner to make decisions regarding the mitigation or restoration of agricultural impacts on such Landowner’s property. Person(s) include an individual or entity, including any partnership, corporation, association, joint stock company, trust, joint venture, limited liability company, unincorporated organization, or governmental entity (or any department, agency, or political subdivision thereof).
Livestock	Domesticated animals raised in an agricultural setting to produce labor and commodities, such as meat, eggs, milk, fur, leather, and wool; or to promote the survival of rare breeds.

Term	Definition
Permanent Right-of Way	The legally acquired land rights used to install, maintain, operate, and access the pipeline and associated facilities.
Pipeline	Any pipe, pipes, or pipelines used for the transportation or transmission of any solid, liquid, or gaseous substance, except water, or hazardous liquid, within or through Minnesota.
Pipeline Construction	Activity associated with installation, relocation, replacement, removal or operation or maintenance of a pipeline that disturbs agricultural land, but shall not include work performed during an emergency, tree clearing, or topsoil surveying completed on land under Easement with approval from the landowner.
Planned Tile	Locations where the proposed Tile installation is made known in writing to SCS by the Landowner either: 1) within 60 days after the signing of an Easement; or 2) before the issuance of a Route Permit to SCS; whichever is sooner.
Soil Conservation Practices	Any land conservation practice recognized by federal or state soil conservation agencies including, but not limited to, grasslands and grassed waterways, hay land planting, pasture, and tree plantings.
Temporary Access Roads	An access road is a road used to access the pipeline construction workspace, permanent right-of-way, or associated facility. Access roads can be public roads or private drives and can be existing, modified, or newly constructed.
Temporary Workspace (TWS)	Temporary construction workspace outside the Easement that will be used during construction for soil storage and operation of equipment and vehicles along the entire length of the pipeline.
Tenants	Any person, other than the Landowner, lawfully residing on or in possession or control of the land that makes up the "right-of-way" as defined in this Plan.
Tile	Subsurface drainage systems and their aboveground appurtenances.
Wet Conditions	Adverse soil conditions due to rain events, antecedent moisture, or ponded water, where the passage of construction equipment may cause rutting that mixes topsoil and subsoil, may prevent the effective removal or replacement of topsoil and subsoil, may prevent proper decompaction, or may damage underground tile lines.

6 MITIGATION MEASURES

6.1 Right-of-Way Width

Prior to the commencement of clearing activities, civil survey crews will flag the boundaries of the construction workspace in Agricultural Lands. The construction plan and profile, tract (property) boundaries, and environmental features will be shown on alignment sheet drawings provided to the SCS

construction contractor, County Inspector, SCS Environmental Inspector, SCS Agricultural Inspector, and regulatory authorities.

- A. The Construction Workspace is expected to be typically 100 feet wide in uplands, of which 50 feet will typically be retained in a permanent right-of-way or Easement, and 50 feet, respectively, will be TWS. The TWS will be used during construction for soil storage and operation of equipment and vehicles along the entire length of the pipeline. At certain select areas where the pipeline crosses natural geographic or larger man-made features such as roads, railroads, streams, or wetland crossings, a defined area of ATWS may be required on each side of the feature.
- B. If, for a variety of reasons, the area of the Construction Workspace is not sufficient to perform the work and implement BMPs, SCS will discuss the need for ATWS with the construction contractor, inspection team, Agricultural Inspector(s) and the Landowner, and will not use any additional workspace until approved by the Landowner and regulatory authorities, as applicable.

6.2 Pipeline Depth of Cover

- A. Except for aboveground facilities, such as mainline valves, pig launcher/receiver sites, and cathodic protection system components, and except as otherwise stated in this Plan, the pipeline will be buried with the following depths of cover on Agricultural Land:
 - 1) The pipeline will be constructed with a minimum depth of cover of 54 inches as required by Section 216G.07 of the Minnesota Statutes.
 - 2) Where existing Tile systems are present, and where landowners have, prior to construction, consulted with SCS on specific future Planned Tile systems that may be impacted by construction, the pipeline will be installed at a depth that will achieve at least a 12-inch separation between the pipeline and overlying Tiles as described in Section 2.C. of this Plan, or have an agreed upon separation distance with the Landowner and/or appropriate local jurisdiction.
- B. SCS will construct the pipeline under existing non-abandoned Tile and Planned Tile within 8 feet of the existing ground level unless the Landowner determines otherwise in writing. SCS may install the pipeline over Tile that is buried deeper than 8 feet. If, prior to construction, the Landowner plans to install a new Tile system, the Landowner must provide to SCS plans drawn by a qualified professional with experience in Tile design and installation. In determining the proper depth of the pipeline, SCS will accommodate the depth and grade needed for both existing and Planned Tile to function properly. SCS will not change the grade of existing Tile to accommodate the pipeline without the Landowner's advance written consent.
- C. A minimum of 12 inches of separation will be maintained between the pipeline and Tile unless the Landowner and/or appropriate local jurisdiction agrees in writing to a lesser separation. If unforeseen physical conditions are discovered during construction that prevents minimum separation, the Landowner will be informed of the situation prior to the installation of the pipeline over the Tile. If a good faith effort is made and the Landowner is unavailable, the Agricultural Inspector(s) will be informed, and construction will continue.

6.3 Winter Construction

Should winter construction be required, SCS would develop winter construction procedures that would be described in a Winter Construction Plan. If constructing the pipeline in frozen conditions through agricultural lands is necessary, the following mitigation measures are proposed to protect the productivity of agricultural lands:

- A. Minimize topsoil stripping in frozen conditions. Frozen conditions can preclude effective topsoil stripping. When soil is frozen to a depth greater than the depth of the topsoil, topsoil cannot be efficiently separated from the subsoil without pulling subsoil and mixing it with topsoil. If topsoil stripping must proceed under these conditions, it will only be removed from the area of the trench. A ripper (deep tillage device or scarifier) may be used to break up the frozen topsoil over the trenchline and a backhoe will remove the topsoil layer and store the material in a separate pile. The ripper will extend to the depth of topsoil or to a maximum depth of 12 inches, whichever is less.
- B. Minimize Final Clean-up activities in frozen conditions. Frozen conditions can preclude effective topsoil replacement, removal of construction debris, removal of excess rock, decompaction of soil as required, final grading, and installation of permanent erosion control structures. If seasonal or other weather conditions preclude Final Clean-up activities, the trench will be backfilled, stabilized, and temporary erosion control measures will be installed until restoration can be completed. Frozen topsoil would not be placed back into the trench until thawing has occurred to prevent settlement of soil in the trench. If topsoil/spoil piles remain throughout the winter, the topsoil/spoil piles will be stabilized methods approved by the regulatory authority. To prevent subsidence, backfill operations will resume when the ground is thawed, and the subsoil will be compacted (as needed) prior to Final Clean-up activities. The construction contractor must monitor these areas until final restoration is complete.
- C. Topsoil Stripping and Final Clean-up activities proposed in Agricultural Lands in frozen conditions in Minnesota will be discussed with the MDA as part of the development of the Winter Construction Plan, prior to commencement of these activities.

6.4 Temporary Erosion and Sediment Control BMPs

Temporary erosion and sediment control BMPs will be implemented as required and are described in the Minnesota ECP.

6.5 Topsoil Stripping, Trenching, Soil Storage, and Replacement

- A. When segregating topsoil, the Contractor will strip all topsoil. Topsoil depth will be determined onsite. Equipment operators will be trained to discriminate between topsoil and subsoil based on obvious color changes. In locations where the topsoil and subsoil color changes are not easily distinguishable or variable, the Agricultural Inspector will determine the depth.
- B. SCS will use the following topsoil segregation methods during construction on Agricultural Lands. The method selected will be dependent on specific Landowner approvals or agreements, field conditions, regulatory authority, permit requirements, and/or other factors:

- Conventional Lay with Double Ditch Method (refer to Figure B-1)
- Conventional Lay Method (refer to Figure B-2)

The Conventional Lay with Double Ditch Method (Figure B-1) will typically be used in active cropland and pasture, which will consist of stripping topsoil from the full width of the construction right-of-way excepting the areas reserved for topsoil storage. This method typically limits soil mixing between topsoil and subsoil caused by equipment working over areas where topsoil was not stripped. A larger volume of topsoil will be generated using this method and, consequently, may warrant the need for topsoil to also be stored on both sides of the construction right-of-way.

The Conventional Lay Method (Figure B-2) will consist of stripping a layer of topsoil across the full width of the construction right-of-way sufficient to establish a level working surface, and such shall be stored on opposite side of the construction right-of-way. This method will be used where requested by the landowner or regulatory agency.

- C. Before removing topsoil during wet soil conditions, the Agricultural Inspector will assess whether the moisture content in the surface horizon is suitable for grading. If the soil is considered too wet to segregate, stripping may be postponed. Based on the Agricultural Inspector recommendation, SCS may allow Topsoil removal in areas where soils are persistently wet.
- D. SCS may also remove topsoil from ATWS as dictated by site-specific conditions and Landowner agreements. Topsoil will be removed in all “cut and fill” areas prior to grading.
- E. Areas requiring topsoil stripping may be adjusted where the Agricultural Inspector determines that such modification is necessary for safety or is more protective of the soil resource. The adjusted method may include Conventional Lay with Single Ditch Method topsoil segregation, such as in instances where topsoil is removed under frozen conditions. In all cases where modifications are proposed, approval from SCS, the MDA, or other regulatory authority is required.
- F. Subsoil will be placed in a stockpile that is separate from topsoil. SCS will typically maintain a minimum 1-foot-wide separation or place a barrier between topsoil and subsoil piles to avoid mixing. In areas where the topsoil has not been stripped from the subsoil storage area, subsoil can be stored on a thick layer of mulch or another physical barrier that prevents mixing.
- G. Backfilling will follow lowering the pipe into the trench. During trench backfilling, subsoil material will be replaced first, followed by topsoil. To prevent subsidence, subsoil will be backfilled and compacted. Compaction by operating construction equipment along the trench is acceptable. See Section 10 regarding decompaction.
- H. Rock excavated from the trench may be included with backfill provided the rock content of the pre-construction soils is not significantly increased. In the event excess rock cannot be returned to the trench without substantially increasing pre-existing rock content, rocks will be considered construction debris and removed (see Section 9 of this Plan).

- I. The topsoil and subsoil shall be replaced in the reverse order in which they were excavated from the trench. The depth of the replaced topsoil shall conform as near as possible to the depth of topsoil that was removed. Where excavations are made for road, stream, drainage ditch, or other crossings, the original depth of topsoil shall be replaced as near as possible.

Replacing topsoil will be initiated within 14 days after backfilling the trench. If seasonal or other weather conditions prevent compliance with this timeframe, temporary erosion control measures must be implemented and maintained until conditions allow completion of cleanup. Topsoil will be replaced across the stripped area as near as practicable to its original depth. A trench crown over the trenchline is permissible to offset potential settling. Following placement of the subsoil crown, topsoil would be uniformly returned across the stripped area. The height of the crown will generally be equal to, or less than, 12 inches at the center. Breaks in the crown may be cut to accommodate overland water flow across the right-of-way.

6.6 Protection of Livestock

SCS will work with landowners with livestock in proximity of the construction area to ensure livestock are protected during all phases of construction and restoration. As described in the Minnesota ECP, where deemed appropriate by SCS, the Contractor will leave plugs of subsoil in the ditch or will construct temporary access bridges across the trench to move livestock or equipment. Trenches may also be sloped where started and ended to allow ramps for livestock or other wildlife to escape. Space of plugs and ramps will be determined in the field.

6.7 Temporary and Permanent Repair of Drain Tiles

Tile disturbed or damaged by pipeline construction will be repaired to its original or better condition. Permanent repairs will be completed within 21 days after the pipeline is installed in accordance with the Minnesota ECP. Permanent repair and replacement of damaged drain tile will be performed in accordance with the following requirements:

- A. All damaged, broken, or cracked tile will be removed.
- B. Only unobstructed tile will be used for replacement.
- C. The tile furnished for replacement purposes will be of a quality, size, and flow capacity at least equal to that of the tile being replaced.
- D. Tile will be replaced using a laser transit, or similar instrument or method, to ensure that its proper gradient and alignment are restored, except where relocation or rerouting is required for angled crossings. Tile lines will be repaired in a comparable manner shown on Figure B-3.

The temporary repair and replacement of damaged drain tile will be firmly supported to prevent loss of gradient or alignment due to soil settlement. The ends of the existing tile will not be plugged and continuous flow will be maintained in the tile system during construction, unless otherwise authorized by the Landowner. The method used will be comparable to that shown on Figure B-4.

6.8 Agricultural Drainage Ditches

Where the pipeline route crosses agricultural drainage ditches that are operated by the Landowner, the pipeline will be installed at a depth that is sufficient to allow for ongoing maintenance of the ditch. After

the pipeline is installed, the ditch will be restored to its pre-construction contours with erosion controls as needed. Ditches that are operated and maintained by a public entity (e.g., local watershed district) will be crossed in accordance with applicable licenses, permits, and/or development agreement.

6.9 Removal of Rocks and Debris from the Right-of-Way

Excess rocks will be removed from the right-of-way. The topsoil, when backfilled, and the easement area shall be free of all rock larger than three inches in average diameter not native to the topsoil prior to excavation. Where rocks over three inches in size are present, their size and frequency shall be similar to adjacent soil not disturbed by construction.

The top 24 inches of the trench backfill will not contain rocks in any greater concentration or size than exist in the adjacent natural soils. Consolidated rock removed by blasting or mechanical means shall not be placed in the backfill above the natural bedrock profile or above the frost line. In addition, SCS will examine areas adjacent to the easement and along access roads and will remove any large rocks or debris that may have rolled or blown from the right-of-way or fallen from vehicles.

Rock that cannot remain in or be used as backfill will be disposed of at locations and in a manner mutually satisfactory to the company's environmental inspector and the landowner. Soil from which excess rock has been removed may be used for backfill. All debris attributable to the pipeline construction and related activities will be removed and disposed of properly; such debris includes spilled oil, grease, fuel, or other petroleum or chemical products. Such products and any contaminated soil will be removed for proper disposal or treated by appropriate in situ remediation.

6.10 Compaction, Rutting, and Soil Restoration

- A. In an effort to minimize soil compaction prior to trenching activities, SCS will, where practical, transport pipe joints (i.e., stringing trucks) as closely as possible along the pipeline centerline.
- B. After construction, compaction of the subsoil will be alleviated on Cropland using deep-tillage device or chisel plow, as needed and approved by the Landowner or Land-Managing Agency. Decompaction of the soil, if necessary, will be performed during favorable soil conditions. If the Agricultural Inspector(s) determine that the soil is too wet, decompaction will be delayed until the subsoil is friable/tillable in the top 18 inches.
- C. Deep subsoil ripping in Cropland will occur in all traffic and work areas of the pipeline construction workspace where there was full construction workspace topsoil stripping unless the Agricultural Inspector(s) determines compaction has not occurred. This includes ATWS that has been disturbed.
- D. Subsoil ripping equipment may include v-rippers, chisel plows, or equivalents.
- E. SCS will restore rutted land as near as practical to its pre-construction condition.
- F. SCS will compensate Landowners, as appropriate, for damages caused by SCS during construction. Agreed upon damages will be paid for the cost of soil restoration on the construction workspace to the extent such restoration work is not performed by SCS.

- G. In the event of a dispute between the Landowner and SCS regarding what areas need to be deep tilled (i.e., ripped) or chiseled, or the depth at which compacted areas should be ripped or chiseled, SCS will determine the appropriate actions based on the County Inspector's opinion.
- H. Rutted land will be graded and tilled until restored as near as practical to its preconstruction condition. On lands where topsoil was removed, rutting will be remedied before topsoil is replaced.

6.11 Land Leveling

Following completion of the construction, SCS will restore the construction workspace to as close to the original pre-construction contours as practicable. If uneven settling occurs or surface drainage problems develop as a result of pipeline construction, SCS will provide additional land leveling services after receiving a Landowner's written notice, weather and soil conditions permitting. Alternatively, SCS will negotiate with the Landowner for reasonable compensation in lieu of restoration.

SCS will work with landowners to ensure restoration of terraces to their pre-construction condition. If requested by the landowner, SCS may hire a local contractor to restore the terraces.

Civil surveys will be conducted to document the terraces and contours before disturbance occurs. The pre-construction drainage along the terrace channel will be maintained and additional BMPs may be installed if necessary. SCS will perform post-construction monitoring and inspection to ensure restoration methods of the terraces are sufficient and that they are to their pre-construction elevation and condition. If the terraces require further work, SCS will either compensate the landowner or arrange for a local contractor to perform the work.

6.12 Prevention of Soil Erosion

SCS will follow BMPs and industry standards for erosion and sedimentation control during construction and post-construction. SCS will develop a Minnesota Construction Storm Water Pollution Prevention Plan that will detail the project specific stormwater and soil erosion prevention measures. SCS will install permanent erosion control devices during restoration to prevent erosion as described in SCS' Minnesota ECP. All applicable federal and state regulations and conditions associated with surface water quality criteria will require SCS' full compliance.

6.13 Repair of Damaged Soil Conservation Practices

Soil conservation practices (e.g., terraces, grassed waterways) that are damaged by pipeline construction will be restored to their pre-construction condition.

6.14 Interference with Irrigation Systems

- A. If it is feasible and mutually acceptable to SCS and the Landowner, temporary measures will be implemented to allow an irrigation system to continue to operate across land on which the pipeline is being constructed.
- B. If the construction workspace interferes with an operational (or soon-to-be operational) spray irrigation system, SCS will inform the Landowner of the need to take the irrigation system out of service. SCS and the Landowner will agree upon an acceptable amount of time the irrigation system may be out of service. If SCS and the Landowner are unable to agree on the amount of

time within 10 days of SCS informing the Landowner of the need to take the irrigation system out of service, construction will proceed, and the Landowner will be asked to take the irrigation system out of service.

- C. If, as a result of pipeline construction, interruption of an irrigation system results in crop damages, either within the construction workspace or outside of the construction workspace, compensation of Landowners will be determined as described in Section 20 of this Plan.

6.15 Ingress and Egress

Prior to pipeline construction, SCS will identify the means of entering and exiting the construction workspace should access not be practical or feasible from adjacent tracts or from public highway or railroad rights-of-way, consistent with SCS' Easement rights. Temporary access ramps/pads may be constructed using rock on top of geotextile fabric or construction mats as needed to facilitate the movement of equipment between public roads and the construction workspace.

6.16 Temporary Access Roads

- A. If public roads do not provide sufficient access, SCS will attempt to use existing farms roads for access to and from the construction workspace, subject to approval from the Landowner or SCS' Easement rights. Where SCS needs to construct a new temporary access road across Agricultural Land, the location will be made in collaboration with the Landowner. Temporary access roads that are needed during construction will be located to minimize impacts on the landowner's or tenant's use of the Agricultural Land. If temporary access roads in Agricultural Lands require gravel stabilization, geotextile construction fabric will be placed beneath the rock to add stability and to provide a distinctive barrier between the rock and soil surface. During restoration of the construction workspace, temporary access roads will be removed or restored to pre-construction conditions unless otherwise agreed to with landowner.
- B. Temporary bridges or culverts will be implemented along access roads so as not to impede drainage and will be constructed to minimize soil erosion as described in the Minnesota ECP.
- C. Following construction, new temporary access roads may be left intact through mutual agreement of the Landowner and SCS, except for where gravel or rock was placed during construction, or unless otherwise restricted by federal, state, or local regulations. All rock and gravel used for access road improvement will be removed.
- D. Where temporary access roads are removed, the Agricultural Land on which the temporary roads are constructed will be returned to its previous use and restored to a condition equivalent to what existed prior to construction. Restoration techniques for temporary access roads will be similar to those used in restoring the construction workspace (e.g., decompaction).

6.17 Invasive and Noxious Terrestrial Plant Management

SCS will manage invasive and noxious (INS) terrestrial plants per the Minnesota ECP. SCS will provide for weed control in a manner that prevents the spread of weeds onto adjacent lands used for agricultural purposes. Where necessary and in accordance with federal, state, and local regulations, spraying shall be done by an herbicide applicator that is appropriately licensed. If SCS fails to control weeds resulting from

construction activities within 45 days after receiving written notice from a landowner, SCS will be responsible for reimbursing all reasonable costs of weed control incurred by owners of adjacent land.

SCS will also manage INS species at its aboveground facility sites (e.g., mainline valve sites) during operational activities. Herbicide spraying will be conducted in accordance with applicable regulatory authorities.

6.18 Construction Water Discharges

- A. Prior to construction, SCS will identify the need to discharge water pumped out of trenches or excavations, or from buoyancy control and hydrostatic testing activities; these activities will be permitted by appropriate state regulatory agencies and will be conducted in accordance with the Minnesota ECP, federal and state regulations, and permit conditions.
- B. When dewatering trenches in Agricultural Land, SCS will discharge the water in a manner that is in compliance with any permits and will minimize damaging adjacent Agricultural Land, crops, and/or pasture. Such damages may include, but are not limited to, inundation of crops for more than 24 hours and deposition of sediment in cropland and drainage ditches. If water-related damage during discharge from trenches results in a loss of yield, compensation of Landowners will be determined as described in Section 20 of this Plan.

6.19 Construction in Wet Conditions

The Agricultural Inspector and/or County Inspector, in consultation with SCS shall determine when construction should not proceed in a given area due to wet conditions. The County Inspector will work with SCS construction management and the construction superintendent to shut down construction if conditions are too wet to proceed.

Construction in wet soil conditions will not commence or continue at times when or locations where the passage of heavy construction equipment may cause rutting to the extent that the topsoil and subsoil are mixed or underground drainage structures may be damaged.

To facilitate construction in wet soils, SCS may elect to install mats or padding, or use other methods acceptable to the County Inspector.

6.20 Procedures for Determining Construction-Related Damages

- A. SCS will negotiate in good faith with Landowners who assert claims for construction-related damages. The procedure for resolution of these claims will be in accordance with the terms of the Easements.
- B. Negotiations between SCS and any affected Landowner will be voluntary in nature and no party is obligated to follow a specific procedure or method for computing the amount of loss for which compensation is sought or paid, except as otherwise specifically provided in the Easements. In the event a Landowner should decide not to accept compensation offered by SCS, the compensation offered is only an offer to settle, and the offer shall not be introduced in any proceeding brought by the Landowner to establish the amount of damages SCS must pay. In the event SCS and a Landowner are unable to reach an agreement on the amount of compensation, any such Landowner may seek further recourse as provided in the Easement.

6.21 Advance Notice of Access to Private Property

- A. SCS or its agents will provide the Landowner with a minimum one week notice before accessing his/her property for construction, in addition to any regulatory notifications.
- B. Prior notice will consist of a personal or telephone contact, whereby the Landowner is informed of SCS' intent to access the land. If the Landowner cannot be reached in person or by telephone, SCS will mail or hand-deliver to the Landowner's home a dated, written notice of SCS's intent. The Landowner need not acknowledge receipt of the written notice before SCS enters the property.

6.22 Indemnification

Indemnification obligations relating to the pipeline installation covered by this Plan shall be determined in accordance with the terms of the Easement and applicable law.

6.23 Tile Repair Following Pipeline Installation

SCS will consult with affected persons regarding plans for future drain tile installation. Where an affected person provides SCS with written plans prepared by a qualified tile technician for future drain tile improvements before an easement is secured, the pipeline will be installed at a depth which will allow for proper clearance between the pipeline and the proposed future tile installation.

SCS will consult with affected persons regarding plans for future use or installation of soil conservation practices or structures. Where an affected person provides SCS with a design for such practice or structure prepared by a qualified technician before an easement is secured, the pipeline will be installed at a depth that will retain the integrity of the pipeline.

Appendix A - Mitigation Measures for Organic Agricultural Land

INTRODUCTION

This appendix identifies mitigation measures that apply specifically to farms that are Certified Organic or farms in Minnesota that are in active transition to become Certified Organic and is intended to address the unique management and certification requirements of these operations. All protections provided in the Plan must also be applied to Organic Agricultural Land in addition to the provisions of this appendix. The provisions of this appendix will apply to Organic Agricultural Land for which the Landowner has provided to SCS a true, correct, and current version of the Organic System Plan. SCS recognizes that Organic Agricultural Land is a unique feature of the landscape and will treat this land with the same level of care as other sensitive environmental features.

DEFINITIONS

Unless otherwise provided to the contrary in this appendix, capitalized terms used in this appendix shall have the meanings provided below and in the Plan. In the event of a conflict between this appendix and the Plan with respect to definitions, the definition provided in this appendix will prevail but only to the extent such conflicting terms are used in this appendix. The definition provided for the defined words used herein shall apply to all forms of the words.

Apply	To intentionally or inadvertently spread or distribute any substance onto the exposed surface of the soil.
Certifying Agent	As defined by the National Organic Program Standards, 7 CFR § 205.2.
Decertified or Decertification	Loss of Organic Certification.
Organic Agricultural Land	Farms, or portions thereof, that have been Certified Organic.
Certified Organic	“Certified” as defined in 7 CFR § 205.2.
Organic System Plan	As defined by the National Organic Program Standards, 7 CFR § 205.2.
Prohibited Substance	As defined in 7 CFR § 205.2. Prohibited Substances are further described in 7 CFR §§ 205.600-607.

ORGANIC SYSTEM PLAN

SCS recognizes the importance of the individualized Organic System Plan to the Organic Certification process. SCS will work with the Landowner, the Landowner’s Certifying Agent, and/or a U.S. Department of Agriculture (USDA)-approved organic consultant to identify site-specific construction practices and develop an organic construction plan that will minimize the potential for Decertification as a result of construction activities. SCS also recognizes that Organic System Plans are proprietary in nature and confidentiality will be respected.

PROHIBITED SUBSTANCES

SCS will avoid the application of Prohibited Substances onto Organic Agricultural Land. No herbicides, pesticides, fertilizers, or seed will be applied unless requested and approved by the Landowner. Likewise, no refueling, no fuel, or lubricant storage or routine equipment maintenance will be allowed on Organic Agricultural Land. Equipment will be checked prior to entry to make sure that fuel, hydraulic, and

lubrication systems are in good working order before working on Organic Agricultural Land. If Prohibited Substances are used on land adjacent to Organic Agricultural Land, these substances will be used in such a way as to prevent them from entering Organic Agricultural Land.

SOIL HANDLING

Topsoil and subsoil layers that are removed during construction will be stored separately and replaced in the proper sequence after the pipeline is installed. Unless otherwise specified in the site-specific plan described above, SCS will not use this soil for other purposes, including creating access ramps/pads at road crossings. No topsoil or subsoil (other than incidental amounts) may be removed from Organic Agricultural Land. Likewise, Organic Agricultural Land will not be used for storage of soil from non-Organic Agricultural Land.

EROSION CONTROL

On Organic Agricultural Land, SCS will, to the extent feasible, implement erosion control methods consistent with the Landowner's Organic System Plan. On land adjacent to Organic Agricultural Land, SCS's erosion control procedures will be designed so that sediment from adjacent non-Organic Agricultural Land will not flow along the construction workspace and be deposited on Organic Agricultural Land. Treated lumber will not be used in erosion control measures on Organic Agricultural Land.

WATER IN TRENCHES

During construction, SCS will leave an earthen plug in the trench at the boundary of Organic Agricultural Land to prevent trench water from adjacent land from flowing into the trench on Organic Agricultural Land. Likewise, SCS will not allow trench water from adjacent land to be pumped onto Organic Agricultural Land.

INVASIVE AND NOXIOUS TERRESTRIAL PLANT MANAGEMENT

On Organic Agricultural Land, SCS will, to the extent feasible, implement INS management methods consistent with the Landowner's Organic System Plan. Prohibited Substances will not be used for INS management on Organic Agricultural Land. In addition, SCS will not use Prohibited Substances for INS management on land adjacent to Organic Agricultural Land in such a way as to allow these materials to drift onto Organic Agricultural Land.

MITIGATION OF NATURAL RESOURCE IMPACTS

SCS will not use Organic Agricultural Land for the purpose of required compensatory mitigation of impacts on natural resources such as wetlands or woodlands unless approved by the Landowner.

MONITORING

In addition to the responsibilities of the Agricultural Inspectors described in the Plan, the following will apply:

- The Agricultural Inspectors or a trained Organic Inspector (trained through a USDA-approved Organic Inspection Program and retained by SCS) will routinely monitor construction and restoration activities on Organic Agricultural Land for compliance with the provisions of this appendix and will document activities that could result in Decertification; and

- Instances of noncompliance will be documented according to International Organic Inspectors Association protocol consistent with the Landowner's Organic System Plan, and will be made available to the MDA, the Landowner, the Landowner's Certifying Agent, and to SCS.

COMPENSATION FOR CONSTRUCTION DAMAGES

The settlement of damages will be based on crop yield and/or crop quality determination and the need for additional restoration measures and will proceed in accordance with the terms of the Easement. Unless the Landowner of Organic Agricultural Land and SCS agree otherwise, at SCS's expense, a mutually agreed upon professional agronomist will make crop yield determinations, and the MDA Fruit and Vegetable Inspection Unit will make crop quality determinations. If the crop yield and/or crop quality determinations indicate the need for soil testing, the testing will be conducted by a commercial laboratory that is properly certified to conduct the necessary tests and is mutually agreeable to SCS and the Landowner. Fieldwork for soil testing will be conducted by a Professional Soil Scientist or Professional Engineer licensed by the State of Minnesota. SCS will be responsible for the cost of sampling, testing, and additional restoration activities, if needed. Landowners may elect to settle damages with SCS in advance of construction on a mutually acceptable basis or to settle after construction based on a mutually agreeable determination of actual damages.

COMPENSATION FOR DAMAGES DUE TO DECERTIFICATION

Should any portion of Organic Agricultural Land be Decertified as a result of construction activities, the settlement of damages will be based on the difference between revenue generated from the land affected before Decertification and after Decertification, for the entire period of time the land is Decertified, so long as a good faith effort is made by the Landowner to regain certification.

Appendix B - Construction Typicals

Figure B-1: Typical 100' Construction ROW Conventional Lay with Double Ditch Method

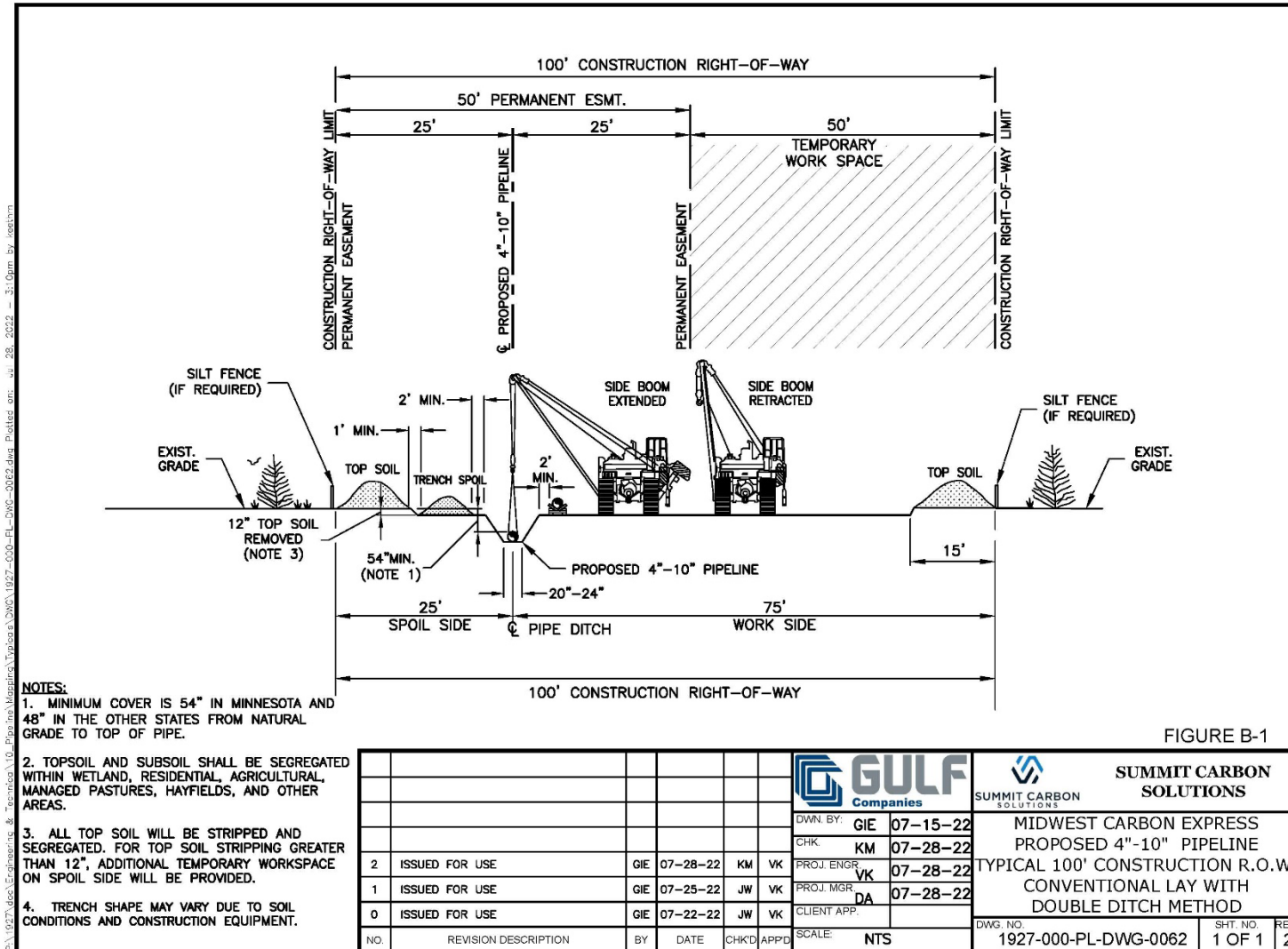


FIGURE B-1

Figure B-2: Typical 100' Construction ROW Conventional Lay

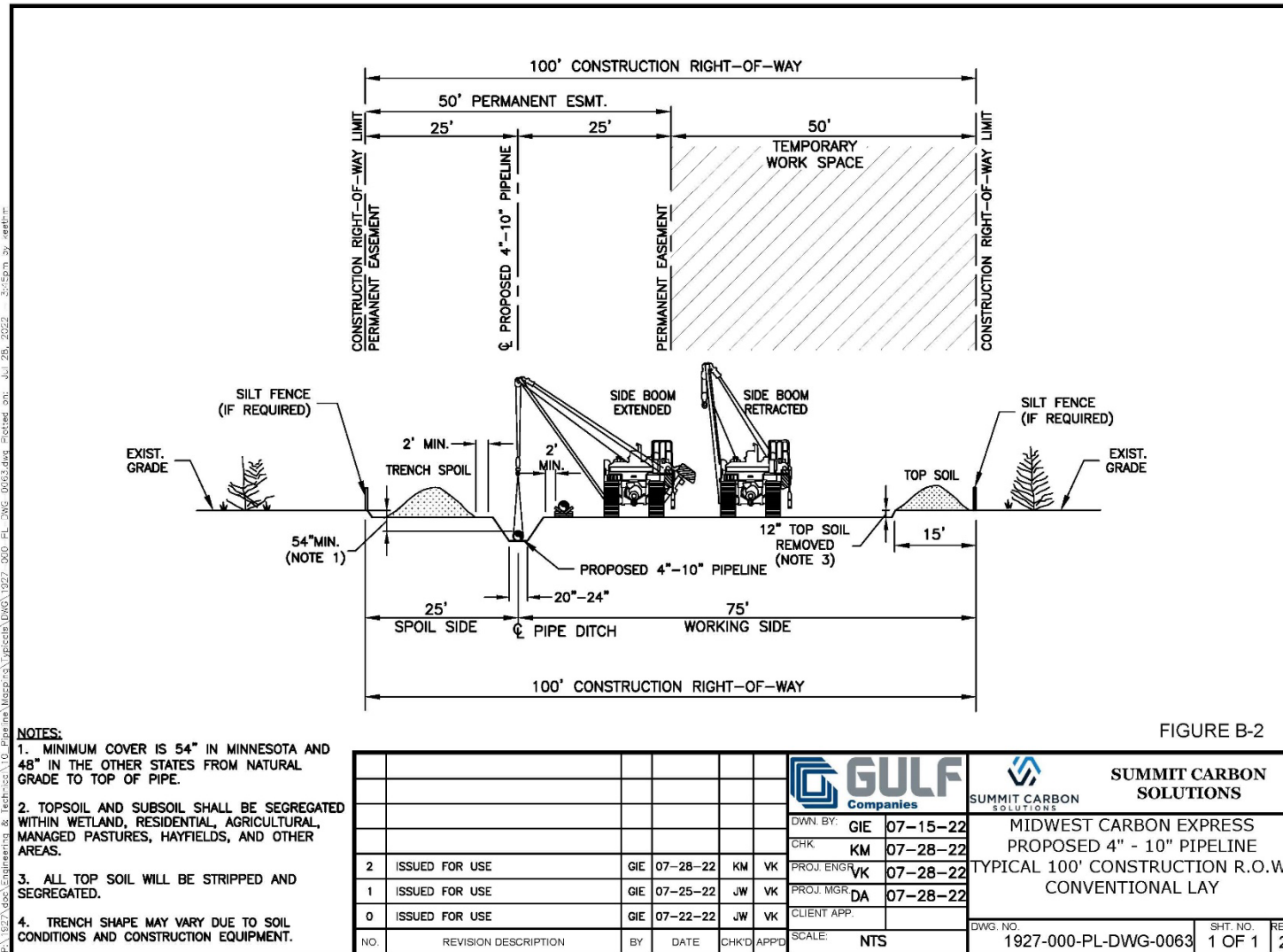
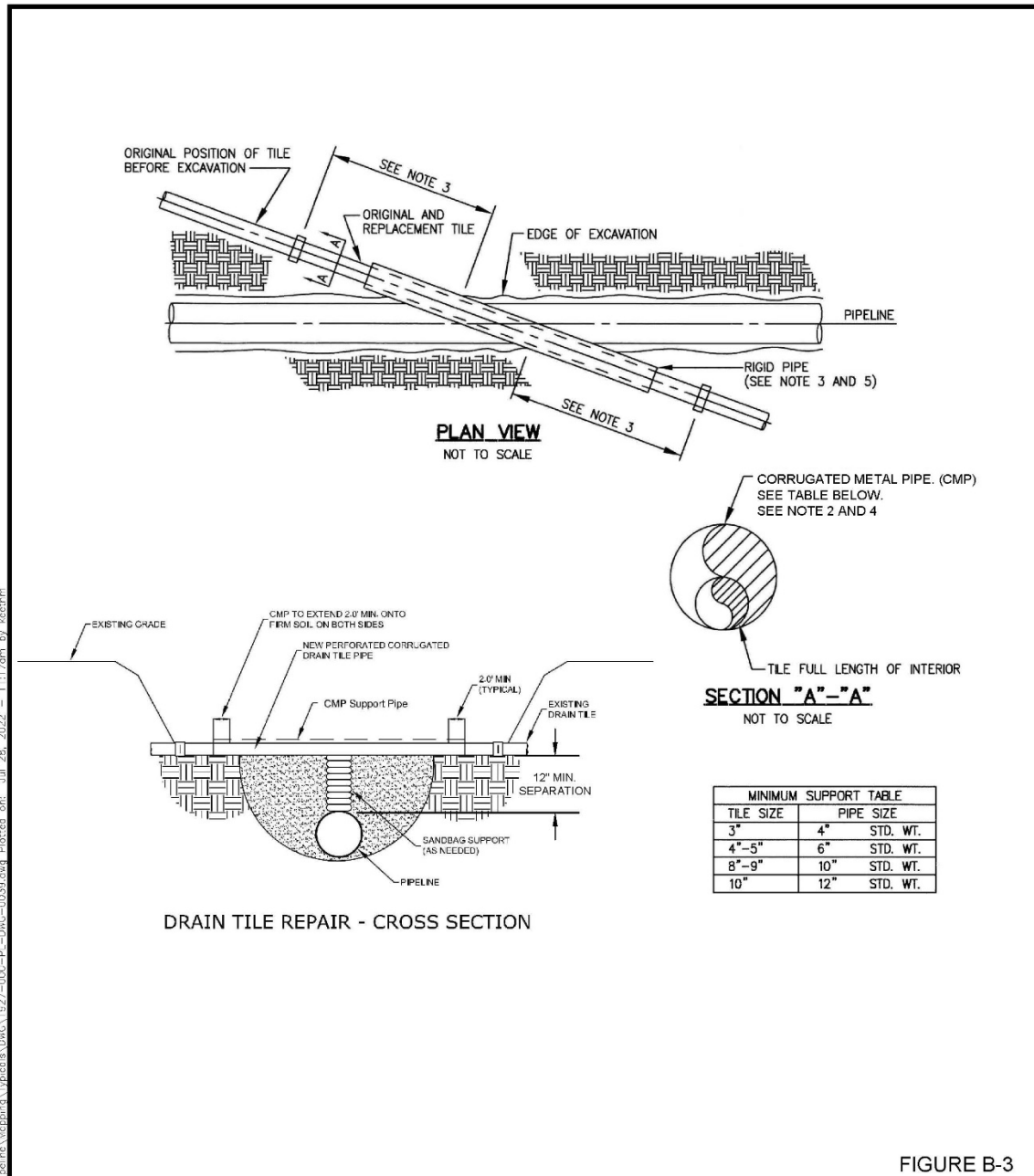


FIGURE B-2

Figure B-3: Typical Construction Permanent Drain Tile Repair



					DWN. BY:	GIE	12-28-21	MIDWEST CARBON EXPRESS PROPOSED 4"-24" PIPELINE TYPICAL CONSTRUCTION PERMANENT DRAIN TILE REPAIR	
					CHK.	KM	07-28-22		
					PROJ. ENGR.	VK	07-28-22		
					PROJ. MGR.	DA	07-28-22		
					CLIENT APP.			DWG. NO.	
					SCALE:	N.T.S.		1927-000-PL-DWG-0039	
								SHT. NO.	1 OF 2
								REV	2
NO.	REVISION DESCRIPTION	BY	DATE	CHKD	APPD				
2	ISSUED FOR USE	GIE	07-28-22	KM	VK				
1	ISSUED FOR INFORMATION	GIE	03-11-22	JW	VK				
0	ISSUED FOR INFORMATION	GIE	01-18-22	JW	DA				

P:\1927\000\Engineering & Technical\10. Pipeline\Mapping\Typical\DWG\1927-000-PL-DWG-0039.dwg Plotted on: Jul 28, 2022 - 11:17am by kschm

1. TILE REPAIR AND REPLACEMENT SHALL MAINTAIN ORIGINAL ALIGNMENT GRADIENT AND WATER FLOW TO THE WATER FLOW TO THE GREATEST EXTENT POSSIBLE, IF THE TILE NEEDS TO BE RELOCATED, THE INSTALLATION ANGLE MAY VARY DUE TO SITE SPECIFIC CONDITIONS AND LANDOWNER RECOMMENDATIONS.
2. 2'-0" MINIMUM LENGTH OF RIGID PIPE SHALL BE SUPPORTED BY UNDISTURBED SOIL, OR IF CROSSING IS NOT AT RIGHT ANGLES TO PIPELINE, EQUIVALENT LENGTH PERPENDICULAR TO TRENCH. (SHIM WITH SAND BAGS ONLY TO UNDISTURBED SOIL FOR SUPPORT AND DRAINAGE GRADIENT MAINTENANCE (TYPICAL BOTH SIDES) IF NEEDED ONLY.
3. DRAIN TILES WILL BE PERMANENTLY CONNECTED TO EXISTING DRAIN TILES A MINIMUM OF THREE FEET OUTSIDE OF EXCAVATED TRENCH LINE USING INDUSTRY STANDARDS TO ENSURE PROPER SEAL OF REPAIRED DRAIN TILES INCLUDING SLIP COUPLINGS.
4. DIAMETER OF RIGID PIPE SHALL BE OF ADEQUATE SIZE TO ALLOW FOR THE INSTALLATION OF THE TILE FOR THE FULL LENGTH OF RIGID PIPE.
5. ALL MATERIAL TO BE FURNISHED BY CONTRACTOR.
6. PRIOR TO REPAIRING TILE, CONTRACTOR SWAB Laterally INTO THE EXISTING TILE TO FULL WIDTH OF THE RIGHTS OF WAY TO DETERMINE IF ADDITIONAL DAMAGE HAS OCCURRED. ALL DAMAGE/DISTURBED TILE SHALL BE REPAIRED AS NEAR AS PRACTICABLE TO ITS ORIGINAL OR BETTER CONDITION.
7. ALL DAMAGED, BROKEN, OR CRACKED TILE SHALL BE REMOVED.
8. ONLY OBSTRUCTED TILE SHALL BE USED FOR REPLACEMENT.
9. THE REPLACE TILE SHALL BE FIRMLY SUPPORTED TO PREVENT LOSS OF GRADIENT OR ALIGNMENT DUE TO SOIL SETTLEMENT.
10. INSPECTION, PRIOR TO BACKFILLING OF THE APPLICABLE TRENCH AREA, EACH PERMANENT TILE REPAIR SHALL BE INSPECTED FOR COMPLIANCE BY THE COUNTY INSPECTOR. IF PROPER NOTICE IS GIVEN, CONSTRUCTION SHALL NOT BE DELAYED DUE TO AND INSPECTOR'S FAILURE TO BE PRESENT.
11. BACKFILLING, THE BACKFILL SURROUNDING THE PERMANENTLY REPAIRED DRAIN TILE SHALL BE COMPLETED AT THE TIME OF REPAIR AND IN A MANNER THAT ENSURES THAT ANY FURTHER BACKFILLING WILL NOT DAMAGE OR MISALIGN THE REPAIRED SECTION OF THE LINE. THE BACKFILL SHALL BE INSPECTED FOR COMPLIANCE BY THE COUNTY INSPECTOR.

FIGURE B-3

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Figure B-4: Typical Construction Temporary Drain Tile Repair

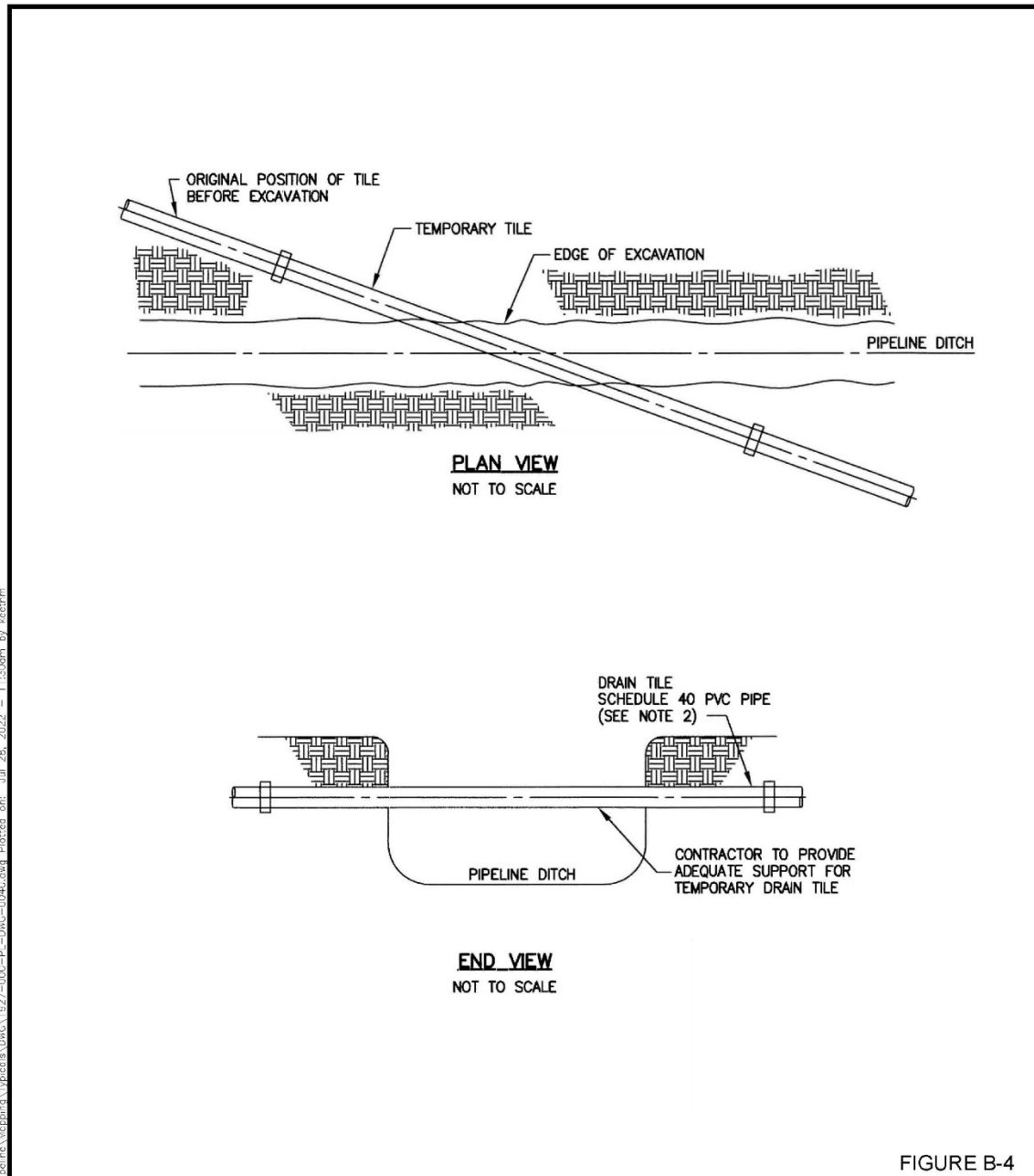




FIGURE B-4

						 GULF Companies	 SUMMIT CARBON SOLUTIONS		
						DWN. BY: GIE	12-28-21	MIDWEST CARBON EXPRESS PROPOSED 4"-24" PIPELINE TYPICAL CONSTRUCTION TEMPORARY DRAIN TILE REPAIR	
						CHK: JW	07-28-22		
2	ISSUED FOR USE	GIE	07-28-22	KM	VK	PROJ. ENGR. VK	07-28-22		
1	ISSUED FOR INFORMATION	GIE	03-11-22	JW	VK	PROJ. MGR. DA	07-28-22		
0	ISSUED FOR INFORMATION	GIE	01-18-22	JW	DA	CLIENT APP.			
NO.	REVISION DESCRIPTION	BY	DATE	CHKD	APPD	SCALE: N.T.S.	DWG. NO. 1927-000-PL-DWG-0040	SHT. NO. 1 OF 2	REV 2

P:\1927\000\Engineering & Technical\10. Pipeline Mapping\Typical\DWG\1927-000-PL-DWG-0040.dwg Plotted on: Jul 28, 2022 - 1:30pm by kschm

NOTES:

1. TEMPORARY TILE REPAIR AND REPLACEMENT SHALL MAINTAIN ORIGINAL ALIGNMENT GRADIENT AND WATER FLOW TO THE GREATEST EXTENT POSSIBLE.
2. TEMPORARY DRAIN TILE TO BE SIZED TO MAINTAIN ADEQUATE FLOW AND CONNECTED TO EXISTING DRAIN TILES.
3. ANY UNDERGROUND DRAIN TILE DAMAGED, CUT, OR REMOVED AND FOUND TO BE FLOWING OR WHICH SUBSEQUENTLY BEGINS TO FLOW SHALL BE TEMPORARILY REPAIRED AS SOON AS PRACTICABLE, AND THE REPAIR SHALL BE MAINTAINED AS NECESSARY TO ALLOW FOR PROPER FUNCTION DURING CONSTRUCTION OF THE PIPELINE. THE TEMPORARY REPAIRS SHALL BE MAINTAINED IN GOOD CONDITION UNTIL PERMANENT REPAIRS ARE MADE.
4. TEMPORARY REPAIR IS NOT REQUIRED IF THE ANGLE BETWEEN THE TRENCH AND THE TILE LINES PLACES THE TILE END POINTS TOO FAR APART FOR TEMPORARY REPAIR TO BE PRACTICAL.
5. IF TEMPORARY REPAIR OF THE LINE IS NOT MADE, THE UPSTREAM EXPOSED TILE LINE SHALL NOT BE OBSTRUCTED BUT SHALL NONETHELESS BE SCREENED OR OTHERWISE PROTECTED TO PREVENT THE ENTRY OF THE FOREIGN MATERIALS AND SMALL ANIMALS INTO THE TILE LINE SYSTEM, AND THE DOWNSTREAM TILE LINE ENTRANCE SHALL BE CAPPED OR FILTERED TO PREVENT ENTRY OF MUD OR FOREIGN MATERIAL INTO THE LINE IF THE WATER LEVEL RISES IN THE TRENCH.
6. MARKING. ANY UNDERGROUND DRAIN TILE DAMAGED, CUT, OR REMOVAL SHALL BE MARKED BY PLACING A HIGHLY VISIBLE FLAG IN THE TRENCH SPOIL BANK DIRECTLY OVER OR OPPOSITE SUCH TILE. THIS MARKER SHALL NOT BE REMOVED UNTIL THE TILE HAS BEEN PERMANENTLY REPAIRED AND THE REPAIRS HAVE BEEN APPROVED AND ACCEPTED BY THE COUNTY INSPECTOR. IF PROPER NOTICE IS GIVEN, CONSTRUCTION SHALL NOT BE DELAYED DUE TO AN INSPECTOR'S FAILURE TO BE PRESENT ON THE SITE.

FIGURE B-4

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Appendix F

Winter Construction Plan



Minnesota Winter Construction Plan

Summit Carbon Solutions

Project Name:

Summit Carbon Solutions (SCS) Midwest Carbon Express Project

SCS Document Number :

SCS-0700-ENV-01-PLN-042

Date

November 2023

REVISION HISTORY

DATE	REVISION	REVISION DESCRIPTION	PREPARED BY:	REVIEWED BY:	APPROVED BY:
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ACRONYMS AND ABBREVIATIONS

ATWS	additional temporary workspace
BMPs	Best Management Practices
BWSR	Minnesota Board of Water & Soil Resources
EI	Environmental Inspector
HDD	horizontal directional drill
INS	invasive or noxious species
MDNR	Minnesota Department of Natural Resources
Minnesota ECP	Minnesota Environmental Construction Plan
MPCA	Minnesota Pollution Control Agency
Plan	Winter Construction Plan
Project	the Midwest Carbon Express Project
ROW	right-of-way
SCS	Summit Carbon Solutions, LLC
USACE	U.S. Army Corps of Engineers

1 INTRODUCTION

The Winter Construction Plan (Plan) provides an overview of the procedures that will be employed by Summit Carbon Solutions, LLC (SCS) and its Contractor during winter conditions on the Midwest Carbon Express Project (Project). Winter construction weather conditions assume the presence of frozen surface soils or frozen precipitation covering the ground surface, and an extended forecast of below freezing temperatures. Due to the variability in weather conditions and site-specific conditions along the Project route, SCS and the Contractor will determine if frozen or non-frozen conditions apply at a given site and will select the construction technique and associated Best Management Practices (BMPs) as appropriate for the conditions at the time of crossing. Written approval from SCS must be obtained prior to implementing an alternative crossing method.

2 GENERAL MITIGATION MEASURES

2.1 Environmental Inspection

As described in the Minnesota ECP, SCS will employ Environmental Inspectors (EIs) to monitor erosion and sediment control BMPs and stabilization efforts and to adjust or repairs as needed in accordance with conditions identified in the applicable Project permits, certifications, and/or licenses. The EI will determine the most effective means of dealing with identified problems, taking into consideration the suitability of access to the ROW, potential equipment damage to the ROW, and the urgency of the issue to be addressed.

2.2 Identification of Avoidance Areas

The EI will confirm that signage or flagging for the avoidance areas described in Section 2.1 of the Minnesota Environmental Construction Plan (Minnesota ECP) has been maintained or replaced for visibility during winter conditions. Federally or state-listed species observations within the construction workspace will be reported to the appropriate agency(ies).

2.3 Wet Weather Shutdown

The transitional periods between fall and winter, and winter and spring may require a wet weather shutdown period. Weather conditions that fluctuate between above freezing temperatures during the day and below freezing temperatures at night often result in soils that are wet and greasy, which are susceptible to rutting, which then results in the mixing of topsoil and subsoil.

SCS will follow the process described in Section 2.5.1 of the Minnesota ECP to determine the need for and duration of a wet weather shutdown or other mitigative actions in these situations.

2.4 Right-of-Way Access

Construction of frost/ice roads may be needed to access the right-of-way (ROW). Development will begin as soon as weather conditions allow. The Contractor will clear all woody vegetation from areas where the frost/ice roads are to be located. After clearing, lightweight equipment such as snowcats and/or amphibious all-terrain vehicles (e.g., Argos) will be used to push and pack existing ice and snow together. This process is referred to as "snow pack." This initial snowpack provides the foundation for frost/ice roads. As the snowpack builds up and hardens, larger and heavier equipment will be used to progressively increase the thickness and density of the snowpack. Typically, a minimum of 30 inches of snow pack is necessary to safely support construction equipment. In some cases, water may

be added to the surface to help build snow pack from the top. If there is insufficient snow pack to safely support construction activities, it may be necessary to lay construction mats in addition to snow pack.

No deicing products will be used on the Project; however, snow removal may be required to allow safe access to the ROW. Snow is typically pushed off an access road with equipment such as a grader, snowplow, or bulldozer and then stockpiled along the edge of the access road. To minimize scraping off underlying soil or gravel during snow removal, snowblower attachments will be installed on compatible equipment. All equipment will remain on the access road and snow will not be pushed or blown onto environmentally sensitive features off ROW.

2.4.1 Bridges and Culverts

The Contractor may utilize waterbody bridges as described in Section 4.2 of the Minnesota ECP. The Contractor may also utilize ice bridges to cross small waterbodies. Ice bridges are suitable over small waterbodies where the ice is thick and solid, generally on relatively shallow, low velocity and narrow watercourses.

2.4.2 Temporary Access Road Restoration

After construction, the Contractor will return improved ice/frost roads to their pre-construction condition. Revegetation of temporary access roads will proceed as described in Section 7.0. No temporary infrastructure in wetlands or waterbodies (e.g., bridges, construction mats) will be permanently left in place without the appropriate regulatory permits, authorizations, and certifications.

2.5 Right-of-Way Requirements

All construction equipment and vehicles will be confined to the approved construction workspace and additional temporary workspace (ATWS), except where landowners or land-managing agencies have given permission for construction dewatering activities outside of the construction workspace (see Section 5.0).

The width of the construction workspace for the Project will vary depending on adjacent features such as utilities, roads, railroads, cultural, and environmental features such as wetlands and waterbodies. Typical construction configurations are included in Figure 1 and 2 of the Minnesota ECP. The construction workspace is inclusive of the permanent ROW, construction workspace, and site-specific extra workspaces (referred to as ATWS). The construction workspace width will be reduced (i.e., necked down) in selected locations (e.g., wetlands, waterbodies, in/near sensitive features), as indicated on the Project construction alignment sheets and in the field using staking.

2.6 Management of Undesirable Species

The Contractor will minimize the potential for introduction and/or spread of undesirable species (i.e., invasive or noxious species) along the construction workspace and temporary access roads due to pipeline construction activities. The measures the Contractor will implement to manage the spread of terrestrial and aquatic INS are described in more detail in Section 2.6 and 7.4 of the Minnesota ECP.

2.7 Upland Clearing

Clearing during winter conditions will proceed as described in Section 3.1 of the Minnesota ECP. Removal of snow from the construction workspace may be necessary to provide safe and efficient working conditions and to expose soils for grading and excavation. Snow is typically pushed off the working area with equipment such as a grader, snowplow, or bulldozer and then stockpiled along the outer portions of the workspace. To minimize scraping off underlying soil or gravel during snow removal, snowblower attachments will be installed on compatible equipment. All equipment will remain within the workspace, and snow will not be pushed or blown onto environmentally sensitive features off ROW. When snow is stored on the ROW, a physical barrier such as mulch or separation of snow piles from spoil piles will be conducted to avoid mixing.

Construction of frost/ice roads to serve as travel lanes may be needed in upland areas within the construction workspace. Where needed, development will begin as soon as weather conditions allow following the process described in Section 2.3.

2.8 Temporary Erosion and Sediment Control Best Management Practices

Due to frozen conditions, installation of certain temporary BMPs (also referred to as erosion control devices) to minimize erosion and control sediment (e.g., silt fence and staked straw bales) may not be practicable. In this case, alternative BMPs (such as compost filter socks, erosion control blankets, or straw wattles) will be installed on bare frozen ground or snow (less than 2 inches deep) to mitigate erosion and sediment migration.

Installed slope breakers and erosion and sediment control BMPs will be subject to inspection and repair requirements as outlined in Section 2.8 of the Minnesota ECP and/or applicable permits. When thawing conditions begin, BMPs will be monitored and upgraded as needed to prevent sediment deposition into resources or off site. Should final grading and cleanup be completed the following spring, then temporary slope breakers and sediment barriers will be installed during backfill and/or rough grade activities.

BMPs will be installed as needed to provide a conduit for the concentrated flow of melt water to ensure that snow melt will not cause erosion and sediment loss.

2.8.1 Mulch

The Contractor will stabilize¹ exposed ground surfaces within the timeframes described in Section 2.8 of the Minnesota ECP and will utilize mulch following guidance in Section 2.8.1 of the Minnesota ECP.

Mulch may be applied regardless of snow cover to cover at least 90 percent of the ground surface; sunlight will melt the straw into the snow to melt onto bare soil in the spring. Mulch will not be applied in wetlands.

2.8.2 Upland Topsoil Segregation and Storage

Once the frost road is established (as needed), crews will mobilize to the area where they will string, assemble, and install the pipeline. Special equipment, such as a trencher, ditching machine, or rock saw, will be used to cut down through the frost layer along both trench boundaries. Where frozen blocks have been cut, excavation equipment (e.g., a backhoe or excavator) will be used to remove the large frozen blocks and to place them adjacent to the trench. Depending on the depth of frost, trenching may be completed using conventional excavators. Trench topsoil will be segregated as practicable but modified dependent on depth of frost, thickness of topsoil, and the trenching method used.

2.8.3 Topsoil Storage

Gaps will be left and erosion and sediment control BMPs installed where stockpiled topsoil, spoil piles, and snow piles intersect with water conveyances (i.e., ditches, swales) to maintain natural drainage. Separation will be maintained between the topsoil, subsoil, and/or snow piles to prevent mixing. Where the separation cannot be maintained, the EI may approve the use of a physical barrier on a site-specific basis, such as a thick layer of certified weed-free straw or hay mulch or silt fence, between the spoil, topsoil, and/or snow piles to prevent mixing.

2.9 Upland Backfilling

After trench excavation, the assembled pipeline sections will be lowered into the trench. The amount of open excavation will be minimized during winter construction to reduce the amount of frozen backfill and facilitate

¹ Stabilization means that the exposed ground surface has been covered by appropriate materials such as mulch, staked sod, riprap, erosion control blanket, mats or other material that prevents erosion from occurring. Grass seeding, agricultural crop seeding, or other seeding alone is not stabilization. Mulch materials must achieve approximately 90 percent ground coverage (Minnesota Rules 7090).

restoration to pre-construction contours. As described in Section 3.2 of the Minnesota ECP, except at boreholes and tie-ins, the Contractor will limit the amount of excavated open trench in uplands to a maximum of 15 days of anticipated welding production per spread, or 15 miles per spread. For locations along the Project where the U.S. Army Corps of Engineers (USACE) Section 404 Utility Regional General Permit applies (i.e., waters of the U.S.), this will be limited to 5,280 linear feet of open trench. Within each spread, site-specific activities, such as horizontal directional drills (HDD), bores, valve work, and pump station construction may be performed independent of open trench work. Excavated soil material will then be used to backfill the trench; the subsoil will be replaced first, and then the topsoil in cases where topsoil has been segregated.

In some situations, frozen upland topsoil will not be replaced during frozen conditions. This option will be implemented when the trench, subsoil backfill, and topsoil are frozen preventing proper replacement of soils and compaction of the trench. Instead, the trench will be backfilled with subsoil only, and topsoil replacement and final grading will occur during the subsequent spring or early summer. Subsoil will be graded to the extent possible to avoid channeling of surface water if topsoil restoration is delayed for an extended amount of time. Additional erosion and sediment control BMPs will also be installed as needed to prevent channeling of surface water prior to topsoil restoration (see Section 2.8 of the Minnesota ECP).

This option will prevent multiple trips into an area to reclaim an excessive topsoil crown or repair subsidence that has taken place over the trench line during the freeze/thaw cycle. The topsoil stockpile will remain temporarily stabilized in accordance with Section 2.7 of the Minnesota ECP throughout this period to prevent erosion and or sediment migration off the construction workspace. Temporary seeding of topsoil piles may be implemented, as appropriate, following the dormant/winter seeding procedures described in Section 7.3. Adequate breaks or gaps in the topsoil stockpiles will be installed for drainage so that spring runoff and snow melt will not impact the topsoil piles and adjacent areas.

2.10 Cleanup and Rough/Final Grading

In cases where topsoil has been segregated into a pile and becomes frozen into irregularly shaped chunks, the Contractor will add a crown of approximately 12 inches or more (depending on soil type and conditions) over the backfilled trench line. Periodic breaks or gaps in the crown will be installed (as necessary) to ensure water is able to move freely across the backfilled trench and not create nuisance conditions during a precipitation event or spring run-off conditions. Crowning will not extend beyond the previously excavated trench limits. In these cases where permanent seeding is not possible, the Contractor will temporarily stabilize all exposed areas, including spoil piles, as described in Section 2.7.

As the backfill material thaws in the spring and summer, there is potential that the original crown may not completely recede to pre-construction contours. If the crown does not fully recede, additional grading will be performed once soils have thawed and conditions allow. Permanent seeding will proceed after final grading as described in Section 8.1 of the Minnesota ECP. Temporary erosion and sediment control BMPs will be maintained until permanent cover has been established. SCS will monitor areas after restoration as described in Section 8.2 of the Minnesota ECP.

3 WATERBODY CROSSING GENERAL REQUIREMENTS

The procedures in this section apply to rivers, streams, and other waterbodies such as jurisdictional ditches. These procedures require that judgment be applied in the field and will be implemented under the supervision of SCS.

Stream crossing requirements, including construction methods, timing, erosion and sediment control BMP usage, and restoration are described in this section and in the waterbody crossing permits, licenses, and certifications issued by federal, state, and local agencies, as applicable. Written approval from SCS must be obtained prior to implementing an alternative crossing method; additional agency review and approval may be required.

3.1 Time Window for Construction

All in-stream work activities (installation of dams, sheet piling, etc.) will be minimized to the extent practicable on an area and time duration basis as outlined in Section 4.4 of the Minnesota ECP.

3.2 Bridges

SCS will utilize the bridge described in Figure 8 and Section 4.2 of the Minnesota ECP, and ice bridges as described in Section 2.3.1.

3.3 Stream and River Crossing Construction Methods

3.3.1 Open Cut (Non-Isolated) Trench Method

If a waterbody that was permitted to cross using a dry crossing technique is dry or frozen at the time of construction, the Contractor will utilize the open cut (non-isolated) crossing method with required agency approval. These methods are described in Sections 4.5.1 and 4.5.2 of the Minnesota ECP.

3.3.2 Isolated Trench: Dam and Pump Method

Dry crossing techniques can be used in frozen conditions where there is water flow. The dam and pump method is preferred during winter construction and will proceed as outlined in Section 4.5.4 of the Minnesota ECP with the following additional steps:

- SCS will remove ice downstream of the crossing location using hand and power tools to install in-water BMPs (e.g., turbidity curtains);
- SCS will mechanically remove ice at the crossing location and install the dam;
- SCS will proceed with the remaining procedures described in Section 4.5.4 of the Minnesota ECP. Flowing water upstream of the dam will be pumped via a hose to the downstream location and discharged below the ice; and
- Measures will be taken to protect pumps from freezing to avoid disruption of water flow past the crossing location (e.g., place inside portable shelters with heaters). Backup pumps are required on site for each crossing.

3.3.3 Trenchless Methods: Horizontal Directional Drill or Bore Methods

The procedures for the bore and HDD methods are outlined in Sections 4.5.5 and 4.5.6 of the Minnesota ECP will be implemented. SCS will complete a pre-construction visit at the site at least 2 weeks prior to initiating HDD setup and operations to determine if additional materials and equipment will be needed. Monitoring, containment, and response of inadvertent release is described in Section 8.

3.4 Restoration and Stabilization

Restoration of the stream bank and bed contours will be initiated immediately after the installation of the crossing using the open cut trench method and prior to restoring flow using the dam and pump or flume method unless site and permit conditions delay permanent installation. SCS will restore the stream banks as near as practicable to pre-construction conditions unless that slope is determined to be unstable. If the slope is considered unstable, the Contractor will reshape the banks to prevent slumping. For public waters, the Contractor will return the bank to pre-construction contours, unless otherwise directed by the site-specific restoration plan. If the Contractor cannot restore to pre-construction contours at a public water, the Contractor will consult with the MDNR before proceeding further. Once the banks have been reshaped, the Contractor will commence soil stabilization activities as described in Section 2.8 of the Minnesota ECP. Temporary slope breakers will be installed on all sloped approaches to streams

in accordance with the spacing requirements identified in Section 2.8.4 of the Minnesota ECP and the outlet of the slope breaker will be directed away from the stream into a well-vegetated area.

3.4.1 Revegetation of Banks

If final grading can be completed during winter conditions, the Contractor will seed the banks following the dormant/winter seeding procedure described in Section 8.1.5 of the Minnesota ECP. If final grading and/or seeding is not feasible, the Contractor will temporarily stabilize all exposed areas, including spoil piles, as described in Section 2.8 of the Minnesota ECP.

Additional final grading may be performed once soils have thawed and conditions allow. Permanent seeding will proceed after final grading as described in Section 8 of the Minnesota ECP. Temporary erosion and sediment control BMPs will be maintained until permanent cover has been established.

3.4.2 Supplemental Bank Stabilization

The Contractor will prepare site-specific restoration plans in coordination with the applicable agencies to identify riparian areas that may require specialized seed mixes, plantings of woody vegetation, or other specialized restoration techniques. Depending on site conditions, some measures identified in the site-specific restoration plans may not be feasible to install during winter conditions. In these cases, the Contractor will temporarily stabilize all exposed areas, including spoil piles, as described in Section 2.8 of the Minnesota ECP until site conditions are such that restoration measures can be fully implemented.

4 WETLAND CROSSING GENERAL REQUIREMENTS

The various crossing techniques employed in different wetland types are described in more detail in Section 5.3 of the Minnesota ECP. Note that the proposed crossing technique may change depending on seasonality and site-specific conditions at the time of crossing (e.g., saturation level).

Wetland crossing requirements, including construction methods, timing, erosion control, and restoration, are described in this section and in the wetland crossing permits issued by federal, state, and local agencies as applicable.

4.1 Clearing

Clearing in wetlands will proceed as described in Section 5.2 of the Minnesota ECP. Removal of snow from the construction workspace may be necessary to provide safe and efficient working conditions and to expose soils for grading and excavation.

4.2 Grading and Topsoil Segregation

Grading and topsoil segregation activities will proceed as described in Section 5.2 of the Minnesota ECP.

4.3 Right-of-Way Stabilization

Construction of frost/ice roads to serve as travel lanes is typically required in winter conditions in wetlands within the construction workspace and will begin as soon as weather conditions allow following the process described in Section 2.3.

4.4 Backfilling

The area of open excavation will be minimized during winter construction to reduce amount of frozen backfill and facilitate restoration to pre-construction contours. As described in Section 3.2 of the Minnesota ECP, except at boreholes and tie-ins, the Contractor will limit the amount of excavated open trench in uplands to a maximum of 15 days of anticipated welding production per spread, or 15 miles per spread. For locations along the Project where the USACE Section 404 Utility Regional General Permit applies (i.e., waters of the U.S.), this will be limited to 5,280 linear feet of open trench. Within each spread, site-specific activities, such as HDDs, bores, valve work, and pump station

construction may be performed independent of open trench work. During backfilling, the excavated subsoil will be replaced first, and then the topsoil in cases where topsoil has been segregated.

4.5 Cleanup, Rough/Final Grading, and Temporary Restoration

The Contractor will add a crown of approximately 12 inches or more (depending on soil type and conditions) over the backfilled trench line. Periodic breaks or gaps in the crown will be installed (as necessary) to ensure water is able to move freely across the backfilled trench and not create nuisance conditions during a precipitation event or spring run-off conditions. Crowning will not extend beyond the previously excavated trench limits. The disturbed area will be temporarily stabilized in accordance with Section 2.8 of the Minnesota ECP until final grading and/or permanent revegetation can proceed.

As the backfill material thaws in the spring and summer, the frozen soil clumps will begin to break apart and collapse into void spaces, resulting in subsidence of the material. There is potential that the original crown may not completely recede to pre-construction contours. However, this is preferred over not having enough material over the trench to restore original contours. If the crown does not fully recede, additional grading will be performed once soils have thawed and conditions allow using low ground pressure equipment or excavators working off construction mats. Permanent revegetation will proceed after final grading as described in Section 8.1 of the Minnesota ECP. Temporary erosion and sediment control BMPs will be maintained until permanent cover has been established. The Contractor will monitor wetland areas after restoration in accordance with Section 8.2 of the Minnesota ECP.

5 CONSTRUCTION DEWATERING

5.1 Trench and Pit Dewatering

If construction dewatering is required during winter conditions, the procedures in Section 7.2 of the Minnesota ECP will be followed with the following additional considerations:

- Measures will be taken to protect pumps from freezing to avoid disruptions in dewatering and potential spills or leaks of lubricants or fuel (e.g., place pumps inside portable shelters with heaters);
- Dewatering structures may be installed early in the construction process before frozen ground conditions exist, where feasible;
- Locations of the filter bags placed off the ROW will be marked with lathe or a similar method to assist crews in relocating the filter bag for proper disposal; and
- Removal of dewatering structures will be conducted as soon as practicable after completion of dewatering in an attempt to remove the structure/filter bags before they are frozen.

5.2 Hydrostatic Test Discharges

Hydrostatic testing in winter conditions will proceed as described in Section 7.3 of the Minnesota ECP with the following additional considerations.

5.2.1 Mainline Hydrostatic Testing

Hydrostatic testing will be conducted in compliance with applicable appropriation and discharge permits. If the source waterbody is nearly or completely frozen to the bottom (minimal flow of water under ice) then the water will be discharged to the surface of the source waterbody on top of the ice to freeze. If there is minimal ice cover (sufficient base flow of water under ice) at the source waterbody, then ice augers will be used to drill several holes around a splash pup mounted on a barrier (e.g., construction mats, plywood) to allow the discharged water to slowly enter the waterbody under the ice without causing scour or concentrated flow to the waterbody bed. Determination on which discharge method to use will be proposed by the Contractor and determined in collaboration with SCS.

As discussed in Section 6.0, the Contractor will not appropriate from approved-groundwater sources during frozen conditions if soil conditions do not allow for infiltration during discharge activities. SCS will utilize an alternative agency-approved surface water source with adequate water flow and will follow the discharge measures outlined above.

5.2.2 HDD Hydrostatic Testing

The Contractor will either infiltrate the water if ground conditions allow (i.e., not frozen), discharge water back to the source, or haul water off-site. The HDD hydrostatic test water will be discharged in accordance with the Section 7.3 of the Minnesota ECP, and in compliance with applicable permits. If the source waterbody is nearly or completely frozen to the bottom (minimal flow of water under ice) then the water will be discharged to the surface of the source waterbody on top of the ice to freeze. If there is minimal ice cover (sufficient base flow of water under ice) at the source waterbody, then ice augers will be used to drill several holes around a splash pup mounted on a barrier (e.g., construction mats, plywood) to allow the discharged water to slowly enter the waterbody under the ice without causing scour or concentrated flow to the waterbody bed. Determination on which discharge method to use will be proposed by the Contractor and determined in collaboration with SCS.

The Contractor may appropriate from approved-groundwater sources during frozen conditions and haul water off-site if conditions do not allow for infiltration. Alternatively, the Contractor may utilize an alternative agency-approved surface water source with adequate water flow, or haul water on-site for smaller volumes. Discharge to surface water will proceed as outlined above, or if water is hauled on-site, water will be hauled off-site for disposal.

6 WATER APPROPRIATION

Water may be drawn from local sources, such as lakes, streams, and groundwater wells, for construction activities such as HDD drilling mud, buoyancy control, trench dewatering, and hydrostatic testing during frozen conditions. SCS will follow applicable permit conditions for the appropriation of water and will only utilize sources approved by the applicable agencies.

For appropriation from surface waters during frozen conditions, if the source waterbody is nearly or completely frozen to the bottom (minimal flow of water under ice) and does not have adequate water flow, an alternative agency-approved source will be used. If there is minimal ice cover (sufficient base flow of water under ice) at the source waterbody, then ice augers will be used to drill holes to allow the intake hose to enter the waterbody under the ice. The intake hose will be managed to minimize sediment intake from the waterbody bed. The Contractor will install a 3/16-inch mesh screen on the intake hose to prevent fish entrainment. During withdrawal, adequate waterbody flow rates and volumes will be maintained to protect aquatic life and allow for downstream uses. The volume and rate of withdrawal will be monitored to comply with applicable permit conditions. Measures will be taken to protect pumps from freezing and to avoid potential spills or leaks of lubricants or fuel (e.g., place pumps inside portable shelters with heaters).

For large volumes of water, the Contractor will likely not appropriate from approved-groundwater sources during frozen conditions if soil conditions do not allow for infiltration during discharge activities. For smaller volumes, the contractor may appropriate from approved-groundwater sources and haul water off-site for disposal. Alternatively, the Contractor will utilize an alternative agency-approved surface water source with adequate water flow, or haul water on-site for smaller volumes.

7 REVEGETATION

7.1 Site Preparation

Site preparation involves the following steps:

- Seed bed preparation;

- Planting of temporary cover crops (if appropriate);
- Installation of permanent erosion and sediment control BMPs; and
- Mulching.

As described in Sections 2.7, 2.9, 2.10, and 4.5, if final grading cannot occur due to frozen conditions, the Contractor will temporarily stabilize exposed soils, and install and maintain temporary erosion and sediment control BMPs until soils thaw and final grading and seed bed preparation, as outlined in Section 8 of the Minnesota ECP, can proceed.

7.1.1 Temporary Revegetation

The Contractor's temporary seed mixes will be developed based on Minnesota Board of Water & Soil Resources (BWSR) seed mixes and additional agency review as outlined in Section 8.1.2 of the Minnesota ECP. The use of short-lived temporary cover crops (e.g., oats, winter wheat, soil building cover crop [pea/oats] or a wetland rehabilitation seed mix) helps stabilize project sites and minimize the need for additional mulch in preparation of planning native seed mixes. Unless specifically requested by landowners or land-managing agencies, the Contractor does not intend to establish temporary vegetation in actively cultivated land, standing water wetlands, and/or other standing water areas.

7.1.1.1 Timing for Temporary Vegetation

Generally, oats will be used for spring or summer revegetation, and winter or spring wheat will be used in the fall. Temporary vegetation should be established at any time between April 1 and October 15 or frozen soil. Attempts at temporary revegetation after this date should be assessed on a site-specific basis and with approval from the Contractor in conformance with the required regulatory authorizations and all applicable federal, state and local regulations governing this activity. Refer to Section 2.8 of the Minnesota ECP for temporary stabilization timing requirements.

7.2 Seeding Periods

The Contractor will typically conduct permanent seeding shortly after final grading/seed bed preparation. The Contractor will delay seeding during frozen ground conditions until the ground has thawed and final grading and seed bed preparation can be completed. If conditions allow, the Contractor will complete dormant seeding. The Contractor will temporarily stabilize exposed soils and will install and maintain temporary erosion and sediment control BMPs during frozen conditions.

7.3 Dormant/Winter Seeding

Dormant seeding is a method used after soil temperatures have cooled to 40 degrees Fahrenheit or cooler to prevent seed germination of cool-season grasses and legumes, and 50 degrees Fahrenheit or below for native warm season grasses, forbs, and legumes (BWSR, 2019). Dormant seeding is only practicable if the soil is not frozen and is preferably done before the first snowfall as the snow cover will prevent loss of seeds from wind and birds (BWSR, 2014). Procedures for applying soil amendments, seedbed preparation, seeding, and mulching are the same as outlined for permanent revegetation in Section 8.1 of the Minnesota ECP.

Winter or snow seeding can be implemented during early or late winter when there is less than 1 foot of snow and on a sunny day when seed can move into the soil surface (BWSR, 2019). The freeze/thaw action helps to set the seed firmly in the soil to prepare for spring growth. The seed bed must have been previously prepared for winter seeding to be successful, and it is not recommended for areas prone to spring flooding or running water (BWSR, 2014).

Where dormant or winter seeding is conducted, one or more of the following temporary erosion and sediment control BMPs will be put in place over the freshly seeded area unless the local soil conservation authority, landowner, or land managing agency specifies otherwise. The temporary measures will be in place after seeding, and are as follows:

- certified weed-free straw or hay mulch, at 90 percent cover, anchored;
- hydromulch, according to supplier specifications; and/or
- erosion control blanket.

Additional erosion and sediment control BMPs will be applied as requested by the EI.

If conditions do not allow for final grading and seed bed preparation, seeding will not occur until soils have thawed. The Contractor will temporarily stabilize the area and install and maintain erosion and sediment control BMPs until conditions allow for final grading and permanent seeding.

8 DRILLING FLUID RESPONSE, CONTAINMENT, AND NOTIFICATION PROCEDURES

8.1 On-Site Observation During Construction

Early detection is key to minimizing the area of potential impact from an inadvertent release. The Contractor will monitor the drill path by observing land surfaces and the waterbodies for surface migration during drilling, reaming, and pipe installation procedures. The Contractor will also walk the drill path to monitor for surface seepage, sinkholes, and settlement. The Contractor will clear snow from the HDD path where practical and as needed to facilitate visual identification of drilling fluid at the surface. In addition, a flowing stream will be monitored both upstream and downstream of the drill path. If an observer notices inadvertent release conditions or lowered pressure readings on the drilling equipment, shutdown will occur immediately. The on-site observation notification process during construction is further described in Section 9 of the Minnesota ECP.

If drilling is performed during frozen conditions, holes shall be established in the frozen portion of a waterbody to monitor for fluid release. The following shall apply:

- Upstream of the drill path – holes (6-inch minimum diameter) will be drilled within the waterbody 10 feet upstream of the drill path at intervals starting 10 feet from the existing bank with a minimum of one hole (if the waterbody is less than 20 feet wide). These holes will be monitored throughout the duration of drilling operations.
- Downstream of the drill path – holes (6-inch minimum diameter) will be drilled within the waterbody 25 feet downstream of the drill path at intervals starting 10 feet from the existing bank with a minimum of one hole (if the waterbody is less than 20 feet wide). In addition, a second set of holes will be located 75 feet downstream of the drill path at intervals starting 10 feet from the existing bank with a minimum of one hole (if the waterbody is less than 20 feet wide). All downstream holes will be monitored throughout the duration of drilling operations.
- Equipment such as portable shelters may be used as needed to increase underwater visibility.

Voice contact shall be maintained at all times between all drill personnel to ensure that any operational changes are communicated immediately and effectively between observation personnel and drilling rig operators. The Contractor shall provide handheld two-way radio communications for this purpose.

8.2 Response

If an inadvertent release occurs in a waterbody with frozen ice, the Contractor will immediately notify the Minnesota Duty Officer (1-800-422-0798 or 651-649-5451) and the appropriate agencies of the release and will mechanically remove the ice downstream of the release as rapidly as possible, assuming ability to access the waterbody and ensuring the safety of all people and equipment and will install in-water BMP(s) to contain any drilling mud that may migrate downstream. The Contractor will then remove ice at the location of the upstream inadvertent release to

contain drilling mud at that location and prevent any further downstream migration. The in-water BMPs selected will correspond with site-specific conditions and these response materials will be on-site and available for rapid deployment in the event of an inadvertent release.

8.3 Clean-Up

Drilling fluid recovery methodology is not as variable as containment measures. When such measures effectively isolate the release from the stream flow, pumps or other appropriate measures are used to recover drilling fluid. When the release location cannot be isolated after initial in-water containment installation, drilling fluid that has settled from the water column typically collects in the acute upstream angle of the containment tool, and recovery efforts will be localized to that location.

9 REFERENCES

BWSR. 2014. Minnesota Wetland Restoration Guide. 2nd Edition. Available online at: <https://bwsr.state.mn.us/mn-wetland-restoration-guide>.

BWSR. 2019. Native Vegetation Establishment and Enhancement Guidelines. January 2019. Available online at: <https://bwsr.state.mn.us/sites/default/files/2019-07/Updated%20guidelines%20Final%2007-01-19.pdf>.

Appendix G

Summary of PHMSA Regulations and Accidental Release Dispersion Reports

Summary of PHMSA Regulations: CO2 Pipelines
July 2024

Appendix G

Summary of PHMSA Regulations: CO₂ Pipelines

G.1 Is the project regulated by the Pipeline and Hazardous Materials Safety Administration, and if so, how is the project regulated?

Yes, the Otter Tail to Wilkin Carbon Dioxide (CO₂) Pipeline Project (project) is regulated by the Pipeline and Hazardous Materials Safety Administration (PHMSA) under Title 49 Code of Federal Regulations (CFR) Parts 190 and 195–199 concerning engineering, design, construction, safety, and operation of the project.

G.2 What is PHMSA, and what does it regulate?

PHMSA is a federal agency within the United States Department of Transportation (USDOT) that has statutory authority over pipeline engineering, design, construction, safety, and operation (see 49 CFR Parts 190, 195-199). PHMSA establishes the federal regulations for pipeline safety. It was created under the Special Programs Improvement Act (Public Law 108-426) of 2004. The mission of PHMSA is to protect people and the environment by advancing the safe transportation of energy products and other hazardous materials that are essential to our daily lives. There are two safety offices within PHMSA: the Office of Pipeline Safety and the Office of Hazardous Materials Safety.

PHMSA regulates the construction, operation, and maintenance of CO₂ pipelines. PHMSA defines CO₂ as “a fluid consisting of more than 90 percent carbon dioxide molecules compressed to a supercritical state” (49 CFR Section 195.2). Proposed rules and regulations (discussed below) will extend the regulations to pipelines transporting liquid and gas CO₂ as well. Extending PHMSA oversight to cover all forms of CO₂ will ensure that no new CO₂ pipelines lack safety standards and regulations.

G.3 Why does PHMSA regulation apply to the project?

In 1979, Congress enacted comprehensive safety legislation governing the transportation of hazardous liquids by pipeline, the Hazardous Liquids Pipeline Safety Act of 1979 (HLPESA; 49 United States Code 2001 et seq.). The HLPESA expanded the existing statutory authority for safety regulation. It also added civil penalty, compliance order, and injunctive enforcement authorities to the existing criminal sanctions. The HLPESA provides for a national hazardous liquid pipeline safety program with nationally uniform minimal standards and with enforcement administered through a federal-state partnership.

The HLPESA leaves to exclusive federal regulation and enforcement the “interstate pipeline facilities,” or those used for the pipeline transportation of hazardous liquids in interstate or foreign commerce. For the remainder of the pipeline facilities, denominated “intrastate pipeline facilities,” the HLPESA provides that the same federal regulation and enforcement will apply unless a state certifies that it will assume those responsibilities. A certified state must adopt the same minimal standards but may adopt additional more stringent standards so long as they are compatible. Therefore, in states that participate in the hazardous liquid pipeline safety program through certification, it is necessary to distinguish interstate and intrastate pipeline facilities.

Concerning the proposed CO₂ project, USDOT would consider this project to be an interstate pipeline facility and thus subject to PHMSA regulation.

G.3.1 Current PHMSA CO₂ Pipeline Regulations

Transportation of Hazardous Liquids by Pipeline (49 CFR Part 195) is broken down into the following subparts:

- Subpart A – General. This subpart prescribes safety standards and reporting requirements for pipeline facilities used in the transportation of hazardous liquids or carbon dioxide.
- Subpart B – Annual, Accident, and Safety-Related Condition Reporting. This part prescribes requirements for periodic reporting and for reporting of accidents and safety-related conditions.
- Subpart C – Design Requirements. This subpart prescribes minimum design requirements for new pipeline systems constructed with steel pipe and for relocating, replacing, or otherwise changing existing systems constructed with steel pipe. However, it does not apply to the movement of line pipe covered by 49 CFR Section 195.424.
- Subpart D – Construction. This subpart prescribes minimum requirements for constructing new pipeline systems with steel pipe and for relocating, replacing, or otherwise changing existing pipeline systems that are constructed with steel pipe. However, this subpart does not apply to the movement of pipe covered by 49 CFR Section 195.424.
- Subpart E – Pressure Testing. This subpart prescribes minimum requirements for the pressure testing of steel pipelines. However, this subpart does not apply to the movement of pipe under 49 CFR Section 195.424. Provisions include risk-based alternatives to pressure testing, test pressure, testing of components, test medium, pressure testing aboveground breakout tanks, testing of tie-ins, and records.
- Subpart F – Operation and Maintenance. This subpart prescribes minimum requirements for operating and maintaining pipeline systems constructed with steel pipe.
- Subpart G – Qualification of Pipeline Personnel. This subpart prescribes the minimum requirements for operator qualification of individuals performing covered tasks on a pipeline facility.
- Subpart H – Corrosion Control. This subpart prescribes minimum requirements for protecting steel pipelines against corrosion.

G.3.2 Status of Pending PHMSA Regulations for CO₂ Pipelines

On February 22, 2020, the Denbury Green Pipeline, a CO₂ pipeline in Satartia, Mississippi, experienced a rupture that caused 48 people to seek medical attention and many others to evacuate the release area (further discussed Chapter 8 of this Environmental Impact Statement [EIS]). As a result of this CO₂ pipeline failure, PHMSA announced in May 2022 that the agency will be taking various measures to strengthen CO₂ pipeline safety and steps to implement new safety and oversight measures to prevent future failures and/or mishandling of CO₂ pipeline failures (Docket No. PHMSA-2023-0013).¹

On December 13–15, 2022, PHMSA held an informational public meeting addressing multiple safety topics. Among other things, PHMSA discussed with the public and industry how it is improving CO₂ pipeline safety by issuing advisory bulletins based on lessons learned from events like the pipeline failure that threatened the community of Satartia. This included discussion about calculating the potential impact radii for CO₂ pipeline releases. The overall purpose of the informational public meeting was to share safety information with the public and industry as well as gather input to inform future rulemaking decisions.

PHMSA received a letter from the Pipeline Safety Trust on February 17, 2023 (Docket No. PHMSA-2022-0125), formally requesting that PHMSA hold a public meeting on CO₂ pipeline safety and the announced rulemaking under RIN 2137-AF60.²

On May 31 and June 1, 2023, PHMSA held a public meeting and webcast on CO₂ pipeline safety.³ The purpose of the May–June 2023 public meetings was to serve as an opportunity for pipeline stakeholders to help inform pipeline safety-related rulemaking decisions and share information surrounding CO₂ pipeline safety. Key stakeholders included the public, states, Tribal governments, other federal agencies, industry, and international regulators and/or organizations. Topics included the following:

- Safety expectations for pipeline operators
- General state of CO₂ pipeline infrastructure – current mileage and forecasts
- Federal and state jurisdictions and authorities
- Public awareness, engagement, and emergency notification
- Emergency equipment, training, and response
- Dispersion modeling
- Safety measures to address other constituents besides CO₂ in CO₂ pipelines
- Leak detection and reporting
- Geohazards
- Conversion to service
- Environmental justice

Speakers/participants included the following

- Public advocacy groups
- Pipeline operators
- Federal regulators
- Tribal governments
- States through the National Association of Pipeline Safety Representatives
- Other United States government agencies

Comments were allowed to be submitted for the meeting.

PHMSA intended to publish a Notice of Proposed Rulemaking (NPRM) in June 2024.⁴ While not yet formally published in the *Federal Register*, the NPRM was submitted to the Office of the Secretary of Transportation in December 2023, and the date for the Office of Management and Budget completing its review is listed as May 1, 2024.⁵ As of July 23, 2024, no new information is available from PHMSA, and PHMSA has not yet published the NPRM in the *Federal Register*.⁶ The rulemakings chart of the Protecting Our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2020 was last updated by PHMSA on July 9, 2024, and states that the NPRM will be published in the *Federal Register* on August 10, 2024. A first draft of the new regulations from the agency is not expected before October 2024.⁷ No date has been set for a prediction as to when the agency will have finalized rules in place.

G.4 What are CO₂ pipeline project mitigation strategies and measures to ensure public safety?

G.4.1 Measures Consistent with Proposed and Final Federal Rules

Since PHMSA has not formally initiated the Notice of Proposed Rulemaking process, proposed, new, or amended rules to current CO₂ pipeline regulations under 49 CFR Part 195 are not known at this time. PHMSA indicates the new rules and regulations will extend the regulations to pipelines transporting liquid and gas CO₂ as well, and that extending PHMSA oversight to cover all forms of CO₂ will ensure that no new CO₂ pipelines lack safety standards and regulations. As indicated above, PHMSA plans to publish a Notice of Proposed Rulemaking by August 10, 2024, and first drafts of any new regulations are not expected before October 2024. Therefore, discussion of mitigation strategies and measures to ensure public safety associated with any newly proposed (or final) PHMSA rules is not possible at this time. Chapter 3 of this EIS also discusses this topic.

Safety mitigation strategies and measures are further discussed and summarized in Chapter 8 of this EIS and in this Appendix G.

¹ See [PHMSA Announces New Safety Measures to Protect Americans From Carbon Dioxide Pipeline Failures After Satartia, MS Leak | PHMSA \(dot.gov\)](#).

² See [Federal Register :: Pipeline Safety: Carbon Dioxide Pipeline Safety Public Meeting](#). Accessed January 19, 2024.

³ See [Regulations.gov](#). Accessed January 19, 2024.

⁴ See [IN12169 \(congress.gov\)](#). Accessed January 19, 2024.

⁵ PHMSA. 2024. *Protecting Our Infrastructure of Pipelines and Enhancing Safety Act of 2020 Web Chart*. July 9. Accessed July 23, 2024. [PIPES ACT 2020 Web Chart \(dot.gov\)](#).

⁶ PHMSA. 2022. *PHMSA Announces New Safety Measures to Protect Americans From Carbon Dioxide Pipeline Failures After Satartia, MS Leak*. May 26. Accessed November 2023. <https://www.phmsa.dot.gov/news/phmsa-announces-new-safety-measures-protect-americans-carbon-dioxide-pipeline-failures>.

⁷ See <https://www.eenews.net/articles/midwest-co2-pipeline-rush-creates-regulatory-chaos/#:~:text=PHMSA%E2%80%99s%20existing%20regulations%20cover%20pipelines%20carrying%20carbon%20dioxide%20in%20a%20%E2%80%9Csupercritical%E2%80%9D%20phase>.

**Updated Aerial and Thermal Dispersion Report:
Otter Tail to Wilkin CO2 Pipeline Project
July 21, 2024 (Allied Solutions)**

**AERIAL AND THERMAL DISPERSION ANALYSIS:
OTTER TAIL TO WILKIN CARBON DIOXIDE
PIPELINE PROJECT
MN DOCKET No.: PL-22-422**

**1-11-2024
UPDATED FOR FINAL EIS JULY 21, 2024**

PREPARED BY:



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1. Executive Summary

Allied Solutions verified the aerial dispersion analysis that Summit Carbon Solutions (the applicant) conducted on the Otter Tail to Wilkin CO₂ Pipeline by duplicating their input data and running the analysis in CANARY, a software package used specifically for calculating aerial dispersion impact of a product release from a pipeline. We also created our own assumptions and input data and ran our own analysis using CANARY, then we compared our results to the applicant's results.

Our analysis generated larger impact areas than the applicant's analysis (11.1 feet greater at 15,000 parts-per-million (ppm) and 107.9 feet greater at 40,000 ppm). We investigated the reasons for the differences and concluded that the applicant's process was valid, but we used more conservative assumptions and more targeted levels of concern.

The applicant also conducted an analysis of the effects of terrain using a software package called FLO-2D, which did not materially impact their CANARY-generated results. FLO-2D, however, does not account for windbreaks. Furthermore, engineers at FLO-2D reported that the software cannot account for gaseous mixing—a key component in aerial dispersion—and is not intended to be used for aerial dispersion analyses. Therefore, we recommend using computational fluid dynamics (CFD) software to determine if windbreaks and terrain would materially affect the aerial dispersion impact area of a potential release from the potential Otter Tail to Wilkin CO₂ Pipeline and determine how long impacted areas would remain hazardous.

2. Introduction

Allied Solutions (hereinafter referred to as “Allied,” “us,” “we,” or “our”) created this report for HDR Engineering, Inc. (hereinafter referred to as “HDR,” “the client,” or “client”), on behalf of the State of Minnesota, Department of Commerce, Environmental Review and Analysis (EERA) unit. In it, we describe our methodology for completing an aerial and thermal dispersion analysis for the Otter Tail to Wilkin CO₂ Pipeline project and summarize the results.

We also validated a previous aerial dispersion analysis conducted by the applicant, Summit Carbon Solutions (hereinafter referred to as “the applicant”). The applicant submitted the inputs and outputs of said aerial dispersion as part of an effort to gain a permit from the State of Minnesota to build the Otter Tail to Wilkins pipeline.

3. Definitions

Table 1. Definition of Terms

Acronym or Term	Definition
CANARY	Software used to determine the impact of various HVL releases on the surrounding area. CANARY integrates multicomponent thermodynamics into a time-varying fluid release simulation. These simulations account for two-phase flow, flash vaporization, and aerosol formation, as well as liquid rainout. Vaporization from liquid pools takes into account pool spreading, heat transfer effects, and impoundment.
CDC	Centers for Disease Control and Prevention

Acronym or Term	Definition
CFD	Computational fluid dynamics
CO ₂	Carbon dioxide
Levels of Concern (LOCs)	A threshold value of a hazard (toxicity, flammability, thermal radiation, or overpressure); usually, the value above which a threat to people or property exists
NOAA	National Oceanic and Atmospheric Administration
Product	Synonymous with “products in the pipeline”
Valve Segment	A segment of pipeline that is between two valves
VCE	Vapor cloud explosion

4. Methodology

In this section, we describe the methodology, software, and analyses we use for all aerial and thermal dispersion analyses.

NOTE: In this analysis, we did not consider terrain and vegetation when calculating impact area. Terrain and vegetation are considered in a separate computational fluid dynamics (CFD) analysis noted in the Reference section.

4.1 Software and General Analyses

We perform aerial dispersion analyses using CANARY software, which was designed by engineers at Quest Consultants, Inc. The software uses a multi-component thermodynamics model to determine the potential outcomes following a hazardous liquid release. Our Integrity Engineers who perform these analyses are trained and qualified by Quest to use CANARY.

CANARY software is an industry standard for aerial and thermal dispersion analysis. See Appendix C for an overview of aerial dispersion software available on the market.

These are the types of analyses we perform with CANARY software to check for potentially hazardous conditions:

- Area impact of vapor cloud;
- Flammable area impact of vapor cloud;
- Vapor cloud explosion area impact; and
- Jet fire and pool fire area of impact.

5. Project-Specific Methodology and Data

For this project, we completed an aerial and thermal analysis of the proposed Otter Tail to Wilkin CO₂ pipeline and validated the aerial dispersion analysis conducted by the applicant.

5.1 Aerial and Thermal Analysis

We used the data in Tables 2 and 7 (see Appendix A) to perform the area impact analyses for this project. Table 7 lists the specific variables we used for our analysis.

Because CO₂ is not flammable, we did **not** conduct the following analyses:

- Flammable area impact of vapor cloud;
- Vapor cloud explosion area impact; and
- Jet fire and pool fire area of impact.

We performed an aerial dispersion analysis of the proposed project pipeline rights-of-way, keeping the worst-case scenario in mind.

The Levels of Concern (LOCs) we chose for the project are 40,000 ppm (the NIOSH-defined limit of “immediately dangerous to life or health” (IDLH)) and 30,000 ppm (the NIOSH short-term exposure limit (STEL)). STEL is the maximum time-weighted average concentration a person could be exposed to over a 15-minute period without injury.

Evidence presented by the CDC suggests that longer exposures to higher concentrations can produce signs of intoxication but not death or permanent impact to health. Regardless, to be conservative, we have selected the CDC-recommended IDLH level of 40,000 ppm.

We selected these LOCs because they are useful exposure milestones typically presented by the CDC to inform the public of relevant exposure limits.

Table 2. Project-Specific Analysis Information

Product	Analyses Performed	LOC (ppm)
CO ₂	Vapor cloud analysis	30,000
		40,000

NOTE: We conducted modeling in CANARY based on the assumption that the product was pure CO₂, not a mixture of CO₂ and other components, because:

- The introduction of even fractions of a percent of other product components can interfere with CANARY’s ability to accurately model the result due to software model constraints; and
- Modeling pure CO₂ produces more conservative results.

5.2 Applicant’s Aerial Dispersion Analysis

We vetted the applicant’s aerial dispersion analysis of the proposed Otter Tail to Wilkin CO₂ pipeline. The applicant used the data in Tables 3 and 8 (Appendix A) to perform the area impact analyses. Table 3 lists the analyses they conducted and the CO₂-specific LOCs they used. Table 8 in Appendix A lists the project-specific data they used.

Table 3. Applicant Project-Specific Analysis Information

Product	Analyses Performed	LOC (ppm)
CO ₂	Vapor cloud analysis	15,000
		40,000
		80,000

NOTE: The applicant modeled their analysis in CANARY using a mixture of CO₂ and other components such as nitrogen (0.0047 molar fraction) and oxygen (0.002 molar fraction). This can interfere with CANARY's ability to accurately model the result due to software model constraints, per Quest Consultants.

6. Results

Since the environment where the pipeline would be located can vary greatly in terms of temperature and humidity (see Table 9 in Appendix B), we ran models for both the hottest part of the year and the coldest part of the year, along with the associated humidity levels, to determine worst-case impact distance. Table 10 (Appendix B) shows the data we used for reasonable worst-case scenarios.

Based on our modeling of release impact distances using the highest and lowest reasonable temperatures and associated humidities (Table 10), we chose a reasonable worst-case temperature of -22.1 °F and a humidity level of 74.3%.

Table 4 shows the impact distances for CO₂ at different concentrations.

There is a reasonable chance that the pipeline will need to be shut in during pipeline operations, which would leave CO₂ trapped in the pipeline for an undetermined amount of time. If the CO₂ stays above 1,200 psi, it stays in a supercritical state. If the CO₂ is allowed to depressurize below 1,200 psi, the operator runs the risk of CO₂ phasing to a mixture of gas and liquid—an operational condition to avoid.

Table 4. Impact Distances for CO₂ at Different Concentrations

Pipeline	Pipeline Diameter (in)	Segment Length (mi)	Pressure (psi)	Maximum Impact Distance at 40,000 ppm ¹ (ft)	Maximum Impact Distance at 30,000 ppm ² (ft)	Maximum Impact Distance at 15,000 ppm ³ (ft)
Otter Tail to Wilkins CO ₂	4 ⁴	13.9	2,197.89	617.5	701.6	910.1

¹ 40,000 ppm is the immediately dangerous to life or health (IDLH) limit.

² 30,000 ppm is the National institute for Occupational Safety and Health (NIOSH) short-term exposure limit (STEL). The NIOSH STEL is the maximum time-weighted average concentration a person could be exposed to over a 15-minute period without injury.

³ 15,000 ppm is half of the NIOSH STEL. We used it to compare with the applicant LOCs.

⁴ A 4-inch nominal diameter pipeline has an outside diameter of 4.5 inches.

6.1 Evaluation of Applicant's Aerial Dispersion Analysis

Using applicant-provided data (see Table 8), Allied ran the CANARY model and verified the applicant-provided impact distances (see Table 5).

Table 5. Applicant Provided LOCs and Associated Impact Distances

Product	Analyses Performed	LOC (ppm)	Maximum Impact Distance (ft)
CO ₂	Vapor cloud analysis	15,000	896.0
		40,000	509.6

Also, the applicant used a software package called FLO-2D to model the aerial dispersion over terrain. However, from information supplied by the applicant, it appears that the FLO-2D analysis did not affect the impact distances produced using CANARY.

7. Discussion and Recommendations

Our analysis resulted in greater potential impact distances than the applicant-calculated impact distances. To understand what could contribute to this discrepancy, see the differences in project-specific values in Table 6.

Table 6. Differences in Project-Specific Values Contributing to Discrepancies in Potential Impact Distances

Attribute	Applicant Value Used	Allied Value Used	Comment
Wind Speed (mph)	5	4	Slower wind speeds tend to extend impact distances. See Table 7 for more information.
Product Temperature Before Rupture (°F)	30	-20	It is our opinion that this should be the colder temperature based on the last five years of weather data at Fergus Falls, Minnesota. See Appendix B for more information.
Relative Humidity	71%	88.7%	It is our opinion that this should be the higher value based on the last five years of weather

Attribute	Applicant Value Used	Allied Value Used	Comment
			data at Fergus Falls, Minnesota. See Appendix B for more information.
Air Temperature (°F)	3.2	-22.1	It is our opinion that this should be the colder temperature based on the last five years of weather data at Fergus Falls, Minnesota. See Appendix B for more information.
Angle of CO ₂ Release from Horizontal	5 degrees	19 degrees	Quest Consultants recommend 19 degrees because it generates the worst-case scenario with their models. Angles less than 19 degrees tend to be unrealistically conservative and generate a greater area of impact than is practical.
Dispersion Coefficient Averaging Time (min)	1	Same as the Rupture Release time (60 minutes)	In general, when this value is less than the release time, it generates an artificially greater potential impact distance. In general, matching the rupture release time is standard.
Valve Segment Length (ft)	105,600.69	73,392.0	The different valve segment lengths do not materially affect the impact distance.
Rupture Placement Along the Valve Segment	About 1/8 downstream of the center of the valve segment	Equidistant from both ends of the valve segment	The different rupture locations do not materially affect the impact distance.

In general, the applicant's methodology and results are valid, but they could have been more conservative in their modeling parameters and LOCs. The main concern is the impact distance at the 40,000-ppm concentration level. Allied calculated 617.5 ft and the applicant calculated 509.6 ft. Even though the applicant uses the more conservative impact distance at the 15,000-ppm concentration LOC to make certain determinations, the 30,000-ppm and 40,000-ppm level LOCs are more meaningful because they have a larger effect on the health and wellbeing of those impacted by a potential pipeline rupture.

There are slight terrain changes along the rights-of-way, in addition to windbreaks designed to interrupt the wind that carries CO₂. It seems appropriate to take into consideration those factors when determining the reasonable worst-case impact from a potential rupture. The applicant uses FLO-2D to attempt that analysis. However, FLO-2D only considers terrain, not windbreaks or other flora. Also, according to engineers at FLO-2D, their software is meant to model liquid releases (single-phase flow) or liquid releases with sediment, which they refer to as "2-phase flow."

Furthermore, engineers at FLO-2D maintain that said software cannot account for gaseous mixing—a key component in aerial dispersion—and is not intended to be used for aerial dispersion analyses. As Allied did

not attempt to account for windbreaks and terrain and the use of FLO-2D is not appropriate for terrain modeling of gaseous releases, we recommend using a computational fluid dynamics (CFD) software to determine if windbreaks and terrain materially affect a potential release.

Performing a CFD analysis would not only provide better insight into the effect of terrain and local windbreaks, it would also show how long LOCs would be exceeded at various impact distances away from the pipeline. The time aspect of impact is very important because many NIOSH limits are based on exposure time at different limits. Exposure times associated with different concentration levels and impact distances are some of the most important aspects of aerial dispersion analysis. Again, we recommend using CFD software to determine the exposure time associated with various NIOSH exposure limits.

8. References

We performed this analysis in conjunction with the following reports:

- Single Line CFD Analysis – Proposed Otter Tail to Wilkin CO₂ Pipeline Project – Report v0.pdf
- Reports and documents supplied by the applicant.

Appendix A – Project-Specific Data

Table 7 describes the project-specific data we used to conduct the analysis.

Table 7. Project-Specific Data

Attribute	Used For	Value Used	Source	Justification
Wind Speed (mph)	Momentum jet dispersion model VCE momentum jet dispersion model	4	Allied Solutions	4.47 mph is endorsed by Quest Consultants to produce reasonable worst-case conditions when using their software. We used a slightly lower value for additional conservatism.
Product Temperature Before Rupture (°F)	All models	-20	Allied Solutions	Due to a measured soil temperature at burial depth being subzero ⁵ and the existence of aboveground valve sets, this temperature should be nearly the same as the air temperature.
Wind Speed Measurement Height (ft)	Momentum jet dispersion model VCE momentum jet dispersion model	32.81 (10 m)	Allied Solutions	Endorsed by Quest Consultants to produce reasonable worst-case conditions when using their software
Wind Stability Class	Momentum jet dispersion model VCE momentum jet dispersion model	Class F	Allied Solutions	A laminar wind condition that produces the largest impact long distances away from the pipeline
Relative Humidity	All models	88.7%	Allied Solutions	Selected from analysis in Appendix B
Air Temperature (°F)	All models	-22.1	Allied Solutions	Selected from analysis in Appendix B

⁵ NOAA. Soil Temperature Maps by Depth: History data in CSV. Data retrieved 12/15/2023.
https://www.weather.gov/ncrfc/LMI_SoilTemperatureDepthMaps.

Attribute	Used For	Value Used	Source	Justification
Surrounding Surface Roughness (in)	All models	6 (0.007 m)	Allied Solutions	Selected to provide the reasonably largest impacted area by assuming the smoothest onshore surfaces the CANARY software can offer
CO ₂ Pressure (psi)	All models	2,197.89	Applicant Provided	Applicant-provided data adjusted for altitude
Release Duration (min)	All models	60	Allied Solutions	Sufficient time to fully depressurize a valve segment (If we find it insufficient, we increase it until results verify that it is sufficient)
Rupture Release Point (ft)	All models	0	Allied Solutions	Indicates the worst case of pipe at ground level and unburied
Angle of CO ₂ Release from Horizontal	All models	19 degrees	Allied Solutions	The angle of release Quest Consultants recommend because it generates the worst-case scenario with their models
Dispersion Coefficient Averaging Time (min)	Momentum jet dispersion model VCE momentum jet dispersion model	Same as the Rupture Release time	Allied Solutions	Must be the same as the Rupture Release Time or results cannot be trusted
Impoundment?	All models	No	Allied Solutions	No impoundment generates the worst case
Max Flow Rate (lbs/sec)	All models	13.34	Applicant Provided	Applicant-provided data
Pipe Diameter (in)	All models	4.5	Applicant Provided	Applicant-provided data plus 0.5 inches for conservatism
Rupture Diameter (in)	All models	Same as pipe diameter to simulate a full guillotine rupture	Applicant Provided	Applicant-provided data

Attribute	Used For	Value Used	Source	Justification
Valve Segment Length (ft)	All models	73,392	Applicant Provided	Result from running CANARY on all pipeline segments provided by Applicant. The segment that generated the largest impact area starts at the valve at milepost 4.8 and ends at the valve at milepost 18.7.
Rupture Placement Along the Valve Segment	All models	Equidistant from both ends of the valve segment	Allied Solutions	Provides accurate answers considering how the various models work
Isolation Valve Closure Time (min)	All models	10	Applicant Provided	Applicant-provided data

Table 8. Applicant Project-Specific Data

Attribute	Value Used
Wind Speed (mph)	5
Product Temperature Before Rupture (°F)	30
Wind Speed Measurement Height (ft)	32.81 (10 m)
Wind Stability Class	Class F
Relative Humidity	71%
Air Temperature (°F)	3.2
Surrounding Surface Roughness (in)	6 (0.007 m)
CO ₂ Pressure (psi)	2,197.89

Attribute	Value Used
Release Duration (min)	60
Rupture Release Point (ft)	0
Angle of CO ₂ Release from Horizontal	5 degrees
Dispersion Coefficient Averaging Time (min)	1
Impoundment?	No
Max Flow Rate (lbs/sec)	13.34
Pipe Diameter (in)	4.03
Rupture Diameter (in)	Same as pipe diameter to simulate a full guillotine rupture
Valve Segment Length (ft)	105,600.69
Rupture Placement Along the Valve Segment	About 1/8 downstream of the center of the valve segment
Isolation Valve Closure Time (min)	10

Appendix B – Finding Reasonable Worst-Case Values for Humidity and Air/Ground Conditions

To use humidity and air/ground temperature inputs that generate a reasonable worst-case scenario, we reviewed temperature and humidity data for Fergus Falls, Minnesota for the last five years: 12-17-2018 through 12-17-2023⁶ (see Table 9).

Table 9. Descriptive Weather Statistics for Fergus Falls 12-17-2018 through 12-17-2023

Attribute	Minimum Value	Maximum Value	Median Value
Air Temperature (°F)	-34.6	98.6	43.9
Relative Humidity (%)	27.4	99.8	75.3

To find the reasonable worst-case temperature and humidity, we test reasonable high and low temperatures with their associated humidities to see which ones produce the reasonable worst-case impact scenario.

Finding Low Temperature and Humidity Values

To determine the reasonable worst-case scenario low temperature and humidity values for our model, we reviewed the temperature and humidity data for Fergus Falls, Minnesota for the last five years: 12-17-2018 through 12-17-2023.

There were 196 days on which the temperature at Fergus Falls dropped below zero during the last five years. The vast majority of the coldest temperatures were above -25.2 °F. Figure 1 shows the number of days the minimum temperature was in each range of below-zero temperatures. For example, the minimum temperature was in the range of -11.1 °F to -6.4 °F for a total of 37 days between 12-17-2018 and 12-17-2023.

⁶ Visual Crossing. Total Weather Data: History & forecast data in CSV or JSON. Data retrieved 12/18/2023.

<https://www.visualcrossing.com/weather-data>

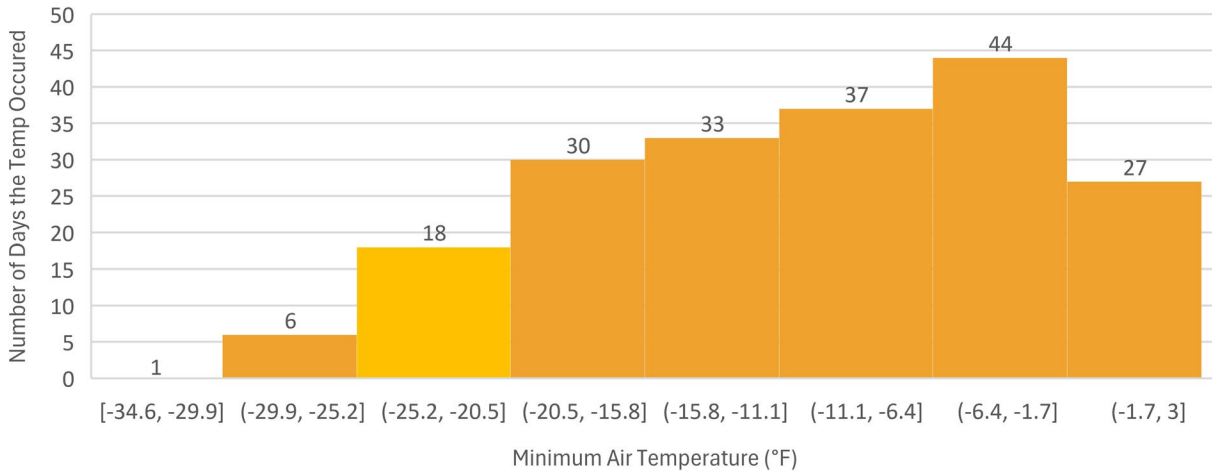


Figure 1. Number of Days Minimum Temperature Was Below Zero in Fergus Falls 12-17-2018 through 12-17-2023

We chose -25.2 and -20.5 °F as the reasonable worst-case temperature range to use for this project. We did not choose the extreme worst-case temperatures, which occur extremely seldom (0.4% of the time). For the 18 cases where the temperature was within the chosen reasonable worst-case scenario range, we averaged the high and low of the range to come up with a single value: -22.9 °F.

In the weather dataset we used, there isn't a recorded measurement of -22.9 °F. The closest temperature recorded was in February 2021—a minimum temperature of -22.1 °F, which was associated with a relative humidity of 74.3%. We used those values as the low temperature and humidity values for this project.

Note About Temperature at Pipe Depth

It is our understanding that the applicant will install its proposed pipeline at a depth of 54 inches (measured from top of pipe). Normally, this would provide considerable insulation from the ambient temperature aboveground. However, we looked at soil temperature data from NOAA⁷ and discovered that over the last two years, the coldest soil reading of the year at 40 inches deep differed from the coldest ambient temperatures by only a few degrees Fahrenheit. Since colder temperatures in Minnesota can penetrate so deeply into the ground, the installation depth of the pipeline does far less to insulate it from colder temperatures than in other parts of the country. Therefore, to be conservative, we chose the coldest air temperatures as the basis for a worst-case scenario rather than modifying those temperatures to approximate below-ground temperatures.

Finding High Temperature and Humidity Values

To determine the reasonable worst-case scenario high temperature and humidity values for our model, we reviewed the temperature and humidity data for Fergus Falls, Minnesota for the last five years: 12-17-2018 through 12-17-2023.

⁷ NOAA. Soil Temperature Maps by Depth: History data in CSV. Data retrieved 12/15/2023.
https://www.weather.gov/ncrfc/LMI_SoilTemperatureDepthMaps.

When evaluating the 606 days on which the maximum temperature at Fergus Falls was above 70 degrees⁸ during the last five years, we saw that the vast majority of the hottest temperatures were below 87.4 °F. Figure 2 shows the number of days the maximum temperature was in each range of above 70-degree temperatures. For example, the maximum temperature was in the range of 80.2 °F to 82.6 °F for a total of 143 days between 12-17-2018 and 12-17-2023.

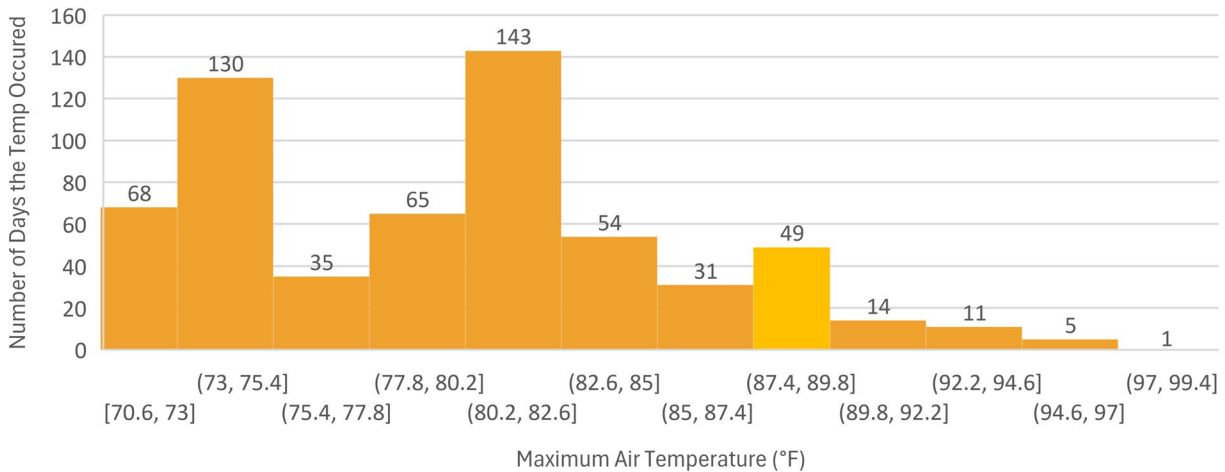


Figure 2. Number of Days Maximum Temperature Was Above 70 degrees in Fergus Falls 12-17-2018 through 12-17-2023

We chose 87.4 to 89.8 °F as the reasonable worst-case temperature. We did not choose the extreme worst-case temperatures, which occur extremely seldom (1.7% of the time). For the 49 cases where the temperature was within the chosen reasonable worst-case scenario range, we averaged the high and low of the range to come up with a single value: 88.6 °F.

In the weather dataset we used, there isn't a recorded measurement of 88.6 °F. The closest temperature was recorded in June 2019—a maximum temperature of 88.7 °F, which was associated with a relative humidity of 55.5%. We used those values as the high temperature and humidity values for this project.

Finding Final Reasonable Temperature and Humidity Values

Table 10 shows the high and low Fergus Falls temperatures and associated humidity values we used for our analysis.

⁸ Days with temperatures above 70 degrees are temperatures within roughly 30 degrees of the maximum temperatures in the dataset used for this project. This range was chosen to mirror the range chosen in the previous section which looked at temperatures roughly within 30 degrees of the coldest temperature recorded.

Table 10. High and Low Temperatures with Humidity Levels Used in Our Analysis

Attribute	Minimum Value	Maximum Value
Air Temperature (°F)	-22.1	88.7
Relative Humidity (%)	74.3	55.5

These are not the extreme worst-case temperatures and humidities, because we are not trying to represent a “sky is falling” scenario. Instead, we are trying to base our analysis on a “reasonable” worst-case scenario.

To that end, we used the other model variables in Appendix A, along with the variables in Table 10, to run CANARY and determine which set of temperature and relative humidity variables create a larger area of impact from a potential release. With all other variables being equal, the lowest temperature and its associated humidity level created a larger area of impact.

Appendix C – Overview of Available Aerial Dispersion Software and CANARY Validation

Overview of Available Aerial Dispersion Software

Aerial dispersion modeling plays a crucial role in assessing the environmental impact of and potential risks associated with the release of hazardous substances into the atmosphere. Additionally, aerial dispersion modeling is typically completed for proposed CO₂ pipeline projects as part of engineering, design, and other compliance requirements of the Pipeline and Hazardous Materials Safety Administration (PHMSA).

Various software tools have been developed to simulate and predict the dispersion patterns of pollutants. Such simulations help users conduct emergency response planning, assess risk, and comply with applicable regulations. As the demand for accurate and reliable dispersion modeling increases, it's important to continuously compare aerial dispersion modeling software packages, their functionality and limitations, and user reviews and feedback.

In this report, we provide a brief overview of the three most common, non-CFD⁹ software packages—CANARY, ALOHA, and CHARM—all of which can be used to conduct aerial dispersion analyses of liquid CO₂ pipeline releases as the CO₂ rapidly decompresses to a heavier-than-air gas. Please note that CFD and non-CFD software are not designed to quantify risk or conduct risk analysis. Rather, they are tools for establishing potential impacts and limits of said impacts, which is only one element of risk analysis.

CANARY, a software tool developed by Quest, is a multi-component thermodynamics model that determines potential outcomes following a liquid CO₂ release. CANARY provides the means for a qualified user to model the development of a variety of toxic, flammable, explosive, and radiant energy releases. CANARY is used for siting buildings and planning for pipeline and rail transport of highly volatile hazardous liquids such as liquid CO₂. Use of CANARY is commonplace in the pipeline industry.

ALOHA, which stands for Areal Locations of Hazardous Atmospheres, is a software tool developed by the National Oceanic and Atmospheric Administration (NOAA) to model the dispersion of hazardous chemicals in the atmosphere. ALOHA is used for emergency response planning, risk assessment, and decision support in the event of accidental chemical releases.

CHARM, which stands for Complex Hazardous Air Release Model, is a modeling program developed and maintained by Dr. Mark Eltgroth. It calculates and predicts the dispersion and concentration of airborne vapor and particle plumes from released chemicals. CHARM also predicts the footprints of thermal radiation, overpressures, and particle deposition. CHARM is used for evaluating the impact of hazard liquid releases, designing emergency response plans, and implementing training programs.

There are many technical pros and cons related to each software package. However, in this overview, we present high-level distinctions.

⁹ Computational fluid dynamics (CFD) is the branch of applied science that concerns the analysis of flow, turbulence, and pressure distribution of liquids and gases, and their interaction with structures. It also helps predict fluid flow, mass transfer, chemical reactions, and related phenomena.

Pros:

- All three software packages accurately model CO₂ aerial dispersions of volatile hazardous liquid releases – for which they were designed.
- CANARY has a long and vetted history in the pipeline industry—so much so that some major pipeline operators have it written into their standards that they will use only CANARY when modeling aerial dispersions.
- ALOHA is free and has an extensive library of chemicals and levels of concern.
- CHARM has a “pseudo-CFD” capability to incorporate terrain in dispersion models.

Cons:

- All three software packages require special training to use them correctly (that is, an untrained individual could pick up any of the three software packages, input data, and receive what looks like a reasonable answer but it would be wrong).
- CANARY does not incorporate terrain into its dispersion modeling capabilities.
- ALOHA can only model a limited number of basic situations and requires significant amounts of personnel time to run large numbers of simulations. ALOHA also doesn't take terrain into account.
- CHARM has difficulty coupling the heavier-than-air modeling with the lighter-than-air modeling in some cases, which can affect the accuracy of the initial release for some products.

Combining these factors with our professional experience, Allied chooses to primarily use CANARY for aerial dispersion modeling. CANARY is widely used and accepted in the pipeline industry, and other software packages can be used in conjunction with CANARY to include the effects of terrain and other objects if necessary. In addition, since the applicant used CANARY to perform their aerial dispersion analysis, Allied chose to use CANARY when validating the applicant's results. Using the same software also allowed us to more easily compare the results of the applicant's analysis to our own independent analysis.

CANARY Validation and Verification

Quest verifies the release and dispersion models contained in the QuestFOCUS package (the predecessor to CANARY by Quest), which were reviewed in a United States Environmental Protection Agency (EPA)–sponsored study¹⁰ and an American Petroleum Institute (API)–sponsored study¹¹. In both studies, the authors evaluated the QuestFOCUS software on technical merit (appropriateness of models for specific applications) and how well the model predicted specific releases. One conclusion the authors drew in both studies was that the dispersion software tended to overpredict the extent of the gas cloud travel, resulting in too large a cloud when compared to the test data (i.e., a conservative approach).

¹⁰ TRC (1991), Evaluation of Dense Gas Simulation Models. Prepared for the U.S. Environmental Protection Agency by TRC Environmental Consultants, Inc., East Hartford, Connecticut, 06108, EPA Contract No. 68-02-4399, May 1991.

¹¹ [Hanna, S. R., D. G. Strimaitis, and J. C. Chang (1991), Hazard Response Modeling Uncertainty (A Quantitative Method), Volume II, Evaluation of Commonly-Used Hazardous Gas Dispersion Models. Study cosponsored by the Air Force Engineering and Services Center, Tyndall Air Force Base, Florida, and the American Petroleum Institute; performed by Sigma Research Corporation, Westford, Massachusetts, September, 1991]

Finally, the authors of a third study prepared for the Minerals Management Service (Chang, et al., 1998) reviewed models for use in modeling routine and accidental releases of flammable and toxic gases. CANARY by Quest received the highest possible ranking in the science and credibility categories. In addition, the report recommends CANARY by Quest for use when evaluating toxic and flammable gas releases.¹²

¹² Chang, Joseph C., Mark E. Fernau, Joseph S. Scire, and David G. Strimaitis (1998), A Critical Review of Four Types of Air Quality Models Pertinent to MMS Regulatory and Environmental Assessment Missions. Mineral Management Service, Gulf of Mexico OCS Region, U.S. Department of the Interior, New Orleans, November 1998.

**Computational Fluid Dynamics Report
Otter Tail to Wilkin CO2 Pipeline Project
January 15, 2024**

**Addendum for Supplemental Modeling:
Otter Tail to Wilkin CO2 Pipeline Project
July 11, 2024**

(Allied Solutions)

**COMPUTATIONAL FLUID DYNAMICS ANALYSIS:
OTTER TAIL TO WILKIN CARBON DIOXIDE
PIPELINE PROJECT
MN DOCKET No. PL-22-422**

1/15/2024

**(With Addendum to Computational Fluid
Dynamics Analysis: Otter Tail to Wilkin
CO2 Pipeline Project, July 11, 2024)**

PREPARED BY:



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1. Introduction

Allied Solutions (hereinafter referred to as “Allied,” “we,” “us,” or “our”) conducted a computational fluid dynamics (CFD) analysis for HDR Engineering, Inc. (hereinafter referred to as “HDR,” “you,” “your,” “the client,” or “client”) on behalf of the State of Minnesota, Department of Commerce, Environmental Review and Analysis (EERA) unit. In this report, we describe our methodology for completing a CFD analysis for the proposed Otter Tail to Wilkin CO₂ Pipeline Project and summarize the results.

Please note that this CFD analysis shows how elevation and windbreaks can affect an aerial dispersion model and does not give an absolute impact distance for every case that might arise along the pipeline. While we chose reasonable worst-case conditions and modeling factors where practical, weather conditions can vary in unpredictable ways. The reader must interpret the results of the CFD analysis in conjunction with the Single Line Aerial Dispersion Analysis – Proposed Otter Tail to Wilkin CO₂ Pipeline Project – Report (1/11/2024) (AD Report). The reader should not consider this report as an independent set of quantitative results.

Addendum: In response to public comments received on the Draft Environmental Impact Statement (EIS) for the project, specifically comments on Appendix G of the Draft EIS (“Computational Fluid Dynamics Analysis: Otter Tail to Wilkin Carbon Dioxide Pipeline Project, MN Docket No. PL-22-422”), Allied performed supplemental CFD modeling which is presented after section 8 herein.

2. Background

We documented our aerial dispersion analysis for the proposed Otter Tail to Wilkin CO₂ Pipeline Project in the AD Report. One of our key recommendations was to supplement the aerial dispersion analysis with this CFD analysis to account for windbreaks and slight terrain changes along the rights-of-way. HDR and EERA accepted that recommendation, and this report is the result.

3. Definitions

Table 1. Definition of Terms

Acronym or Term	Definition
Computational Fluid Dynamics (CFD)	A branch of fluid mechanics that uses numerical analysis and computer software to analyze and solve problems that involve fluid flows
Digital Elevation Model (DEM)	A 3D computer graphical representation of elevation data to represent terrain
Levels of Concern (LOCs)	A threshold value above which a hazard may exist (e.g., toxicity, flammability, thermal radiation, or overpressure); usually, the value above which a threat to people or property exists
United States Geological Survey (USGS)	A scientific agency that studies the landscape of the United States, its natural resources, and the natural hazards that threaten it to support decision-making about environmental, resource, and public safety issues

4. Methodology

In this section, we describe the methodology, software, and analyses we use for the CFD analysis for the proposed Otter Tail to Wilkin CO₂ Pipeline Project. We included terrain and windbreaks representative of those present in the pipeline project area and analyzed their influence on the impact of a potential CO₂ pipeline rupture. We analyzed four different scenarios as described below.

The Level of Concern (LOC) we chose for the project is 30,000 ppm (the NIOSH short-term exposure limit (STEL)). STEL is the maximum time-weighted average concentration a person could be exposed to over a 15-minute period without injury.

4.1 Scenario 1: Standard Aerial and Thermal Dispersion Analysis

This is our baseline analysis, for which we used a reasonable worst-case scenario. (See the AD Report). Since this analysis is our baseline scenario it does not take terrain or windbreaks into account so the other scenarios could be compared to this baseline scenario to show the difference between terrain vs. no terrain and windbreak vs. no windbreak on the impact distance.

4.2 Scenario 2: CFD with Terrain

In this analysis, we take into account terrain representative of the proposed project right-of-way (referred to as RA-South in the draft Environmental Impact Statement) — flat terrain (0.4% average grade slope running the entirety of the project area). We used the same assumptions and data we used in the first scenario. We compared the results of this scenario to the results of the first scenario to determine what effect modeled terrain has on a potential CO₂ release impact distance.

4.3 Scenario 3: CFD with Windbreak 50 feet from the Rupture

In this analysis, we don't take terrain into account and assume the CO₂ released from the pipeline arcs into the air and hits a windbreak before it hits the ground.

4.4 Scenario 4: CFD with Windbreak 500 feet Downwind of the Rupture

In this analysis, we don't take terrain into account and assume the CO₂ released from the pipeline arcs into the air, settles back to the ground, and then hits a windbreak.

In Scenarios 3 and 4, we use Darcy's Law¹ to calculate the pressure drop through the windbreak. Darcy's Law can be expressed as:

$$q = -\frac{k}{\mu L} \Delta p$$

Where q is the total mass flow rate of the gas flowing through the windbreak, k is the permeability of the windbreak, μ is the dynamic viscosity of the gas², L is the depth of the windbreak, and Δp is the pressure drop through the windbreak. Using this formula, we can enhance the CFD model to account for how a CO₂

¹ Darcy's law describes the flow of a fluid, including gases, through a porous medium such as a windbreak.

² The dynamic viscosity of the gas is calculated at each time increment the CFD model is running based on the mass fraction of air and CO₂ and the temperature at the associated point in time.

release can approach and pass through a windbreak using porosity and permeability values for trees typically used in windbreaks (see Table 2).

4.5 Software Used

We performed CFD analyses using COMSOL software version 6.1, which is a multiphysics finite element analysis modeling software with a CFD module. COMSOL is a finite element analysis, solver, and simulation software package for various physics and engineering applications, especially coupled phenomena and multiphysics. COMSOL is designed by engineers at COMSOL, Inc. which was founded in 1986 in Stockholm, Sweden.

We used CANARY software to create Scenario 1, as we reported in the AD Report. CANARY was designed by engineers at Quest Consultants, Inc. CANARY uses a multi-component thermodynamics model to determine the potential outcomes following a hazardous liquid release.

5. Project Data

For Scenario 1, we used the results of the independently modeled results from the AD Report.

For the elevation data in Scenario 2, we downloaded an 8-meter (1/3 arc-second) accurate digital elevation model (DEM) surrounding the proposed project area³ from the United States Geological Survey (USGS), which is the most granular DEM available for the project area. The specific area we chose for Scenario 2 traversed a highway embankment and an irrigation ditch, which were representative of elevation changes along the proposed project right-of-way (RA-South).

To model the windbreaks in Scenarios 3 and 4, we reviewed actual windbreaks along the proposed project right-of-way. While there was variability in the windbreaks surveyed, we chose conifers approximately 40 feet tall with green vegetation 20 feet in diameter, which seemed to approximate the windbreaks average height and diameter. To be conservative, we assumed a single row of trees.

In the CFD model, we approximated this windbreak with a wall 40 feet tall, 20 feet deep, and 400 feet wide that has the wind porosity properties shown in Table 2. Four hundred feet is just wider than the widest part of the reasonable worst-case CO₂ release we modeled in the AD Report. We used that width to negate any effects that could arise from a dispersion going around a windbreak so that we could focus on how a release could penetrate a windbreak. Also, a 400-foot windbreak width is a good representation of the windbreaks in the project area. Table 2 shows the CO₂ and windbreak properties we used in our analysis.

³ USGS. GIS data download application. Data retrieved 01/09/2024. <https://www.usgs.gov/the-national-map-data-delivery/gis-data-download>

Table 2. CO₂ and Windbreak Properties Used

Attribute (units)	Value	Comment
Diffusion coefficient for CO ₂ in air (cm ² per second) ¹	0.139	Used to calculate the total mass moving through the windbreak
Windbreak porosity (unitless) ²	0.95	Is equal to $1 - \frac{\text{tree volume}}{\text{total volume}}$
Windbreak permeability (meters) ²	1x10 ⁻¹³	We used a more liberal number than what was reported in the cited source, which makes the windbreaks in this analysis more permeable.
Plant area density ³	60%	Lower end of winter protection and upper end of wind erosion design recommendations; consistent with local windbreak design

¹ See Pritchard, D. and Currie, J. Diffusion of coefficients of carbon dioxide, nitrous oxide, ethylene and ethane in air and their measurement. *European Journal of Soil Sciences*. Volume 33 (Issue 2), June 1982.

<https://doi.org/10.1111/j.1365-2389.1982.tb01757.x>

² See Figure 5 in Koch, K., Samson, R., Siegfried, D. Experimental and computational aerodynamic characterization of urban trees. *Biosystems engineering*. Volume 190, February 2020.

<https://doi.org/10.1016/j.biosystemseng.2019.11.020>

³ See AF Note 36, page 2 in USDA. Windbreak Density: Rules of thumb for Design. *Agroforestry Notes*. September 2007.

6. Results

Using the methodology and data we have described, we found that elevation changes along the proposed project right-of-way did not affect the impact distance of potential CO₂ in a significant way. The dispersion impact area was approximately 300 feet wide and 700 feet long (see Figure 1). Figures 2 and 3 visualize the dispersion impact area for both Scenarios 3 and 4 which did affect the impact distance significantly.

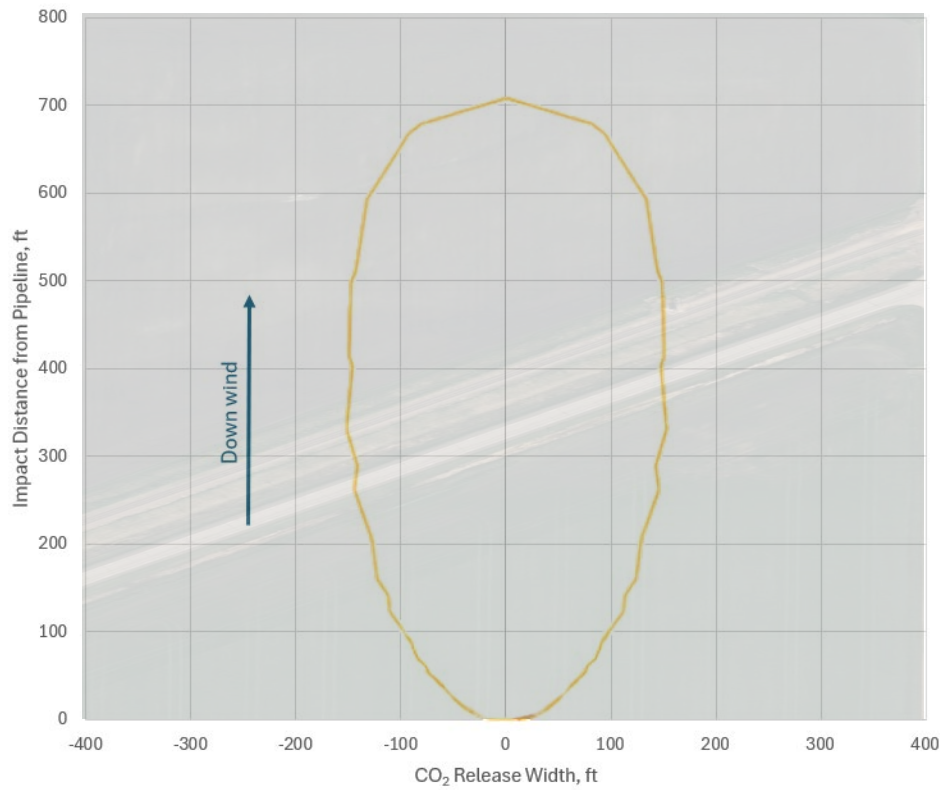


Figure 1. CO₂ Impact Area from a Potential Rupture for 30,000 ppm at 10 Feet Above the Ground for Scenario 2

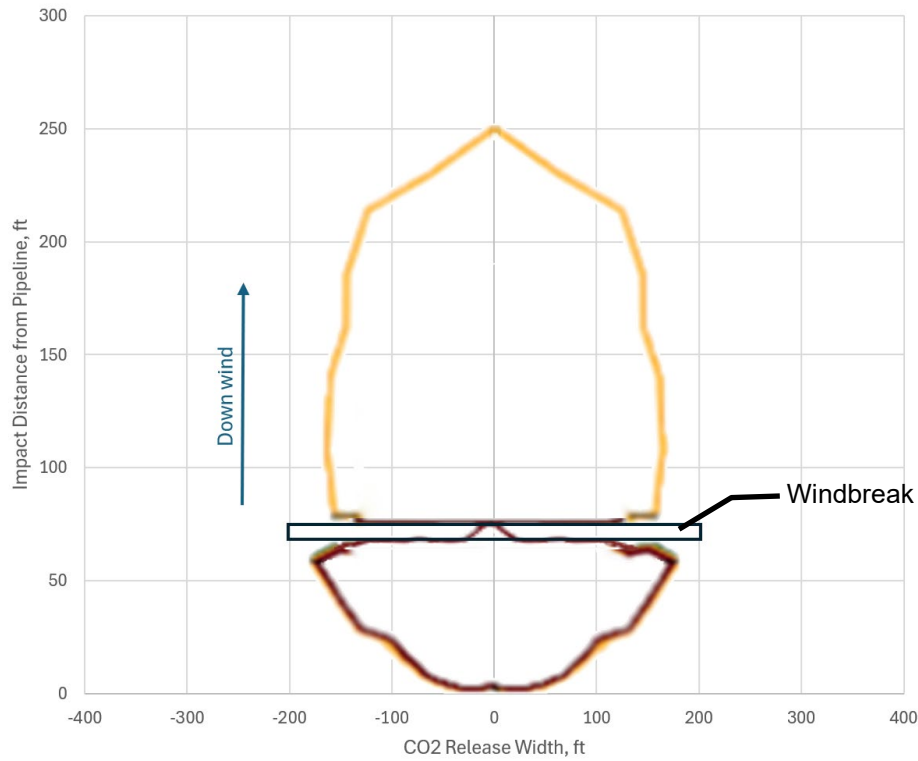


Figure 2. CO₂ Impact Area from a Potential Rupture for 30,000 ppm at 10 Feet Above Ground for Scenario 3

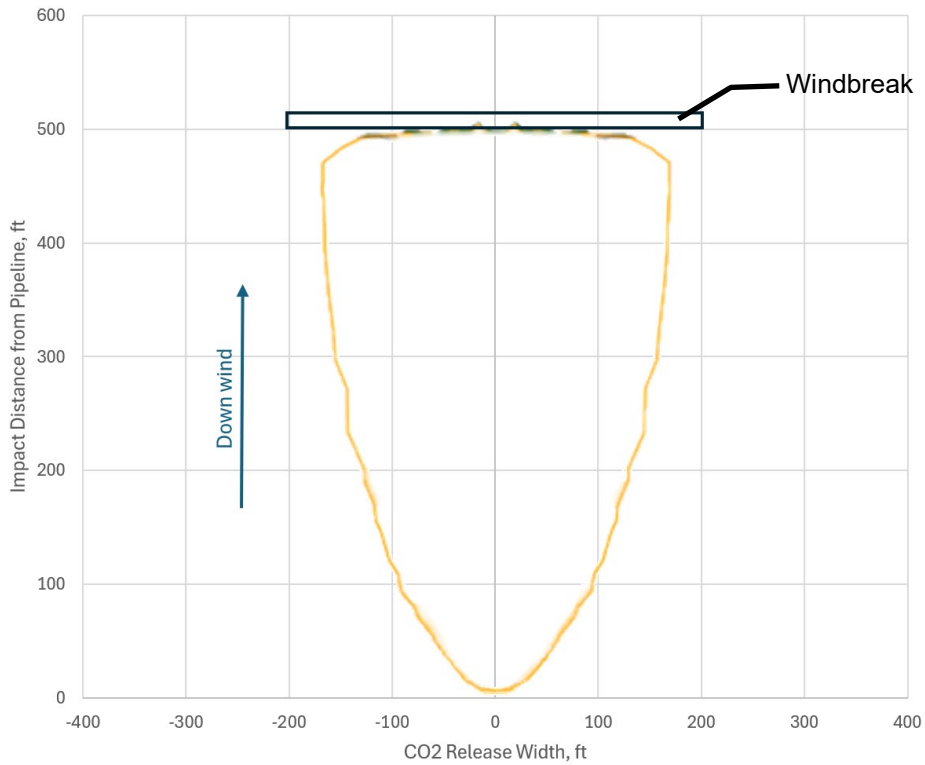


Figure 3. CO₂ Impact Area from a Potential Rupture for 30,000 ppm at 10 Feet Above Ground for Scenario 4

Table 3 shows the impact distances for the four scenarios, plus the time in seconds and minutes it takes to reach the maximum impact distance from the pipeline centerline, and the time it takes for the release to dissipate below 30,000 ppm.

Table 3. Comparison of Impact Distances for Different Scenarios for a LOC of 30,000 ppm

Scenario	Maximum Impact Distance (ft)	Time it Takes to Reach Maximum Impact Distance (sec (min))	Comment	Time it Takes for the Release to Dissipate Below 30,000 ppm (sec (min)) ¹
Scenario 1: CANARY-only model	702	146 (2.4)	Baseline scenario	N/A ²
Scenario 2: CFD with terrain	711	151 (2.5)	Terrain only adds 1.2% to the impact distance	234 (3.9)
Scenario 3: CFD with windbreak 50 feet downwind	253	108 (1.8)	Significant CO ₂ transfer through windbreak. However, the windbreak absorbs most of the energy from the release.	157 (2.6)
Scenario 4: CFD with windbreak far 500 feet downwind	500	129 (2.2)	No CO ₂ goes beyond the wind break at the 30,000-ppm concentration.	182 (3)

¹ Assumes all of the release is beneath 30,000 ppm from source to maximum impact distance.

² CANARY cannot calculate how long it takes for a release to dissipate.

As the data in Table 3 shows, windbreaks decrease the impact distance of the modeled CO₂ release in Scenario 1.

7. Discussion

When analyzing the results in Table 3, there are a few things to keep in mind:

1. We modeled one row of windbreak. If a windbreak has more rows, which is usually the case in the project area, the impact distances will be much shorter.
2. We assumed the windbreaks were intact and had uniform density from top to bottom. Wind break variation would affect CO₂ release impact distances.
3. In Scenario 3, where the CO₂ release comes out of the ground and then hits the windbreak before it settles back on the ground, the product would most likely freeze and accumulate on that windbreak. This would most likely decrease the permeability of the windbreak and make it more wall-like than what we modeled, which would decrease the CO₂ release impact distance even more than what we show in Table 3.

4. We used conifers as our windbreak because that is what is present along the project right-of-way and because they generally provide the most protection from the wind closer to the ground.

Figure 2 shows that in Scenarios 2 through 4, the CO₂ clouds form and disperse rapidly. Based on that information, we can make the following conclusion:

- A full rupture results in impacts too quickly for an early warning device, such as an oxygen detector, to be effective.

Finally, regardless of the scenario, the time it takes for the 30,000-ppm concentration CO₂ release to dissipate is very short—less than 4 minutes. In fact, the total time of the entire event would be less than 7 minutes in a worst-case scenario.

8. References

We performed this analysis in conjunction with the following reports and documents:

- Single Line Aerial Dispersion Analysis - Otter Tail to Wilkin CO₂ Pipeline Project – Report (1/11/2024)

Addendum – Supplemental Modeling

Addendum created July 11, 2024.

In response to public comments regarding the “Computational Fluid Dynamics Analysis: Otter Tail to Wilkin Carbon Dioxide Pipeline Project MN Docket No. PL-22-422” report dated January 15, 2024 (Appendix G of the Draft EIS), Allied performed supplemental CFD modeling to address concerns about the effect of:

- Wind speeds of less than 4 mph,
- Wind applied to the analysis after all of the CO₂ has evacuated the pipeline, and
- A worst-case surface roughness value equal to ice on the ground during winter conditions.

In this addendum, we describe our methodology for completing this supplementary CFD analysis for the proposed Otter Tail to Wilkin CO₂ Pipeline Project, summarize the results, and compare the results to the results in the January 15, 2024, report.

Methodology

For an explanation of the CFD software we used, see the above Section 4.5 of the original report.

For this model, we chose the same assumptions, input data, and conditions used in Scenario 3, in the January 15, 2024, report with some exceptions. Section 4.3 of the original report outlined the following conditions and assumptions: Terrain was not taken into account and the CO₂ released from the pipeline arced into the air and hit a windbreak before it hit the ground. The windbreak was 50 feet from the rupture. The exceptions used in this model are as follows:

- **Exception 1** – We removed the windbreak. From the results in the original report, we found that terrain along the proposed rights-of-way did not materially affect the impact distance associated with a CO₂ concentration of 30,000 ppm. Therefore, Scenario 3 is a reasonable model to use if we remove the windbreak, because Scenario 3 doesn't consider terrain.
- **Exception 2** – We adjusted the surrounding surface roughness (ground roughness) from 0.007 meters to 0.00001 meters. We did that to address the concern noted in comments that the model should mimic the snow and ice on the ground of the proposed rights-of-way in the winter. We chose a surface roughness commensurate with the conditions found on an ice-skating rink—near zero roughness—as a highly conservative estimate of ground roughness in winter conditions.
- **Exception 3** – We varied the wind speed between 1 mph and 4 mph addressing the concern noted in comments that the model should take into consideration wind speeds of less than 4 mph. This addendum CFD model shows the effect those lower wind speeds have on impact distance of a CO₂ dispersion.
- **Exception 4** – The final concern noted in comments we addressed in this addendum CFD model is if the CO₂ is released during a potential rupture with zero wind influencing the dispersion cloud and then, after a time, the wind picks up and carries the dispersion downwind. To address this concern, we tested those conditions in the model.

Analysis and Results

First, using the surrounding surface roughness associated with an ice-skating rink (0.00001 meters) and a wind speed of 1 mph, we determined the wind delay that maximizes the impact distance by running the

CFD model with the spread of wind time delays in Table 4. This covered all significant wind delay scenarios. Table 4 also shows the modeling results associated with the various wind delay scenarios.

Table 4. Comparison of Impact Distances for Different Wind Delay Scenarios for a LOC of 30,000 ppm at 1 mph Constant Windspeed

Wind Delay (seconds)	Comment	Maximum Impact Distance (ft)	Time to Reach Maximum Impact Distance (sec (min))	Time to Dissipate Below 30,000 ppm (sec (min)) ¹
0	We chose a 0-second delay so that the “wind delay equals zero” scenario could complement the results in the original report.	671	188 (3.1)	277 (4.6)
10	We chose a 10-second delay because the original aerial dispersion results show that the bulk of the carbon dioxide leaves the pipe in that amount of time.	650	191 (3.2)	281 (4.7)
95	We chose a 95-second delay because the original aerial dispersion results show that almost all the carbon dioxide leaves the pipe in that amount of time.	515	401 (6.7)	590 (9.8)

¹ Assumes the concentration of the release is below 30,000 ppm from source to maximum impact distance.

Second, using the zero-wind delay in Table 4 that resulted in the largest impact distance (671 feet), we then determined what wind speed would create the maximum impact distance by running the CFD model with the varying wind speeds shown in Table 5. These wind speeds were all equal to or less than 4 mph to address commenters’ concerns with the initial modeling results included in the Draft EIS.

Table 5. Comparison of Impact Distances for Wind Speed Scenarios with 4 mph or Less for a LOC of 30,000 ppm with a Wind Delay of Zero

Wind Speed (mph)	Maximum Impact Distance (ft)	Time to Reach Maximum Impact Distance (sec (min))	Time to Dissipate Below 30,000 ppm (sec (min)) ¹	Comment
1	671	188 (3.1)	277 (4.6)	Same as the first row in Table 4 above. Repeated here for comparison to other wind speeds.
2	702	182 (3.0)	265 (4.4)	

Wind Speed (mph)	Maximum Impact Distance (ft)	Time to Reach Maximum Impact Distance (sec (min))	Time to Dissipate Below 30,000 ppm (sec (min)) ¹	Comment
3	736	177 (3.0)	251 (4.2)	
4	769	144 (2.4)	231 (3.9)	
4	711	151 (2.5)	234 (3.9)	For comparison, these are the results from Scenario 2 in Table 3 of the above original report, which is the maximum impact distance from the original report. ²

¹ Assumes the concentration of the release is below 30,000 ppm from source to maximum impact distance.

² Note that we used a surface roughness value of 0.007 meters, which is different from the 0.0001 meters surface roughness value we used in this supplemental modeling.

Comparison to Original Results

When reviewing the results in Table 5, we found that the new CFD model parameters did not cause significant changes in the impact distance of a CO₂ release. The maximum impact distance in the original modeling was 711 feet. The maximum impact distance under the low wind and low roughness exceptions of this supplemental modeling was 769 feet.

The results of the 4 mph scenarios in Table 5 demonstrate an 8.2% increase (58 feet) in impact distance if we use a surface roughness associated with an ice-skating rink (0.00001 meters) versus a surface roughness associated with short-cut grass (0.007 meters). A surface roughness of 0.007 meters is the industry standard and what we used in the original CFD model.

Ice-skating rink roughness, which has near-zero friction, does not normally occur in nature. This roughness is unrealistic for the proposed right-of-way because it does not take snow and other environmental conditions into consideration. However, this roughness provides an upper limit for the modeled potential impact distance of a 30,000 ppm CO₂ cloud. Also, we did not consider vegetation (crops, grass, bushes, etc.) in the CFD modeling we conducted for this addendum, which would reduce the potential impact distance.

Finally, Scenarios 3 and 4 in the original report show that windbreaks virtually stop CO₂ dispersions, and the results of the supplemental modeling do not change this observation.

**CO2 Pipeline Sensitivity Analysis Report:
Otter Tail to Wilkin CO2 Pipeline Project
January 16, 2024
(Allied Solutions)**

**CO₂ PIPELINE SENSITIVITY ANALYSIS REPORT:
OTTER TAIL TO WILKIN CARBON DIOXIDE
PIPELINE PROJECT
MN DOCKET No.: PL-22-422**

1-16-2024

PREPARED BY:



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1. Introduction

Carbon capture and storage (CCS) and other industrial processes require transportation of carbon dioxide (CO₂) through pipelines. Ensuring the safe operation of these pipelines is of paramount importance to protect people, animals, and the environment. To understand the dynamics of CO₂ pipeline ruptures and identify critical factors that influence the release and dispersion of CO₂, experienced subject matter experts are engaged to conduct a sensitivity analysis.

Allied Solutions, INC (hereinafter referred to as “Allied,” “we,” “us,” or “our”) conducted such a sensitivity analysis for HDR Engineering, Inc., on behalf of the State of Minnesota, Department of Commerce, Environmental Review and Analysis (EERA) unit on the Proposed Otter Tail to Wilkin CO₂ Project. In this report, we describe our methodology for completing a CO₂ sensitivity analysis and summarize the results.

Please note that this analysis shows how various weather and operational parameters can affect the impact distance of an aerial dispersion model. While we chose reasonable weather conditions and modeling factors consistent with the proposed project and the area it is in, the reader must interpret the results of this report in conjunction with the two reports in the References section below. The reader should not consider this report as an independent set of quantitative results.

2. Background

The increasing emphasis on mitigating greenhouse gas (GHG) emissions has led to the development of technologies like CCS, which is the process of capturing CO₂ with special equipment, subjecting it to high pressure to turn it into a liquid (called a “supercritical” state), and transporting it to underground storage sites. When we conduct a sensitivity analysis on those proposed pipelines, it allows us to inform the public and decisionmakers when considering the impact a CO₂ pipeline could have in the unlikely event of a rupture.

3. Definitions

TABLE 1. DEFINITIONS OF TERMS

Acronym or Term	Definition
CANARY	Software used to determine the impact of various HVL releases on the surrounding area; integrates multicomponent thermodynamics into a time-varying fluid release simulation, which accounts for two-phase flow, flash vaporization, aerosol formation, and liquid rainout
CO ₂	Carbon dioxide
Highly Volatile Liquid (HVL)	Per 49 CFR §195.2 , a hazardous liquid that will form a vapor cloud when released to the atmosphere and that has a vapor pressure exceeding 276 kPa (40 psia) at 37.8 °C (100 °F)
Level of Concern (LOCs)	A threshold value above which a hazard may exist (e.g., toxicity, flammability, thermal radiation, or overpressure); usually, the value above which a threat to people or property exists

Acronym or Term	Definition
Machine Learning	A computer system that learns and adapts without following explicit instructions by using algorithms and statistical models to analyze and draw inferences from patterns in data
Root Mean Square Error (RMSE)	The proportion of the variance in the output of a regression model that can be explained by the inputs; a value closer to 1 indicates a model where the inputs more accurately predict the output
multiple R squared	A goodness-of-fit measure for linear regression models; a value of 0 to 1 indicates the percentage of the variance in the dependent variable that the independent variables explain collectively, with 1 being a perfect fit
Sensitivity Analysis	A method of analysis that determines how different values of multiple inputs affect a particular output under a given set of assumptions
Valve Segment	A segment of pipeline between two valves

4. Software and Techniques Used

To conduct the sensitivity analysis, we used an aerial dispersion software package—CANARY—and machine learning, which is a method for determining patterns and relationships between inputs and outputs.

4.1 CANARY

CANARY is an aerial dispersion analysis software designed by engineers at Quest Consultants, Inc. This software uses a multi-component thermodynamics model to determine the potential outcomes following a hazardous liquid release. Integrity engineers who perform these analyses must be trained and qualified by Quest to use CANARY.

4.2 Machine Learning

We used machine learning to display the relationship between the inputs and outputs from CANARY. Machine learning is a computer system that learns and adapts without following explicit instructions by using algorithms and statistical models to analyze and draw inferences from patterns in data. We first normalized the data in terms of a standard deviation to prepare the data for modeling. We then used a gradient-boosted regression tree¹ to create a model to fit the data.

5. Levels of Concern

We used the National Institute of Occupational Safety and Health (NIOSH) exposure limits as levels of concern (LOCs). The Centers for Disease Control and Prevention's NIOSH Pocket Guide to Chemical Hazards provides exposure limits for a wide range of chemicals stemming from documented cases and research, which creates an industry-accepted clearinghouse of chemical safety information.

¹ Gradient-boosted regression trees (GBRT) are a flexible, non-parametric, statistical learning technique for classification and regression; used to accurately fit models to data.

For this project we used the CO₂-specific toxic LOC of 15,000 ppm, which is half of 30,000 ppm (the NIOSH short-term exposure limit² (STEL)). This value generates the largest amount in variability in impact distances of the LOCs used in the Single Line Aerial Dispersion Analysis (see the References section). We need the LOC so that we have a way to compare the impact of the various scenarios we modeled.

6. Models Used

The toxic area impact of a CO₂ vapor cloud is the area in which the ground-level toxic vapor concentration is predicted to be hazardous. We use CANARY's momentum jet dispersion model to predict the downwind travel of a toxic gas or aerosol momentum jet release. The model requires LOCs (see the Levels of Concern section of this report) and the variables listed in Table 2 (see Appendix A) to run an analysis of the toxic area impact.

The output of this analysis is the impact distance from the pipeline that a potential CO₂ release could reach (in feet).

7. Analysis

We performed this sensitivity analysis on a representative pipeline transporting supercritical CO₂ by 1) using a basic set of input variables that can influence a dispersion; 2) modeling a wide range of CO₂ ruptures by differing the basic set of variables as inputs; and 3) using machine learning to display the sensitivity of input variables to the outputs of the impacted area of a potential CO₂ pipeline rupture.

The representative pipeline we modeled has a broader range of the same properties of the proposed project, so this analysis is valid in the context of the proposed project and potential weather it may be subjected to.

7.1 Declaring Input Variables

For this project, we analyzed the relationship between certain inputs and the resulting potential impact of a CO₂ rupture. We chose these inputs based on practical variable ranges³ appropriate for the project area:

- Four different wind speeds
- Four different air and ground surface temperatures
- Four different pipeline pressures
- Five different volumes of CO₂ released, based on diameter and length of the pipeline⁴
- Four different relative humidities

² The NIOSH STEL is the maximum time-weighted average concentration a person could be exposed to over a 15-minute period without injury.

³ The variable ranges selected were slightly larger than the expected operational and weather conditions the proposed project would be affected by.

⁴ The five pipeline segment volumes are based on the Otter Tail to Wilkin CO₂ Pipeline Project pipeline segments.

In our experience, these are the core influential input variables. See Appendix A for a list of all the variables we used.

7.2 Modeling CO₂ Ruptures

We used the values in Table 2 (see Appendix A) to build CANARY input files, and the CANARY software itself to generate 1,208 individual models (i.e., all permutations of all the input variables we chose).

7.3 Using Machine Learning to Show Model Sensitivity

We used the inputs and outputs from the previous section to create a “learning dataset” for machine learning (ML) to model the sensitivity. Using a gradient-boosted regression tree, we generated a model that fit the data by 97%⁵—meaning the model closely fits the CANARY software’s ability to produce results over the range of input values used in this analysis. Keep in mind that the range of inputs used in this analysis covers the weather and operational conditions this proposed project will be subjected to as provided in the Single Line Aerial Dispersion Analysis (see the References section).

We then used the ML model to obtain the sensitivity of the inputs to the output (impact distance). Figure 1 shows the attribute set we considered (inputs) and the range of potential positive and negative effects that all inputs can have on the impact from a potential CO₂ rupture. Green is a positive impact, meaning it reduces the size of the CO₂ rupture, whereas red is a negative impact, meaning the CO₂ impact was increased.

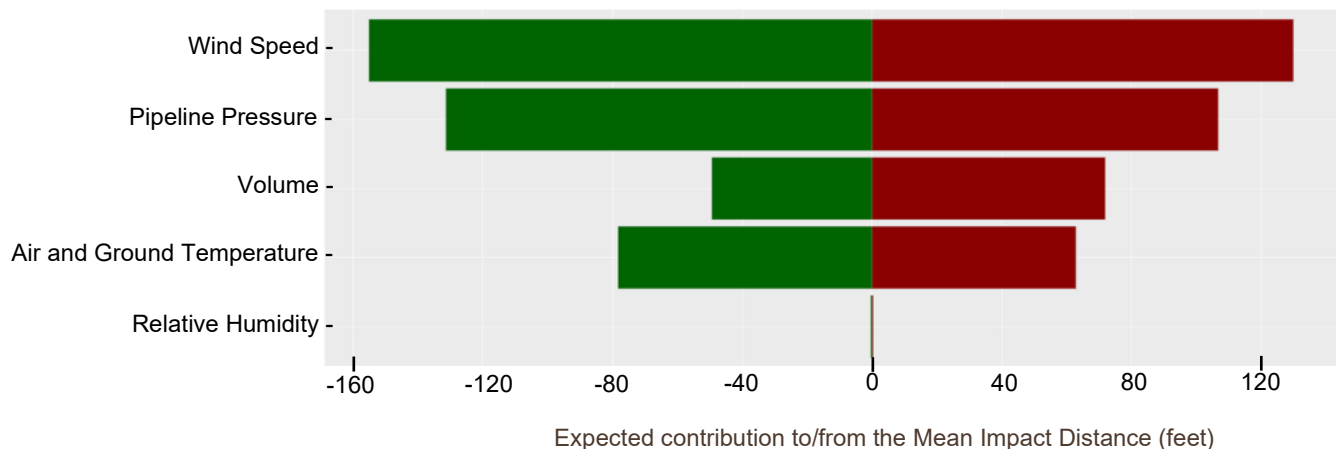


FIGURE 1. SENSITIVITY RANGE OF AERIAL DISPERSION ATTRIBUTES ON POTENTIAL CO₂ RUPTURE AREA

8. Discussion and Conclusions

The multiple R squared score and the RSME of the gradient-boosted regression tree (see footnote 5 on the previous page) demonstrates that ML generated a model that very closely represents the 1,280 CANARY aerial dispersion models, which show that wind speed has the biggest impact on a potential CO₂ rupture

⁵ The model has a multiple R squared value of 0.97 and a RSME value of 48 with a mean of 661.

for the proposed project—from nearly negative 160 feet to more than positive 120 feet. What this means is that wind speed can add up to 120 feet of impact distance above and beyond the mean impact distance we calculated for the 1,280 models, or it can decrease the impact distance by up to 160 feet. It's common knowledge in the oil and gas industry that wind speed has a significant influence on aerial dispersion impact distance, so this result is consistent with industry knowledge or experience.

Pipeline pressure has the second largest impact on the amount (mass) of CO₂ immediately released from a potential rupture. The higher the pipeline pressure, the higher the density (mass per volume) of CO₂, released. The higher the density released, the less likely it is to dissipate over time because more density means greater concentration. Likewise, the lower the pressure, the less the density. The less the density, the more quickly the release can dissipate over time.

One other point to note is that volume, like pressure, also affects the amount of CO₂ immediately released from a rupture. What the ML model shows, however, is though volume matters, it doesn't matter as much as wind speed and pipeline pressure.

Also of note is that humidity does not materially contribute to the impact distance. Comparatively, temperature is much more important.

Perhaps the biggest takeaway is how the dynamic relationship of the five input variables simultaneously affect the impact distance. In other words, if all five variables are included in the same ML model, Figure 1 shows how much influence each input has on the mean impact distance. For example, if we were to take out one of the input variables, the remaining input variables may affect the impact distance in a significantly different way because of the complex relationships between all the input variables.

Finally, Figure 1 shows the *range* of influence the input variables have on the mean impact distance. In other words, given the input variables we used with data ranges in Table 2, wind speed can affect the mean impact distance anywhere from nearly negative 160 feet to more than positive 120 feet, making it the most influential input variable we tested. It also means that, in certain cases, wind speed doesn't affect the mean impact distance at all; zero is one of the impact distances between negative 160 ft and positive 120 feet.

9. References

We performed this analysis in conjunction with the following reports:

- Single Line Aerial Dispersion Analysis - Otter Tail to Wilkin CO₂ Pipeline Project - Report (1/11/2024).pdf

Single Line CFD Analysis – Proposed Otter Tail to Wilkin CO₂ Pipeline Project – Report (1/15/2024).pdf

Appendix A – Project-Specific Data

Table 2 describes the project-specific data we used to conduct the analysis.

TABLE 2. PROJECT-SPECIFIC DATA

Attribute	Value Used	Justification
Wind Speed ¹ (mph)	2, 4.33, 6.67, 9	4.47 mph is endorsed by Quest Consultants to produce reasonable worst-case conditions when using their software; we chose these values based on typical weather patterns for the project area
Wind Speed Measurement Height (ft)	32.81 (10 m)	Endorsed by Quest Consultants to produce reasonable worst-case conditions when using their software
Wind Stability Class	Class F	A laminar wind condition that produces the largest affect to impacted areas away from the pipeline
Relative Humidity ¹	20, 46.67, 73.33, 100%	Based on weather typical in the project area
Air/Ground Temperature ¹ (°F)	-30, 13.33, 56.67, 100	Based on weather typical in the project area
Surrounding Surface Roughness (in)	6 (0.007 m)	Provides the reasonably largest impacted area by assuming the smoothest onshore surface the CANARY software offers
CO ₂ Pressure ¹ (psi)	1,100, 1,465.96, 1,831.93, 2,197.89	Based on the data for the proposed pipeline the applicant provided for the proposed project
Release Duration (min)	60	Sufficient time to fully depressurize a valve segment
Rupture Release Point (ft)	0	Indicates the worst-case scenario of pipe at ground level and unburied
Angle of CO ₂ Release from Horizontal	19 degrees	The angle of release Quest Consultants recommend because it generates the worst-case scenario with their models

Attribute	Value Used	Justification
Dispersion Coefficient Averaging Time (min)	Same as the Rupture Release time	Must be the same as the Rupture Release Time or results may be suspect
Impoundment?	No	Generates the worst-case scenario for any given pipeline release
Max Flow Rate (lbs/sec)	10.36	Based on the data for the proposed pipeline that the applicant provided for the proposed project
Pipe Diameter ¹ (in)	4	Based on the data for the proposed pipeline that the applicant provided for the proposed project
Rupture Diameter (in)	Same as pipe diameter to simulate a full guillotine rupture	Assumes a total guillotine rupture by setting this value to the same diameter of the pipeline
Valve Segment Length ¹ (miles)	4.8, 13.9, 1.6, 7.4, 0.7	Measurements of the pipeline segments on the proposed pipeline
Rupture Placement Along the Valve Segment	Equidistant from both ends of the valve segment	Provides accurate answers considering how the various models work
Isolation Valve Closure Time (min)	10	Typical closure time for hazardous liquids pipelines

¹ We chose these values to produce a set of normalized inputs for modeling. Also, we chose the values because they are reasonably representative of the project area.

Appendix H

Sample Routing Permit

STATE OF MINNESOTA PUBLIC UTILITIES COMMISSION

ROUTING PERMIT FOR
CONSTRUCTION OF A LARGE [PIPELINE TYPE] PIPELINE
AND ASSOCIATED FACILITIES

IN
[COUNTY]

ISSUED TO
[PERMITTEE]

PUC DOCKET NO. [Docket Number]

In accordance with the requirements of Minnesota Statutes Chapter 216G and Minnesota Rules Chapter 7852 this route permit is hereby issued to:

[Permittee]

[Permittee] is authorized by this routing permit to construct [Provide a description of the project authorized by the Minnesota Public Utilities Commission].

The pipeline and associated facilities shall be built within the route identified in this permit and as portrayed on the official route maps and in compliance with the conditions specified in this permit.

Approved and adopted this ____ day of _____

BY ORDER OF THE COMMISSION

Will Seuffert,
Executive Secretary

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ATTACHMENTS

Attachment 1 – Complaint Handling Procedures for Permitted Energy Facilities

Attachment 2 – Routing Maps

1 ROUTING PERMIT

The Minnesota Public Utilities Commission (Commission) hereby issues this routing permit to [Permittee Name] (Permittee) pursuant to Minnesota Statutes Chapter 216G and Minnesota Rules Chapter 7852. This permit authorizes [Permittee Name] to construct [Provide a brief description of the project as authorized by the Commission], and as identified in the attached routing maps, hereby incorporated into this document.

1.1 Pre-emption

Pursuant to Minn. Stat. § 216G.02, subd. 4, this permit shall be the sole route approval required to be obtained by the Permittee for construction of the pipeline facilities. This permit shall supersede and preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

1.2 Definitions

“Affected landowner,” as defined in Minn. R. 7852.0100, subp. 3, “means an owner or lessee of record of real property, any part of which is within the proposed pipeline route.”

“Associated Facilities” means all parts of those physical facilities through which hazardous liquids or gas moves in transportation, including but not limited to pipe, valves, and other appurtenances connected or attached to pipe, pumping and compressor units, fabricated assemblies associated with pumping and compressor units, metering and delivery stations, regulation stations, holders, breakout tanks, fabricated assemblies, cathodic protection equipment, telemetering equipment, and communication instrumentation located on the right-of-way. (Minn. R. 7852.0100, subp. 7).

“Construction” means any clearing of land, excavation, or other action for the purpose of constructing new pipeline that would adversely affect the natural environment of a pipeline route. Construction does not include changes needed for temporary use of a route for purposes of maintenance, repair, or replacement of an existing pipeline and associated facilities within existing rights-of-way, or for the minor relocation of less than three-quarters of a mile of an existing pipeline or for securing survey or geological data, including necessary borings to ascertain soil conditions. (Minn. R. 7852.0100, subp. 11).

2 PIPELINE SAFETY

Pursuant to Minn. Stat. § 216G.02, subd. 3(a) this pipeline routing permit may not set safety standards for the construction of the pipeline. Pipeline safety regulations are promulgated by the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration

in the Federal Code of Federal Regulations Part 195 – Transportation of Hazardous Liquids by Pipeline (49 CFR 195).

3 PROJECT DESCRIPTION

[Provide a description of the project as authorized by the Commission]

3.1 Project Location

[Describe the location of the project including details such as the county, state, city, and townships, as appropriate]

County	Township Name	Township	Range	Section

3.2 Associated Facilities

[Provide a detailed description of the associated facilities authorized by the Commission]

3.3 Class Location [if applicable]

[Ensure language is consistent with specific pipeline project]

Example: The pipeline will be designed to meet a Class 3 location designation as required by 49 CFR 192.5. The class location of a pipeline is a factor in determining the maximum allowable pressure of the pipeline and is based on the number and type of buildings intended for human occupancy that are situated in an area that extends 220 yards on either side of the centerline of any continuous 1.0-mile length of a gas pipeline. A Class 3 location is defined as 46 or more buildings or an area where the pipeline lies within 100 yards (300 feet) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period.

4 DESIGNATED ROUTE

The route designated by the Commission in this permit is the route described below and shown on the routing maps attached to this permit. The route is generally described as follows:

[Provide detailed description of the authorized route including the route widths and any other specifics relevant to each segment. Also include a reference to the relevant routing map to be attached to the permit.]

The final alignment must be located within this designated route. The identified route widths on the attached route maps provide the Permittee with flexibility for minor adjustments of the alignment or right-of-way to accommodate landowner requests and unforeseen conditions. The final alignment (*i.e.*, permanent and maintained rights-of-way) will be located within this designated route unless otherwise authorized by this permit or the Commission.

4.1 Permanent Right-of-Way

This Permit authorizes the Permittee to obtain a new permanent right-of-way for the pipeline facility up to [number] in width. The permanent right-of-way is typically [number] feet on both sides of the pipeline measured from its centerline. [Describe any right-of-way width variations along the route, as necessary, including that needed for associated facilities]

4.2 Temporary Right-of-Way or Workspace

The Permittee is authorized by this permit to acquire a [Describe temporary right-of-way widths authorized by permit]. The Permittee shall limit temporary workspace to special construction access needs required outside of the authorized permanent right-of-way. Temporary right-of-way shall be selected to limit the removal and impacts to vegetation. Temporary easements outside of the authorized route will be obtained from affected landowners through rental agreements.

4.3 Right-of-Way Conformance

The Project's anticipated alignment is intended to minimize potential impacts relative to criteria identified in Minn. R. 7852.1900. The actual right-of-way will generally conform to the anticipated alignment identified on the routing maps, unless changes are requested by individual landowners and agreed to by the Permittee or for unforeseen conditions that are encountered or as otherwise provided for by this permit.

Any right-of-way modifications within the designated route shall be located so as to have comparable overall impacts relative to the factors in Minn. R. 7852.1900, as does the right-of-way identified in this permit, and shall be specifically identified and documented in and approved as part of the plan and profile submitted pursuant to Section 8.1 of this permit.

4.4 Route Width Variations

Route width variations may be allowed to accommodate the potential site-specific constraints listed below. These constraints may arise from any of the following:

1. Unforeseen circumstances encountered during the detailed engineering and design process.
2. Federal or state agency requirements.
3. Existing infrastructure within the pipeline route, including but not limited to railroads, natural gas and liquid pipelines, high voltage electric transmission lines, or sewer and water lines.

Any alignment modifications arising from these site-specific constraints that would result in right-of-way placement outside of the designated route shall be specifically reviewed by the Commission under Minn. R. 7852.3400.

5 STATE AND FEDERAL MINIMUM DEPTH OF COVER REQUIREMENTS

Minn. Stat. § 216G.07, subd. 1, requires the pipeline trench to be excavated to a depth that sufficiently allows for at least 54 inches (4.5 feet) of backfill from ground surface to the top of pipeline in all areas where the pipeline crosses the right-of-way of any public drainage facility or any county, town, or municipal street or highway and where the pipeline crosses agricultural land. Where the pipeline crosses the right-of-way of any drainage ditch the pipeline shall be installed with a minimum level cover of not less than 54 inches (4.5 feet) below the authorized depth of the ditch, unless waived in the manner provided in Minn. Stat. § 216G.07, subd. 2 and 3.

In agricultural land, the Permittee may seek a depth requirement waiver from the affected landowners to install the pipeline at the same depth as required by U.S. Department of Transportation regulation 49 CFR 192.327. In all cases, the pipeline trench shall be excavated to a depth that sufficiently allows for at least 36 inches (3 feet) of backfill from ground surface to the top of pipeline.

6 PRE-CONSTRUCTION CONDITIONS

The following pre-construction conditions require submissions to the Commission. All submissions must be made by electronic filing.

6.1 Permit Distribution

Within 30 days of permit issuance, the Permittee shall send a copy of the permit to the office of each regional development commission, soil and water conservation district, watershed district, watershed management district, office of the auditor of each county, and the clerk of each city and township crossed by the designated route.

Within 30 days of permit issuance, the Permittee shall provide all affected landowners with a copy of this permit and the complaint procedures. In no case shall the landowner receive this route permit and complaint procedures less than five days prior to the start of construction on their property. An affected landowner is any landowner or designee that is within or adjacent to the permitted route.

The Permittee shall provide all affected landowners with complete information about the project keeping them informed throughout the initial survey, right-of-way acquisition, right-of-way preparation, construction, restoration, and future operation and maintenance. As provided by applicable laws and regulations the Permittee shall provide educational materials about the project and any restrictions or dangers associated with the project to landowners within the route whose land is crossed by the pipeline and, upon request, to any interested persons.

6.2 Plan and Profile

At least 30 days before right-of-way preparation for construction begins on any segment or portion of the project, the Permittee shall provide the Commission with a plan and profile of the right-of-way and the specifications and drawings for right-of-way preparation, construction, cleanup, and restoration for the segment of pipeline for which construction is scheduled. The documentation shall include maps depicting the plan and profile including the designated route, right-of-way, and pipeline alignment approved per this permit.

The Permittee may not commence construction until the 30 days has expired or until the Commission has advised the Permittee in writing that it has completed its review of the plan and profile documents and determined that the planned construction is consistent with this permit. If the Permittee intends to make any significant changes in its plan and profile or the specifications and drawings after submission to the Commission the Permittee shall notify the Commission at least five days before implementing the changes. No changes shall be made that would be in violation of any of the terms of this permit.

The Permittee shall also provide the Minnesota Office of Pipeline Safety with the same information provided to the Commission. The Permittee's plan and profile and specifications and drawings, shall become a condition of this permit and shall be complied with by the Permittee in accordance with Minn. R. 7852.3500.

6.3 Status Reports

The Permittee shall report to the Commission on progress during finalization of the route and construction of the pipeline. The Permittee shall report weekly. Reports shall begin with the submittal of the plan and profile for the project and continue until completion of restoration.

6.4 Agricultural Protection Plan [if applicable]

The Permittee shall comply with the Agricultural Protection Plan (APP) that is attached to this permit (Appendix XX) and incorporated herein. The obligation to comply with the APP as a condition of this permit shall expire with the termination of Commission jurisdiction over this permit as prescribed by Minn. R. 7852.3900, unless otherwise specified in the APP. The Minnesota Department of Agriculture must approve of any amendments to the APP. The Permittee shall file the amended APP with the Commission within 10 days of Minnesota Department of Agriculture approval.

6.5 Environmental Mitigation Plan [if applicable]

The Permittee shall comply with the Environmental Mitigation Plan that is attached to this permit (Appendix XX) and incorporated herein. The Permittee shall also comply with all additional conditions that may be added as a result of permits issued by other agencies or governmental units.

7 CONSTRUCTION CONDITIONS

The Permittee shall comply with the following conditions during pipeline right-of-way preparation, construction, cleanup, and restoration over the life of this permit.

7.1 Notification

The Permittee shall notify landowners or their designee at least 14 days in advance but not greater than 60 days in advance of entering the property.

7.2 Access to Property for Construction

The Permittee shall obtain all necessary permits authorizing access to public rights-of-way prior to any construction. The Permittee shall obtain approval of the landowners for access to private property prior to any construction. The Permittee shall consult with property owners to identify and address any special problems the landowners may have that are associated with the pipeline prior to any construction.

The Permittee shall work with landowners to provide access to their property, to locate the pipeline on their property to minimize the loss of agricultural land, forest, and wetlands, with due regard for proximity to homes and water supplies, even if the deviations will increase the cost of the pipeline, so long as the landowner's requested relocation does not adversely affect environmentally sensitive areas.

The Permittee shall negotiate agreements with landowners that will give the landowners access to their property; minimize the impact on planned future development of the property; and to assume any additional costs for such development that may be the result of installing roads, driveways and utilities that must cross the right-of-way. The Permittee shall not unreasonably deny a landowner's request to cross the easement to access the landowner's property.

The Permittee shall follow those specific construction practices and material specifications described in [Permittee Name] Application to the Commission for a route permit for the [Project Application Name and Environmental Information Report], dated [Date], and the record of the proceedings unless this permit establishes a different requirement in which case this permit shall prevail. The Permittee shall comply with the conditions for right-of-way preparation, construction, cleanup, and restoration contained in Minn. R. 7852.3600.

7.3 Field Representative

The Permittee shall designate a field representative responsible for overseeing compliance with the conditions of this permit during construction of the project. This person shall be accessible by telephone or other means during normal business hours throughout site preparation, construction, cleanup, and restoration.

The Permittee shall file with the Commission the name, address, email, phone number, and emergency phone number of the field representative 14 days prior to commencing construction. The Permittee shall provide the field representative's contact information to affected landowners, residents, local government units and other interested persons 14 days prior to commencing construction. The Permittee may change the field representative at any time upon notice to the Commission, affected landowners, residents, local government units and other interested persons.

7.4 Agricultural Monitor and County Inspector Notification Requirements

The Permittee shall at least 14 days prior to the start of construction provide notice to all landowners affected by construction with the name, telephone number and email address of the Agricultural Monitor and County inspector designated by the County, if appointed.

7.5 Employee Training and Education of Permit Terms and Conditions

The Permittee shall inform all employees, contractors, and other persons involved in construction of the terms and conditions of this permit.

7.6 Public Services, Public Utilities, and Existing Easements

During construction, the Permittee shall minimize any disruption to public services or public utilities. To the extent disruptions to public services or public utilities occur these would be temporary, and the Permittee will restore service promptly. Where any impacts to utilities have the potential to occur the Permittee will work with both landowners and local agencies to determine the most appropriate mitigation measures if not already considered as part of this permit.

The Permittee shall cooperate with all entities that have existing easements or infrastructure within the pipeline route to ensure minimal disturbance to existing or planned developments.

7.7 Noise

The Permittee shall comply with noise standards established under Minn. R. 7030.0100 to 7030.0080, at all times at all appropriate locations during operation of the facility. Construction and maintenance activities shall be limited to daytime working hours to the extent practicable to ensure nighttime noise level standards will not be exceeded.

7.8 Site Sediment and Erosion Control

The Permittee shall implement those erosion prevention and sediment control practices recommended by the Minnesota Pollution Control Agency (MPCA) Construction Stormwater Program. If construction of the facility disturbs more than one acre of land, or is sited in an area designated by the MPCA as having potential for impacts to water resources, the Permittee shall obtain a National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Construction Stormwater Permit from the MPCA that provides for the development of a Stormwater Pollution Prevention Plan (SWPPP) that describes methods to control erosion and runoff.

The Permittee shall implement reasonable measures to minimize erosion and sedimentation during construction and shall employ perimeter sediment controls, protect exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, stabilizing slopes, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking. Contours shall be graded as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation and prevent erosion. All areas disturbed during construction of the facilities shall be returned to pre-construction conditions.

7.9 Topsoil Protection

The Permittee shall take precautions to minimize mixing of topsoil and subsoil during excavation of the trench for the pipe unless otherwise negotiated with the affected landowner.

7.10 Soil Compaction

Compaction of agricultural lands by the Permittee must be kept to a minimum and mitigated in accordance with its agricultural protection plan [if applicable].

7.11 Landscape Preservation

Care shall be used to preserve the natural landscape, minimize tree removal, and prevent any unnecessary destruction of the natural surroundings in the vicinity of all pipeline construction and restoration activities.

7.12 Sensitive Areas

The Permittee shall stabilize stream banks and other sensitive areas disturbed by pipeline construction in accordance with the requirements of applicable state or federal permits.

7.13 Wetlands and Water Resources

Wetlands and riparian areas shall be accessed using the shortest route possible in order to minimize travel through wetland areas and prevent unnecessary impacts. No temporary workspace areas shall be placed within or adjacent to wetlands or water resources, as practicable. To minimize impacts, construction in wetland areas shall occur during frozen ground conditions where practicable and shall be according to permit requirements by the applicable permitting authority. When construction during winter is not possible, wooden or composite mats shall be used to protect wetland vegetation. Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area.

Dewatering during periods of excessive precipitation or in areas where the natural groundwater table intersects the pipeline trench will not be directed into wetlands or water bodies.

Dewatering discharges will be directed toward well vegetated upland areas. Should discharge activities need to be directed off the right-of-way landowner consent will be obtained and locations will be chosen to minimize impacts. All discharge activities will comply with applicable agency permits or approvals.

Areas disturbed by construction activities shall be restored to pre-construction conditions. Restoration of the wetlands will be performed by Permittee in accordance with the requirements of applicable state and federal permits or laws and landowner agreements. Wetland and water resource areas disturbed by construction activities shall be restored to pre-construction conditions in accordance with the requirements of applicable state and federal permits or laws and landowner agreements. All requirements of the U.S. Army Corps of

Engineers (USACE), Minnesota Department of Natural Resources (DNR), and local units of government shall be met.

7.14 Vegetation Management

The Permittee shall clear the permanent right-of-way and temporary right-of-way preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation in areas such as trail and stream crossings where vegetative screening may minimize aesthetic impacts, to the extent that such actions do not impact the safe operation, maintenance, and inspection of the pipeline and are in compliance with all applicable laws and regulations.

Tree stumps will be removed at the landowner's request or when necessitated due to trench location. The Permittee will dispose of all debris created by clearing at a licensed disposal facility.

7.15 Application of Pesticides

The Permittee shall restrict pesticide use to those pesticides and methods of application approved by the Minnesota Department of Agriculture, DNR, and the U.S. Environmental Protection Agency. Selective foliage or basal application shall be used when practicable. All pesticides shall be applied in a safe and cautious manner so as not to damage adjacent properties including crops, orchards, tree farms, apiaries, or gardens. The Permittee shall contact the landowner or designee to obtain approval for the use of pesticide at least 14 days prior to any application on their property. The landowner may request that there be no application of pesticides on any part of the site within the landowner's property. The Permittee shall provide notice of pesticide application to affected landowners and known beekeepers operating apiaries within three miles of the project site at least 14 days prior to such application.

7.16 Invasive Species

The Permittee shall employ best management practices to avoid the potential spread of invasive species on lands disturbed by project construction activities.

7.17 Noxious Weeds

The Permittee shall take all reasonable precautions against the spread of noxious weeds during all phases of construction. When utilizing seed to establish temporary and permanent vegetative cover on exposed soil the Permittee shall select site appropriate seed certified to be free of noxious weeds. To the extent possible, the Permittee shall use native seed mixes. The Permittee shall consult with landowners on the selection and use of seed for replanting.

7.18 Roads

The Permittee shall advise the appropriate governing bodies having jurisdiction over all state, county, city or township roads that will be used during the construction phase of the project. Where practical, existing roadways shall be used for all activities associated with construction of the facility. Oversize or overweight loads associated with the facility shall not be hauled across public roads without required permits and approvals.

The Permittee shall construct the least number of site access roads it can. Access roads shall not be constructed across streams and drainage ways without the required permits and approvals. Access roads shall be constructed in accordance with all necessary township, county or state road requirements and permits.

The Permittee shall promptly repair private roads or lanes damaged when moving equipment or when accessing construction workspace, unless otherwise negotiated with the affected landowner.

7.19 Archaeological and Historic Resources

The Permittee shall make every effort to avoid impacts to identified archaeological and historic resources when constructing the transmission facility. In the event that a resource is encountered, the Permittee shall contact and consult with the State Historic Preservation Office and the State Archaeologist. Where feasible, avoidance of the resource is required. Where not feasible, mitigation must include an effort to minimize project impacts on the resource consistent with State Historic Preservation Office and State Archaeologist requirements.

Prior to construction, workers shall be trained about the need to avoid cultural properties, how to identify cultural properties, and procedures to follow if undocumented cultural properties, including gravesites, are found during construction. If human remains are encountered during construction, the Permittee shall immediately halt construction and promptly notify local law enforcement and the State Archaeologist. Construction at such location shall not proceed until authorized by local law enforcement or the State Archaeologist.

7.20 Livestock

Precautions to protect livestock must be taken by the Permittee unless otherwise negotiated with the affected landowner.

7.21 Security

The Permittee will install temporary gates or similar barriers, as needed, to prohibit public access to the right-of-way during construction.

7.22 Pollution and Hazardous Wastes

All appropriate precautions to protect against pollution of the environment must be taken by the Permittee. The Permittee shall be responsible for compliance with all laws applicable to the generation, storage, transportation, clean up and disposal of all wastes generated during pipeline construction and restoration of the right-of-way.

7.23 Cleanup

All waste and scrap that is the product of construction shall be removed from the right-of-way and all premises on which construction activities were conducted and properly disposed of upon completion of each task. Personal litter, including bottles, cans, and paper from construction activities shall be removed on a daily basis.

7.24 Restoration

The Permittee shall restore the right-of-way, temporary workspaces, access roads, abandoned right-of-way, and other public or private lands affected by construction of the pipeline to the natural conditions that existed immediately before construction of the pipeline and as required by other federal and state agency permits. Restoration must be compatible with the safe operation, maintenance, and inspection of the pipeline. Within 60 days after completion of all restoration activities the Permittee shall advise the Commission in writing of the completion of such activities.

7.25 Damages

The Permittee shall fairly restore or compensate landowners for damage to crops, fences, private roads and lanes, landscaping, drain tile, or other damages sustained during construction.

8 OTHER PERMITS AND REGULATIONS

The Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations. A list of the permits known to be required is included in the permit application. The Permittee shall submit a copy of such permits to the Commission upon request.

9 SPECIAL CONDITIONS

The special conditions shall take precedence over other conditions of this permit should there be a conflict.

[Add Special Conditions in accordance with the record of the docket]

10 DELAY IN CONSTRUCTION

If the Permittee has not commenced construction or improvement of the route within four years after the date of issuance of this permit the Commission shall suspend the permit in accordance with Minn. R. 7852.3300. If at the time of suspension, or at a later time, the Permittee decides to construct the pipeline, it shall certify to the Commission that there have been no significant changes in any material aspects of the conditions or circumstances existing when the permit was issued. If the Commission determines that there are no significant changes, it shall reinstate the permit. If the Commission determines that there is a significant change, it may order public information meetings or a new hearing and consider the matter further, or it may require the Permittee to submit a new application.

11 COMPLAINT PROCEDURES

Prior to the start of construction, the Permittee shall submit to the Commission the procedures that will be used to receive and respond to complaints. The procedures shall be in accordance with the requirements of Minn. R. 7829.1500 or Minn. R. 7829.1700, and as set forth in the complaint procedures attached to this permit.

Upon request, the Permittee shall assist the Commission with the disposition of unresolved or longstanding complaints. This assistance shall include, but is not limited to, the submittal of complaint correspondence and complaint resolution efforts.

12 POST-CONSTRUCTION CONDITIONS

Failure to timely and properly make compliance filings required by this permit is a failure to comply with the conditions of this permit. Compliance filings must be electronically filed with the Commission.

12.1 In-Service Date

At least three days before the pipeline is to be placed into service, the Permittee shall notify the Commission of the date on which the pipeline will be placed into service and the date on which construction was complete.

12.2 As-Built

Within 90 days after completion of construction, the Permittee shall submit copies of all final as-built plans and specifications developed during the project.

12.3 GPS Data

Within 90 days after completion of construction, the Permittee shall submit to the Commission, in the format requested by the Commission, geo-spatial information (e.g., ArcGIS compatible map files, GPS coordinates, associated database of characteristics) for the pipeline and associated facilities.

13 RIGHT OF ENTRY

The Permittee shall allow Commission designated representatives to perform the following, upon reasonable notice, upon presentation of credentials and at all times in compliance with the Permittee's site safety standards:

- a. To enter upon the facilities easement of the property for the purpose of obtaining information, examining records, and conducting surveys or investigations.
- b. To bring such equipment upon the facilities easement of the property as is necessary to conduct such surveys and investigations.
- c. To sample and monitor upon the facilities easement of the property.
- d. To examine and copy any documents pertaining to compliance with the conditions of this permit.

14 PERMIT AMENDMENT

The Permittee may apply to the Commission for an amendment of the route designation or to conditions specified in the permit in accordance with the requirements and procedures of Minn. R. 7852.3400.

15 PERMIT MODIFICATION OR SUSPENSION

If the Commission determines that substantial evidence supports a finding that a violation of the terms or conditions of this pipeline routing permit has occurred or is likely to occur, it may take action to modify or suspend this permit in accordance with Minn. R. 7852.3800. The

Commission may at any time re-consider modification or suspension of this permit if the Permittee has undertaken effective measures to correct the violations.

16 PIPELINE CONSTRUCTION COMPLETION CERTIFICATE

In accordance with Minn. R. 7852.3900, the Permittee shall file with the Commission a written certification that the construction and remediation of the permitted pipeline has been completed in compliance with all permit conditions and landowner agreements. The certification shall be considered by the Commission within 60 days of its filing. The Commission shall accept or reject the certification of completion and make a final determination regarding cost or reimbursements due. If the certification is rejected, the Commission shall inform the Permittee in writing which deficiencies, if corrected, will allow the certification to be accepted. When corrections to the deficiencies are completed, the Permittee shall notify the Commission, and the certification shall be reconsidered as soon as possible. After acceptance of the certification, the Commission's jurisdiction over the Permittee's pipeline routing permit shall be terminated.

ATTACHMENT 1

Complaint Handling Procedures for Permitted Energy Facilities

SAMPLE PERMIT

**MINNESOTA PUBLIC UTILITIES COMMISSION
COMPLAINT HANDLING PROCEDURES FOR
PERMITTED ENERGY FACILITIES**

A. Purpose

To establish a uniform and timely method of reporting and resolving complaints received by the permittee concerning permit conditions for site or route preparation, construction, cleanup, restoration, operation, and maintenance.

B. Scope

This document describes complaint reporting procedures and frequency.

C. Applicability

The procedures shall be used for all complaints received by the permittee and all complaints received by the Minnesota Public Utilities Commission (Commission) under Minn. R. 7829.1500 or Minn. R. 7829.1700 relevant to this permit.

D. Definitions

Complaint: A verbal or written statement presented to the permittee by a person expressing dissatisfaction or concern regarding site or route preparation, cleanup or restoration, or other permit conditions. Complaints do not include requests, inquiries, questions or general comments.

Substantial Complaint: A written complaint alleging a violation of a specific permit condition that, if substantiated, could result in permit modification or suspension pursuant to the applicable regulations.

Unresolved Complaint: A complaint which, despite the good faith efforts of the permittee and a person, remains unresolved or unsatisfactorily resolved to one or both of the parties.

Person: An individual, partnership, joint venture, private or public corporation, association, firm, public service company, cooperative, political subdivision, municipal corporation, government agency, public utility district, or any other entity, public or private; however organized.

E. Complaint Documentation and Processing

1. The permittee shall designate a representative responsible for filing complaints to the Commission's eDocket system. This person's name, phone number and email address shall accompany all complaint submittals. The name and contact information for the representative shall be kept current in eDockets.
2. A person presenting the complaint should, to the extent possible, include the following information in their communications:
 - a. name, address, phone number, and email address;
 - b. initial date of the complaint;
 - c. tract, parcel number, or address of the complaint;
 - d. a summary of the complaint; and
 - e. whether the complaint relates to a permit violation, a construction practice issue, or other type of complaint.
3. The permittee shall document all complaints by maintaining a record of all applicable information concerning the complaint, including the following:
 - a. docket number and project name;
 - b. name of complainant, address, phone number and email address;
 - c. precise description of property or parcel number;
 - d. name of permittee representative receiving complaint and date of receipt;
 - e. nature of complaint and the applicable permit condition(s);
 - f. summary of activities undertaken to resolve the complaint; and
 - g. a statement on the final disposition of the complaint.

F. Reporting Requirements

The permittee shall commence complaint reporting at the beginning of project construction and continue through the term of the permit, unless otherwise required below. The permittee shall report all complaints to the Commission according to the following schedule:

Immediate Reports: All substantial complaints shall be reported to the Commission the same day received, or on the following working day for complaints received after working hours. Such reports are to be directed to the Commission's Public Advisor at 1-800-657-3782 (voice messages are acceptable) or publicadvisor.puc@state.mn.us. For e-mail reporting, the email

subject line should read "PUC EFP Complaint" and include the appropriate project docket number.

Monthly Reports: During project construction, restoration, and operation, a summary of all complaints, including substantial complaints received or resolved during the preceding month, shall be filed by the 15th of each month to Will Seuffert, Executive Secretary, Public Utilities Commission, using the eDockets system. The eDockets system is located at: <https://www.edockets.state.mn.us/EFiling/home.jsp>. If no complaints were received during the preceding month, the permittee shall file a summary indicating that no complaints were received.

If a project has submitted twelve consecutive months of complaint reports with no complaints, monthly reports can terminate by a letter to eDockets notifying the Commission of such action. If a substantial complaint is received (by the company or the Commission) following termination of the monthly complaint report, as noted above, the monthly reporting should commence for a period of one year following the most recent complaint or upon resolution of all pending complaints.

If a permittee is found to be in violation of this section, the Commission may reinstate monthly complaint reporting for the remaining permit term or enact some other commensurate requirement via notification by the Executive Secretary or some other action as decided by the Commission.

G. Complaints Received by the Commission

Complaints received directly by the Commission from aggrieved persons regarding the permit or issues related to site or route preparation, construction, cleanup, restoration, or operation and maintenance will be promptly sent to the permittee.

The permittee shall notify the Commission when the issue has been resolved. The permittee will add the complaint to the monthly reports of all complaints. If the permittee is unable to find resolution, the Commission will use the process outlined in the Unresolved Complaints Section to process the issue.

H. Commission Process for Unresolved Complaints

Complaints raising substantial and unresolved permit issues will be investigated by the Commission. Staff will notify the permittee and appropriate persons if it determines that the

complaint is a substantial complaint. With respect to such complaints, the permittee and complainant shall be required to submit a written summary of the complaint and its current position on the issues to the Commission. Staff will set a deadline for comments. As necessary, the complaint will be presented to the Commission for consideration.

I. Permittee Contacts for Complaints and Complaint Reporting

Complaints may be filed by mail or email to the permittee's designated complaint representative, or to the Commission's Public Advisor at 1-800-657-3782 or publicadvisor.puc@state.mn.us. The name and contact information for the permittee's designated complaint representative shall be kept current in the Commission's eDocket system.

SAMPLE PERMIT

ATTACHMENT 2
Routing Maps

Appendix I

Supplemental Information Inquiries and Responses

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: October 5, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: Preferably no later than October 15, 2023

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: “*Requested information sent to whom by what means on date.*” Co-applicants please consolidate your reply into a single response.

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. Provide the following documents: **1) Midwest Carbon Express Project, Minnesota Conventional Archaeological Reconnaissance (Phase I) Survey (2021). Volume 1: MNL-303 (Chippewa, Renville, Yellow Medicine, and Redwood Counties); MNL-304 (Redwood, Cottonwood, and Jackson Counties); MNL-305 (Faribault and Martin Counties); MNL-321 (Ottertail and Wilkin Counties), 2021. Completed by Merjent, Inc. for Summit Carbon Solutions; 2) Minnesota Conventional Archaeological Resources Survey (Phase I). Volume 2: Fieldwork Report (2022). Michael Madson, et al. August 2022**

Summit Carbon Solutions, LLC (Summit) has uploaded both of the requested cultural reports to Andrew Levi of the Minnesota Department of Commerce – Energy Environmental Review and Analysis (DOC-EERA) via a link to an Otter Tail to Wilkin Project (Project) SharePoint site.

In accordance with Minnesota Rules, part 7829.0500 and Minnesota Statutes Chapter 13, Summit has designated portions of both cultural reports as NONPUBLIC DATA – NOT FOR PUBLIC DISCLOSURE because they contain sensitive cultural resource location information. The Minnesota State Historic Preservation Office Manual for Archaeological Projects in Minnesota provides for restricted access to sensitive cultural resource location information. For each of the reports, the following two versions have been provided.

- “Non-Public” version – full report that contains all sensitive and confidential data; and

- “Public” version – all sensitive and confidential data has been redacted.

Note that for Volume 2, Summit has labeled the report with a DRAFT watermark. Summit is presently responding to comments from the Minnesota State Historic Preservation Office (MN SHPO) on the more recent *Minnesota Conventional Archaeological Resources Survey (Phase I), Volume 4*, which will modify Volume 2. Typically, these reports are maintained in draft stage until they address all comments received during the MN SHPO review process; therefore, the watermark is appropriate.

2. Provide an engineering cost estimate associated with the project to include planning/permitting; acquisition/permits; design; procurement; construction/restoration; and closeout. Provide separate estimates for the capture facility and another for the pipeline facilities. Provide the margin of error.

Summit has prepared the following cost estimates for the Project pipeline and capture facility.

Engineering Cost Estimate		Engineering Cost Estimate	
4 Inch MNL-321 Pipeline (28 miles)		Otter Tail Capture Facility	
Work Item	Cost	Work Item	Cost
Planning / Permitting	\$ 2,500,000	Planning / Permitting	\$ 500,000
ROW Acquisition	\$ 8,500,000	ROW Acquisition	\$ -
Engineering	\$ 500,000	Engineering	\$ 1,750,000
Procurement	\$ 2,500,000	Procurement	\$ 10,000,000
Construction	\$ 21,500,000	Construction	\$ 16,500,000
Closeout	\$ 1,500,000	Closeout	\$ 1,000,000
Total	\$ 37,000,000	Total	\$ 29,750,000
Estimate Accuracy: +/- 15%		Estimate Accuracy: +/- 15%	

3. Given the current permitting schedule, provide a revised construction schedule in as much detail as possible. Indicate whether winter construction will occur.

Summit has prepared the following revised construction schedule. These dates do not include a winter construction season, and, at this time, Summit does not plan to construct the Project during the winter.

- Pipeline Construction - March to July 2025
- Capture Facility Construction - May to August 2025

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: October 17, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: Preferably no later than October 31, 2023

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: *“Requested information sent to whom by what means on date.”*

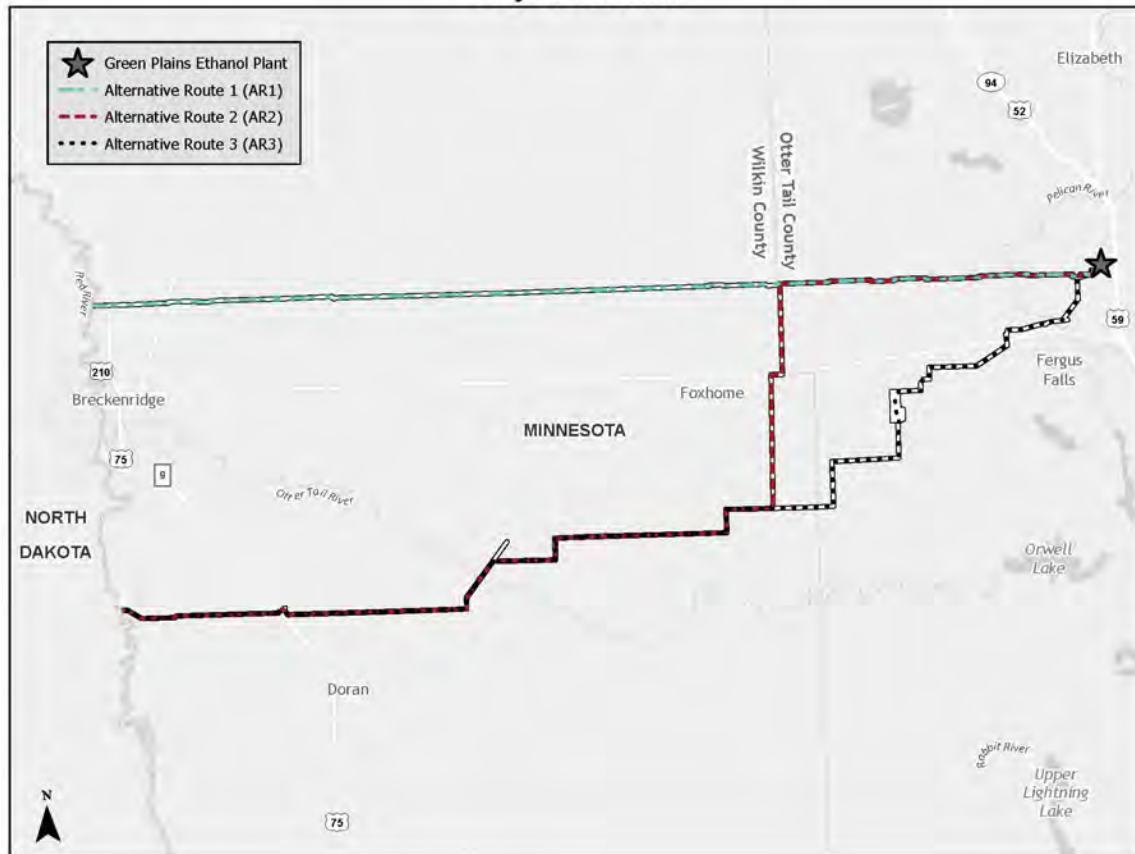
Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. Provide update on any additional cultural resources work (file review, field studies, etc.) that has not been previously provided or indicate when this information will be available.

Summit Carbon Solutions, LLC (Summit) submitted the draft addendum report titled: *“Minnesota Conventional Archaeological Resources Survey (Phase I). Volume 4: Fieldwork Report Addendum (MNL-305 and MNL-321) For Work Completed Between July 2, 2022, and November 14, 2022, on MNL-321 in Otter Tail County and MNL-305 in Martin County, and Since December 3, 2021, for the Eliminated Segment of MNL-305 in Faribault County”* to the Minnesota State Historic Preservation Office (MNSHPO) on April 6, 2023. MNSHPO provided comment to Summit on July 13, 2023. Summit is presently working to address MNSHPO’s comments on the draft Volume 4 and will provide a copy of the final report once available.

2. Provide a shape file and a listing (similar to Appendix J of the Scoping EAW) of noise sensitive receptors within 1,600 feet of the route width for Alternative Route 1 (previously referred to as CURE alternative route 2) and Alternative Route 2 (previously CURE alternative route 3) and Alternative Route 3 (Summit’s proposed route), see map below.

Project Overview



For this analysis, Summit first applied a 500-foot-wide route width to the Alternative Route 1 (previously referred to as CURE Alternative Route 2) and Alternative Route 2 (previously CURE Alternative Route 3) centerlines. For Alternative Route 3 (Summit's proposed route), Summit utilized the presently requested route width, which is a 500- to 1,808-foot-wide route width centered on the Project centerline.

Summit has posted a zipped folder of shapefiles to the Project Sharepoint site that contains centerlines for Alternatives 1, 2 and 3 (with mileposts); route widths for Alternatives 1, 2 and 3, and Noise Sensitive Receptors (NSRs) within 1,600 feet of either side of each route width (see zip file titled "Inquiry 2-2 Otter Tail to Wilkin Alternative Route NSAs_20231025").

Tables that show NSRs within 1,600 feet of the route widths for Alternative Routes 1, 2, and 3 are included in Attachment 2-2 of this response.

3. Provide a high-resolution map, similar to Figure 6-1 in the Scoping EAW, showing an overview of the Midwest Carbon Express Project for inclusion in the EIS. Label the project as Midwest Carbon Express rather than Summit Carbon Solutions Project. No figure number is needed.

Summit has posted a .jpg file to the Project Sharepoint site showing an overview of the Midwest Carbon Express (MCE) Project (see file titled "Inquiry 2-3 Midwest Carbon Express Project Map_20231025").

4. The Scoping EAW states that a 50-foot-wide construction workspace would be needed for HDDs” (Section 6.c, page 21) and “For HDDs and bores of waterbodies where there would not be a travel lane within the ROW (i.e., no use of a bridge) there would be no clearing over the HDD path” (pages 12 and 61). Clarify why a 50-foot-wide construction workspace is needed for HDDs. Describe if and where there would be any travel lanes or other disturbance (aside from hand trimming for guidewire placement) between HDD entry and exits.

Summit is obtaining a standard 50-foot-wide permanent easement over the pipeline so that Summit may construct, own, operate and maintain the proposed pipeline. At HDDs, this 50-foot-wide permanent easement will also serve as temporary construction workspace; however, no ground disturbance will occur here. Within this construction workspace, Summit’s Contractor may trim vegetation using hand tools where necessary to access a water source to withdraw or water for HDD operations and/or hydrostatic testing of the pipeline and/or to place the HDD guidewires along the surface of the drill path within the entry and exit points. Summit’s Contractor would not clear vegetation between the HDD drill entry and exit points during construction. Summit will not use travel lanes on any of the HDDs planned for the Project (the Pelican, Otter Tail, and Bois de Sioux Rivers). Therefore, disturbance within all HDD entry and exit points will be limited to that noted above.

5. Clarify if vegetation maintenance, such as mowing or tree and shrub removal, would be done across the full width of the permanent ROW.

After the pipeline is constructed, Summit would maintain the 50-foot-wide permanent easement for the purposes of pipeline operation, integrity, maintenance, and safety. The 50-foot-wide permanent easement would be maintained free of woody vegetation over 15 feet tall as part of SCS’s vegetation maintenance program. This would involve mowing or tree/shrub removal in non-cultivated areas.

However, there are some exceptions. As outlined in Section 4.8 of the Minnesota Environmental Construction Plan (Minnesota ECP), “post-construction vegetation maintenance will be limited adjacent to waterbodies to promote the growth of the riparian filter strip (buffer)...vegetation along a 10-foot-wide corridor centered over the pipeline will be maintained to facilitate visual inspection of the pipeline and allow corrosion and leak surveys to occur.” In these areas near waterbodies, Summit will limit its standard 50-foot-wide permanent easement maintenance area to a 10-foot-wide area over the pipeline. In addition, as stated in Section 4.8 of the Minnesota ECP, during the operational term, “Vegetation between HDD entry and exit points will not be routinely cleared or mowed.” Summit’s response to Inquiry Number 2.4 above notes that there will be no clearing between HDD exit and exit points during construction. This would also extend to the operational term.

6. Describe chemicals or other additives, if any, that would be added to the hydrostatic test water.

Summit does not plan to add chemicals or other additives to hydrostatic test water. In the unlikely event that hydrostatic test discharge must occur in the winter, Summit may consider adding an anti-freeze additive, such as glycol, to prevent freezing. All additives would be subject to review and approval by relevant regulatory agencies.

7. Indicate when geotechnical studies for the HDD locations would be completed. Provide a preliminary assessment of HDD feasibility for each HDD location based on currently available geologic information.

- Pelican River HDD – The geotechnical study has not been completed. It will be completed prior to construction once approval is received from the landowner.
- Otter Tail River HDD – The geotechnical investigation has been completed. The results confirm that HDD is a feasible method of crossing the Otter Tail River.
- Bois De Sioux River HDD – The geotechnical investigation has been completed. The results confirm that HDD is a feasible method of crossing the Bois De Sioux River.

8. The RPA states that the applicant will develop a contingency plan to address the unintended release of drilling mud to the environment during the execution of each HDD. Indicate whether this plan will include: (1) a contingency for the waterbody crossing in the event the drill is unsuccessful or proves infeasible, (2) measures to reduce the risk for an inadvertent return to occur, and (3) procedures to monitor for inadvertent returns during drilling.

Yes.

9. RPA Section 6.14.2 states “Where feasible, the Applicant narrowed the construction workspace width from 100 feet to 75 feet at wetland crossings to reduce wetland impacts from the Project.” Describe the locations in wetlands where the construction workspace width would be greater than 75 feet.

Summit actively updates its Project construction workspace as new wetland field data becomes available. Presently, there are no locations where the construction workspace is greater than 75 feet in delineated wetlands. It is Summit’s intention to reduce the width of the construction workspace to 75 feet in all delineated wetlands.

10. Provide an update on consultation with the USFWS Region 3 office regarding federally listed species.

Consultation with the U.S. Fish and Wildlife Service (USFWS) Region 3 office regarding federal species is ongoing. Summit is preparing a Biological Assessment for the MCE Project that will cover the potential impacts to federally listed threatened and endangered species. Summit anticipates submitting the Biological Assessment to the U.S. Army Corps of Engineers for their use in Section 7 consultation with the USFWS regarding the MCE Project during Q2 of 2024.

11. Explain why dry waterbody crossing methods are described as part of the project (Scoping EAW Section 12.b.iv.b) but are not proposed for any of the waterbodies that would be crossed by the project (Table 12-2 of the Scoping EAW).

Summit has included dry waterbody crossing methods for flowing waterbodies in the Minnesota ECP and the Route Permit Application (and reflected in the Scoping EAW) as an option that may be applied to specific streams where a dry crossing method is preferred or required based on agency input or regulatory requirements. At this point in time, Summit has proposed to utilize the waterbody crossing methods as presented in Table 12-2 of the Scoping EAW.

12. Provide a width, estimated if necessary, for the perennial stream that would be crossed at MP 6.6 and the three intermittent streams at MPs 4.7, 5.0, and 5.5 (Scoping EAW Table 34).

- MP 4.7 – Summit surveyed this feature in 2023. The surveyed width of the Ordinary High Water Mark (OHWM) is 4.0 feet.
- MP 5.0 – Summit surveyed this feature in 2023. The surveyed width of the OHWM is 3.5 feet.
- MP 5.5 – Summit surveyed this area in 2023. There was no evidence of a waterbody at this location. Therefore, this feature, once considered a “desktop” waterbody, will no longer be considered as a waterbody feature.
- MP 6.6 – Summit has not surveyed the waterbody at this location (note that it is presently closer to MP 6.5). Survey will occur once the landowner grants permission. However, Summit surveyed this feature on an adjacent property to the southeast. In that location, the width of the OHWM is 15.0 feet.

Attachment 2-2
Noise Sensitive Receptor Tables

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 1 Route Width			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 1 Centerline (feet)	Direction from Alternative Route 1
0.01	Garage/Barn *	1,383	SE
0.01	Garage/Barn *	1,607	SE
0.01	Garage/Barn *	1,317	SE
0.01	Residence *	1,491	SE
0.07	Industrial *	752	N
0.07	Industrial *	545	N
0.08	Industrial *	330	N
0.08	Industrial *	662	N
0.10	Industrial *	475	N
0.15	Business *	245	N
0.23	Industrial *	700	N
0.24	Garage/Barn *	835	NW
0.24	Garage/Barn *	817	NW
0.24	Garage/Barn *	979	NW
0.24	Residence *	930	NW
0.41	Garage/Barn *	781	S
0.41	Garage/Barn *	715	S
0.41	Garage/Barn *	846	S
0.42	Residence *	721	S
0.75	Industrial *	296	N
0.75	Industrial *	256	N
0.96	Garage/Barn *	475	S
0.97	Residence *	417	S
0.99	Garage/Barn *	520	S
1.06	Residence *	267	N
1.07	Garage/Barn *	312	N
1.10	Garage/Barn *	572	N
1.10	Residence *	420	N
1.11	Garage/Barn *	439	N
1.11	Garage/Barn *	500	N
1.11	Garage/Barn *	309	N
1.12	Residence *	262	N
1.21	Residence *	1,044	S
1.23	Garage/Barn *	1,107	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 1 Route Width			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 1 Centerline (feet)	Direction from Alternative Route 1
1.23	Garage/Barn *	1,141	S
1.86	Garage/Barn *	378	SW
1.89	Garage/Barn *	437	NE
1.89	Residence *	295	NE
1.96	Residence *	279	S
1.97	Garage/Barn *	476	S
1.97	Garage/Barn *	398	S
1.98	Garage/Barn *	592	S
2.01	Garage/Barn *	391	S
2.01	Garage/Barn *	483	S
2.04	Garage/Barn *	912	N
2.06	Garage/Barn *	973	N
2.07	Garage/Barn *	1,142	N
2.07	Garage/Barn *	1,096	N
2.08	Garage/Barn *	305	S
2.09	Garage/Barn *	1,018	N
2.09	Residence *	920	N
2.09	Garage/Barn *	350	S
2.09	Garage/Barn *	1,071	N
2.09	Garage/Barn *	196	S
2.10	Garage/Barn *	446	S
2.10	Garage/Barn *	1,117	N
2.11	Garage/Barn *	286	S
2.11	Residence *	382	S
2.97	Garage/Barn *	595	NW
2.97	Residence *	381	NW
3.09	Garage/Barn *	681	N
3.09	Garage/Barn *	473	N
3.10	Garage/Barn *	757	N
3.11	Garage/Barn *	505	N
3.57	Residence *	1,542	S
3.59	Garage/Barn *	1,496	S
3.60	Garage/Barn *	1,539	S
3.61	Garage/Barn *	1,652	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 1 Route Width			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 1 Centerline (feet)	Direction from Alternative Route 1
3.98	Garage/Barn *	877	N
4.00	Garage/Barn *	807	N
4.05	Residence *	468	N
4.05	Garage/Barn *	724	N
4.06	Garage/Barn *	538	N
4.07	Garage/Barn *	709	N
4.89	Industrial *	144	S
5.27	Industrial *	966	N
5.30	Residence *	976	N
5.31	Industrial *	796	N
5.32	Industrial *	981	N
5.34	Industrial *	888	N
5.35	Industrial *	935	N
5.36	Industrial *	873	N
5.67	Garage/Barn *	1,248	N
5.69	Garage/Barn *	1,190	N
5.69	Residence *	1,008	N
5.69	Residence *	353	S
5.70	Garage/Barn *	448	S
5.71	Garage/Barn *	1,342	N
5.71	Garage/Barn *	1,094	N
5.71	Garage/Barn *	215	S
5.71	Garage/Barn *	421	S
5.75	Garage/Barn *	362	S
5.75	Garage/Barn *	422	S
5.75	Garage/Barn *	257	S
6.21	Garage/Barn *	434	N
6.23	Garage/Barn *	506	N
6.24	Garage/Barn *	568	N
6.24	Residence *	367	N
6.25	Garage/Barn *	382	N
6.25	Garage/Barn *	494	N
6.26	Garage/Barn *	390	N
6.26	Garage/Barn *	445	N

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 1 Route Width			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 1 Centerline (feet)	Direction from Alternative Route 1
9.89	Garage/Barn	478	N
9.92	Residence	306	N
9.94	Garage/Barn	391	N
10.82	Residence	1,164	N
10.84	Garage/Barn	1,435	N
10.84	Garage/Barn	1,118	N
10.86	Garage/Barn	1,161	N
10.89	Garage/Barn	1,031	N
12.31	Residence	299	N
12.32	Garage/Barn	341	N
12.33	Garage/Barn	406	N
12.34	Garage/Barn	357	N
12.35	Garage/Barn	416	N
13.59	Garage/Barn	634	N
13.60	Garage/Barn	275	N
13.61	Residence	402	N
17.72	Residence	553	S
17.73	Garage/Barn	486	S
17.74	Garage/Barn	396	S
17.74	Garage/Barn	557	S
20.42	Garage/Barn	330	N
20.43	Garage/Barn	350	N
20.44	Residence	182	N
20.45	Garage/Barn	289	N
20.87	Garage/Barn	496	S
20.87	Garage/Barn	347	S
20.90	Garage/Barn	475	S
21.39	Garage/Barn	311	S
21.39	Business	700	S
21.39	Garage/Barn	672	S
21.49	Garage/Barn	462	N
21.50	Garage/Barn	445	N
21.53	Residence	285	N
21.60	Residence	1,824	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 1 Route Width			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 1 Centerline (feet)	Direction from Alternative Route 1
21.62	Garage/Barn	369	N
21.63	Residence	258	N
21.64	Garage/Barn	252	N
21.64	Garage/Barn	377	N
22.66	Garage/Barn	741	N
22.66	Garage/Barn	374	N
22.67	Garage/Barn	450	N
22.67	Garage/Barn	665	N
22.68	Residence	831	N
22.68	Residence	516	N
22.69	Residence	305	N
23.02	Residence	823	NW
23.02	Garage/Barn	981	NW
23.02	Garage/Barn	800	NW
23.02	Garage/Barn	1,360	S
23.02	Garage/Barn	1,343	S
23.02	Garage/Barn	1,149	S
23.02	Garage/Barn	1,089	S
23.02	Residence	1,244	S
23.02	Garage/Barn	972	S
23.02	Garage/Barn	1,062	S
23.02	Garage/Barn	1,116	S
23.02	Garage/Barn	1,499	NW
^a	Mileposts for Alternative Route 1 are unofficial distances along the centerline from the Green Plains Ethanol Plant and are included here to help describe the location of noise sensitive receptors (NSR).		
^b	An asterisk (*) indicates an NSR that is within 1,600 feet of both Alternative Route 1 and Alternative Route 2.		

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
0.01	Garage/Barn *	1,383	SE
0.01	Garage/Barn *	1,607	SE
0.01	Garage/Barn *	1,317	SE
0.01	Residence *	1,491	SE
0.07	Industrial *	752	N
0.07	Industrial *	545	N
0.08	Industrial *	330	N
0.08	Industrial *	662	N
0.10	Industrial *	475	N
0.15	Business *	245	N
0.23	Industrial *	700	N
0.24	Garage/Barn *	835	NW
0.24	Garage/Barn *	817	NW
0.24	Garage/Barn *	979	NW
0.24	Residence *	930	NW
0.41	Garage/Barn *	781	S
0.41	Garage/Barn *	715	S
0.41	Garage/Barn *	846	S
0.42	Residence *	721	S
0.75	Industrial *	296	N
0.75	Industrial *	256	N
0.96	Garage/Barn *	475	S
0.97	Residence *	417	S
0.99	Garage/Barn *	520	S
1.06	Residence *	267	N
1.07	Garage/Barn *	312	N
1.10	Garage/Barn *	572	N
1.10	Residence *	420	N
1.11	Garage/Barn *	439	N
1.11	Garage/Barn *	500	N
1.11	Garage/Barn *	309	N
1.12	Residence *	262	N
1.21	Residence *	1,044	S
1.23	Garage/Barn *	1,107	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
1.23	Garage/Barn *	1,141	S
1.86	Garage/Barn *	378	SW
1.89	Garage/Barn *	437	NE
1.89	Residence *	295	NE
1.96	Residence *	279	S
1.97	Garage/Barn *	476	S
1.97	Garage/Barn *	398	S
1.98	Garage/Barn *	592	S
2.01	Garage/Barn *	391	S
2.01	Garage/Barn *	483	S
2.04	Garage/Barn *	912	N
2.06	Garage/Barn *	973	N
2.07	Garage/Barn *	1,142	N
2.07	Garage/Barn *	1,096	N
2.08	Garage/Barn *	305	S
2.09	Garage/Barn *	1,018	N
2.09	Residence *	920	N
2.09	Garage/Barn *	350	S
2.09	Garage/Barn *	1,071	N
2.09	Garage/Barn *	196	S
2.10	Garage/Barn *	446	S
2.10	Garage/Barn *	1,117	N
2.11	Garage/Barn *	286	S
2.11	Residence *	382	S
2.97	Garage/Barn *	595	NW
2.97	Residence *	381	NW
3.09	Garage/Barn *	681	N
3.09	Garage/Barn *	473	N
3.10	Garage/Barn *	757	N
3.11	Garage/Barn *	505	N
3.57	Residence *	1,542	S
3.59	Garage/Barn *	1,496	S
3.60	Garage/Barn *	1,539	S
3.61	Garage/Barn *	1,652	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
3.98	Garage/Barn *	877	N
4.00	Garage/Barn *	807	N
4.05	Residence *	468	N
4.05	Garage/Barn *	724	N
4.06	Garage/Barn *	538	N
4.07	Garage/Barn *	709	N
4.89	Industrial *	144	S
5.27	Industrial *	966	N
5.30	Residence *	976	N
5.31	Industrial *	796	N
5.32	Industrial *	981	N
5.34	Industrial *	888	N
5.35	Industrial *	935	N
5.36	Industrial *	873	N
5.67	Garage/Barn *	1,248	N
5.69	Garage/Barn *	1,190	N
5.69	Residence *	1,008	N
5.69	Residence *	353	S
5.70	Garage/Barn *	448	S
5.71	Garage/Barn *	1,342	N
5.71	Garage/Barn *	1,094	N
5.71	Garage/Barn *	215	S
5.71	Garage/Barn *	421	S
5.75	Garage/Barn *	362	S
5.75	Garage/Barn *	422	S
5.75	Garage/Barn *	257	S
6.21	Garage/Barn *	434	N
6.23	Garage/Barn *	506	N
6.24	Garage/Barn *	568	N
6.24	Residence *	367	N
6.25	Garage/Barn *	382	N
6.25	Garage/Barn *	494	N
6.26	Garage/Barn *	390	N
6.26	Garage/Barn *	445	N

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
8.54	Garage/Barn	1,036	E
8.54	Garage/Barn	873	E
8.56	Residence	995	E
10.08	Industrial	165	W
14.58	Garage/Barn	1,571	S
14.60	Residence	1,147	S
14.61	Garage/Barn	1,392	S
14.63	Garage/Barn	1,270	S
15.36	Garage/Barn	1,126	S
15.39	Garage/Barn	966	S
15.39	Garage/Barn	1,202	S
15.40	Residence	1,054	S
19.81	Residence	1,542	S
19.83	Garage/Barn	1,704	S
19.83	Garage/Barn	1,638	S
21.02	Residence	971	NW
21.03	Garage/Barn	1,113	NW
23.45	Garage/Barn	1,321	S
23.45	Garage/Barn	1,226	S
23.45	Residence	1,054	S
24.43	Garage/Barn	150	N
24.48	Residence	236	N
25.28	Garage/Barn	516	N
25.30	Garage/Barn	557	N
25.48	Residence	493	NE
26.23	Garage/Barn	325	S
26.24	Garage/Barn	614	S
26.25	Residence	586	S
26.26	Garage/Barn	312	S
26.29	Garage/Barn	745	S
26.31	Residence	351	S
26.67	Garage/Barn	1,206	S
26.69	Residence	1,403	S
26.71	Garage/Barn	1,209	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
27.95	Garage/Barn	1,189	N
27.96	Residence	1,113	N
27.97	Garage/Barn	918	N
27.97	Garage/Barn	1,036	N
27.97	Garage/Barn	1,071	N
27.97	Garage/Barn	1,138	N
28.35	Garage/Barn	1,637	N
28.35	Garage/Barn	1,719	N
28.36	Garage/Barn	1,661	N
28.37	Garage/Barn	1,400	N
28.38	Residence	1,581	N
28.44	Garage/Barn	1,602	N
28.78	Garage/Barn	1,458	SW
28.80	Residence	1,458	SW
28.81	Garage/Barn	1,639	SW
29.22	Residence	1,513	S
29.22	Residence	1,457	S
29.22	Residence	560	SW
29.22	Garage/Barn	555	SW
29.22	Garage/Barn	409	SW
29.22	Garage/Barn	449	SW
^a Mileposts for Alternative Route 2 are unofficial distances along the centerline from the Green Plains Ethanol Plant and are included here to help describe the location of noise sensitive receptors (NSR).			
^b An asterisk (*) indicates an NSR that is within 1,600 feet of both Alternative Route 1 and Alternative Route 2.			

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 3 Route Width			
Approximate Milepost	Description	Distance From Alternative Route 3 Centerline (feet)	Direction from Alternative Route 3
0.01	Garage/Barn	1,607	SE
0.01	Garage/Barn	1,383	SE
0.01	Residence	1,491	SE
0.01	Garage/Barn	1,317	SE
0.07	Industrial	545	N
0.07	Industrial	752	N
0.08	Industrial	330	N
0.08	Industrial	662	N
0.10	Industrial	475	N
0.15	Business	245	N
0.24	Industrial	672	N
0.28	Garage/Barn	669	NW
0.28	Residence	800	NW
0.28	Garage/Barn	734	N
0.28	Garage/Barn	878	N
0.46	Garage/Barn	799	S
0.47	Garage/Barn	710	S
0.47	Garage/Barn	633	S
0.49	Residence	571	S
0.68	Garage/Barn	1,050	W
0.68	Residence	1,082	W
0.68	Industrial	498	NW
0.68	Industrial	519	N
0.68	Residence	1,726	NW
0.68	Garage/Barn	1,803	NW
0.68	Garage/Barn	1,179	W
1.15	Garage/Barn	1,198	SE
1.15	Residence	1,779	E
1.15	Garage/Barn	1,748	E
1.18	Garage/Barn	1,341	SE
1.33	Industrial	1,821	SE
1.74	Garage/Barn	1,206	S
1.74	Residence	1,259	SE
1.74	Garage/Barn	1,174	SE

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 3 Route Width			
Approximate Milepost	Description	Distance From Alternative Route 3 Centerline (feet)	Direction from Alternative Route 3
1.74	Garage/Barn	644	SE
2.14	Garage/Barn	1,176	S
2.14	Business	555	SW
2.24	Residence	367	N
2.26	Garage/Barn	525	S
2.28	Residence	491	N
2.28	Garage/Barn	1,186	S
2.32	Residence	375	N
2.33	Garage/Barn	1,079	S
2.37	Garage/Barn	1,846	N
3.01	Garage/Barn	1,584	NW
3.16	Garage/Barn	791	W
3.35	Garage/Barn	1,244	E
3.35	Garage/Barn	955	SE
3.35	Residence	1,120	E
4.81	Industrial	1,801	N
4.85	Industrial	1,477	N
4.86	Industrial	1,812	N
4.92	Industrial	1,740	N
4.98	Garage/Barn	1,010	S
4.98	Garage/Barn	927	S
4.98	Residence	1,193	S
4.98	Industrial	1,413	N
4.99	Garage/Barn	1,109	S
4.99	Garage/Barn	1,051	S
5.49	Garage/Barn	1,234	E
5.49	Residence	1,312	E
6.94	Residence	229	NE
6.97	Residence	179	SW
7.03	Garage/Barn	186	W
13.46	Garage/Barn	1,571	S
13.48	Residence	1,147	S
13.49	Garage/Barn	1,392	S
13.51	Garage/Barn	1,270	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 3 Route Width			
Approximate Milepost	Description	Distance From Alternative Route 3 Centerline (feet)	Direction from Alternative Route 3
14.25	Garage/Barn	1,126	S
14.27	Garage/Barn	966	S
14.28	Garage/Barn	1,202	S
14.28	Residence	1,054	S
18.57	Garage/Barn	2,626	N
18.57	Garage/Barn	2,725	N
18.60	Garage/Barn	2,929	N
18.62	Residence	2,574	N
18.70	Residence	3,837	N
18.71	Residence	1,542	S
18.72	Garage/Barn	3,945	N
18.73	Garage/Barn	1,704	S
18.73	Garage/Barn	1,638	S
18.73	Garage/Barn	4,082	N
19.91	Residence	973	NW
19.93	Garage/Barn	1,115	NW
22.35	Residence	1,047	S
22.36	Garage/Barn	1,315	S
22.36	Garage/Barn	1,219	S
23.33	Garage/Barn	183	N
23.38	Residence	262	N
24.18	Garage/Barn	542	N
24.20	Garage/Barn	583	N
24.38	Residence	493	NE
25.14	Garage/Barn	325	S
25.14	Garage/Barn	614	S
25.16	Residence	586	S
25.17	Garage/Barn	312	S
25.20	Garage/Barn	745	S
25.22	Residence	351	S
25.57	Garage/Barn	1,206	S
25.59	Residence	1,403	S
25.61	Garage/Barn	1,209	S
26.81	Garage/Barn	1,271	N

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 3 Route Width			
Approximate Milepost	Description	Distance From Alternative Route 3 Centerline (feet)	Direction from Alternative Route 3
26.82	Residence	1,202	N
26.83	Garage/Barn	1,019	N
26.84	Garage/Barn	1,183	N
26.85	Garage/Barn	1,151	N
26.85	Garage/Barn	1,254	N
27.21	Garage/Barn	1,623	N
27.21	Garage/Barn	1,706	N
27.22	Garage/Barn	1,651	N
27.22	Garage/Barn	1,392	N
27.25	Residence	1,581	N
27.32	Garage/Barn	1,602	N
27.65	Garage/Barn	1,458	SW
27.68	Residence	1,458	SW
27.69	Garage/Barn	1,639	SW
27.93	Residence	1,758	SW
28.10	Residence	1,825	S
28.10	Residence	866	SW
28.10	Garage/Barn	836	SW
28.10	Garage/Barn	701	SW
28.10	Garage/Barn	702	SW
28.10	Garage/Barn	1,615	N
28.10	Garage/Barn	1,678	N
28.10	Residence	1,742	N
28.10	Garage/Barn	1,835	N

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: October 17, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: Preferably no later than October 31, 2023

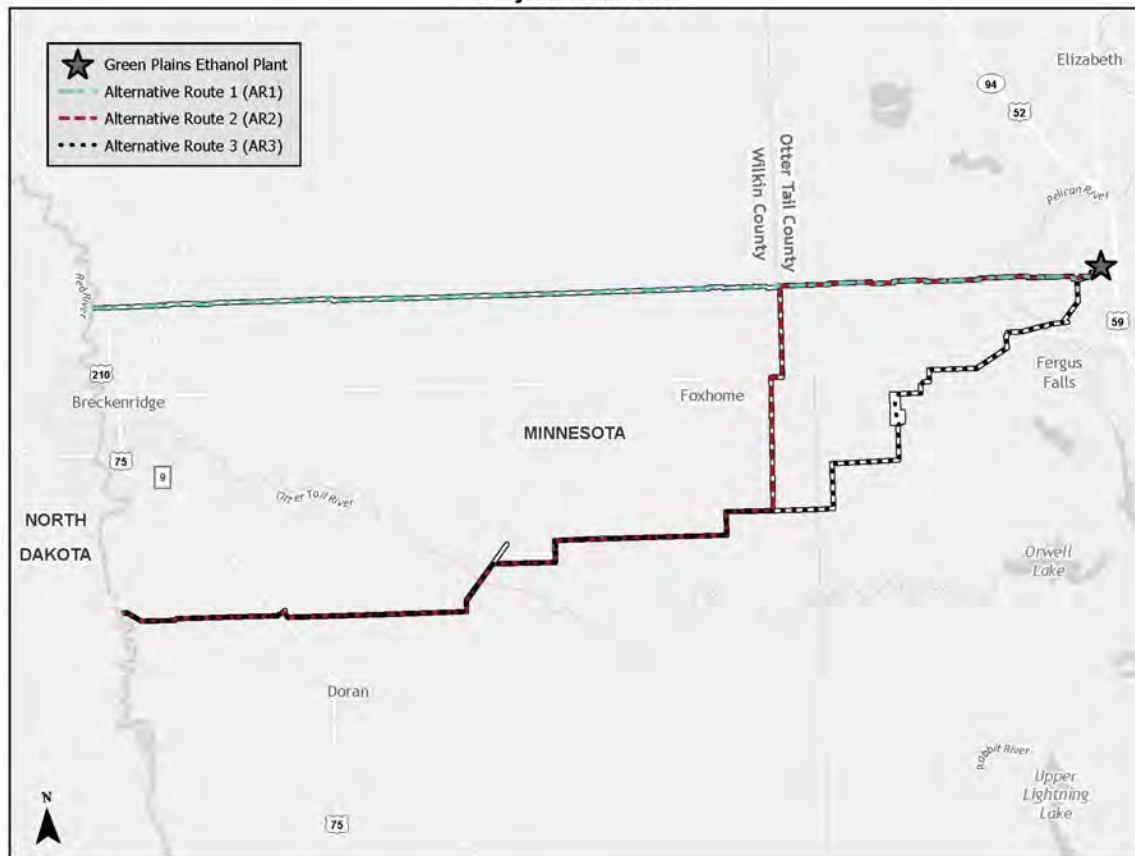
Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: “*Requested information sent to whom by what means on date.*”

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

2. Provide a shape file and a listing (similar to Appendix J of the Scoping EAW) of noise sensitive receptors within 1,600 feet of the route width for Alternative Route 1 (previously referred to as CURE alternative route 2) and Alternative Route 2 (previously CURE alternative route 3) and Alternative Route 3 (Summit’s proposed route), see map below.

Project Overview



On October 31, 2023, Minnesota Department of Commerce, Energy Environment Review and Analysis (DOC-EERA) requested that Summit update data previously provided on October 27, 2023 in response to Information Inquiry Number 2 to reflect an Alternative Route 2 centerline prepared by DOC-EERA and provided to Summit on October 19, 2023 as part of Information Inquiry Number 4.

Summit has posted a folder of shapefiles to the Project Sharepoint site to replace the files provided on October 27, 2023. The new file is titled "Inquiry 2-2 Otter Tail to Wilkin Route Alternative NSAs_Rev1_20231031". The new files are intended to replace the previously provided files. The updated centerline caused a change in the Alternative 2 500-foot-wide route width, updated mileposts, as well as recalculation of distance from some previously reported noise sensitive receptors (NSRs).

A revised table that shows NSRs within 1,600 feet of the route width for Alternative Route 2 is included in Attachment 2-2 of this response. Changes are noted in bold text. During this re-review of Alternative 2, Summit determined that some NSAs within 1,600 feet of Alternative 2 where it is collocated with Alternative 3 were excluded from the table. Those are added in bold as well.

Attachment 2-2
Revised Noise Sensitive Receptor Table for Alternative Route 2

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width Revision 1			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
0.01	Garage/Barn *	1,383	SE
0.01	Garage/Barn *	1,607	SE
0.01	Garage/Barn *	1,317	SE
0.01	Residence *	1,491	SE
0.07	Industrial *	752	N
0.07	Industrial *	545	N
0.08	Industrial *	330	N
0.08	Industrial *	662	N
0.10	Industrial *	475	N
0.15	Business *	245	N
0.23	Industrial *	700	N
0.24	Garage/Barn *	835	NW
0.24	Garage/Barn *	817	NW
0.24	Garage/Barn *	979	NW
0.24	Residence *	930	NW
0.41	Garage/Barn *	781	S
0.41	Garage/Barn *	715	S
0.41	Garage/Barn *	846	S
0.42	Residence *	721	S
0.75	Industrial *	296	N
0.75	Industrial *	256	N
0.96	Garage/Barn *	475	S
0.97	Residence *	417	S
0.99	Garage/Barn *	520	S
1.06	Residence *	267	N
1.07	Garage/Barn *	312	N
1.10	Garage/Barn *	572	N
1.10	Residence *	420	N
1.11	Garage/Barn *	439	N
1.11	Garage/Barn *	500	N
1.11	Garage/Barn *	309	N
1.12	Residence *	262	N
1.21	Residence *	1,044	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width Revision 1			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
1.23	Garage/Barn *	1,107	S
1.23	Garage/Barn *	1,141	S
1.86	Garage/Barn *	378	SW
1.89	Garage/Barn *	437	NE
1.89	Residence *	295	NE
1.96	Residence *	279	S
1.97	Garage/Barn *	476	S
1.97	Garage/Barn *	398	S
1.98	Garage/Barn *	592	S
2.01	Garage/Barn *	391	S
2.01	Garage/Barn *	483	S
2.04	Garage/Barn *	912	N
2.06	Garage/Barn *	973	N
2.07	Garage/Barn *	1,142	N
2.07	Garage/Barn *	1,096	N
2.08	Garage/Barn *	305	S
2.09	Garage/Barn *	1,018	N
2.09	Residence *	920	N
2.09	Garage/Barn *	350	S
2.09	Garage/Barn *	1,071	N
2.09	Garage/Barn *	196	S
2.10	Garage/Barn *	446	S
2.10	Garage/Barn *	1,117	N
2.11	Garage/Barn *	286	S
2.11	Residence *	382	S
2.97	Garage/Barn *	595	NW
2.97	Residence *	381	NW
3.09	Garage/Barn *	681	N
3.09	Garage/Barn *	473	N
3.10	Garage/Barn *	757	N
3.11	Garage/Barn *	505	N
3.57	Residence *	1,542	S
3.59	Garage/Barn *	1,496	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width Revision 1			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
3.60	Garage/Barn *	1,539	S
3.61	Garage/Barn *	1,652	S
3.98	Garage/Barn *	877	N
4.00	Garage/Barn *	807	N
4.05	Residence *	468	N
4.05	Garage/Barn *	724	N
4.06	Garage/Barn *	538	N
4.07	Garage/Barn *	709	N
4.89	Industrial *	144	S
5.27	Industrial *	966	N
5.30	Residence *	976	N
5.31	Industrial *	796	N
5.32	Industrial *	981	N
5.34	Industrial *	888	N
5.35	Industrial *	935	N
5.36	Industrial *	873	N
5.67	Garage/Barn *	1,248	N
5.69	Garage/Barn *	1,190	N
5.69	Residence *	1,008	N
5.69	Residence *	353	S
5.70	Garage/Barn *	448	S
5.71	Garage/Barn *	1,342	N
5.71	Garage/Barn *	1,094	N
5.71	Garage/Barn *	215	S
5.71	Garage/Barn *	421	S
5.75	Garage/Barn *	362	S
5.75	Garage/Barn *	422	S
5.75	Garage/Barn *	257	S
6.21	Garage/Barn *	434	N
6.23	Garage/Barn *	506	N
6.24	Garage/Barn *	568	N
6.24	Residence *	367	N
6.25	Garage/Barn *	382	N

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width Revision 1			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
6.25	Garage/Barn *	494	N
6.26	Garage/Barn *	390	N
6.26	Garage/Barn *	445	N
8.54	Garage/Barn	806	E
8.54	Garage/Barn	643	E
8.56	Residence	765	E
10.08	Industrial	408	W
14.58	Garage/Barn	1,571	S
14.60	Residence	1,147	S
14.61	Garage/Barn	1,392	S
14.63	Garage/Barn	1,270	S
15.36	Garage/Barn	1,126	S
15.39	Garage/Barn	966	S
15.39	Garage/Barn	1,202	S
15.40	Residence	1,054	S
18.57	Garage/Barn	2,626	N
18.57	Garage/Barn	2,725	N
18.60	Garage/Barn	2,929	N
18.62	Residence	2,574	N
18.70	Residence	3,837	N
18.72	Garage/Barn	3,945	N
18.73	Garage/Barn	4,082	N
19.81	Residence	1,542	S
19.83	Garage/Barn	1,704	S
19.83	Garage/Barn	1,638	S
21.02	Residence	971	NW
21.03	Garage/Barn	1,113	NW
23.45	Garage/Barn	1,321	S
23.45	Garage/Barn	1,226	S
23.45	Residence	1,054	S
24.43	Garage/Barn	150	N
24.48	Residence	236	N

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width Revision 1			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
25.28	Garage/Barn	516	N
25.30	Garage/Barn	557	N
25.48	Residence	493	NE
26.23	Garage/Barn	325	S
26.24	Garage/Barn	614	S
26.25	Residence	586	S
26.26	Garage/Barn	312	S
26.29	Garage/Barn	745	S
26.31	Residence	351	S
26.67	Garage/Barn	1,206	S
26.69	Residence	1,403	S
26.71	Garage/Barn	1,209	S
27.95	Garage/Barn	1,189	N
27.96	Residence	1,113	N
27.97	Garage/Barn	918	N
27.97	Garage/Barn	1,036	N
27.97	Garage/Barn	1,071	N
27.97	Garage/Barn	1,138	N
28.35	Garage/Barn	1,637	N
28.35	Garage/Barn	1,719	N
28.36	Garage/Barn	1,661	N
28.37	Garage/Barn	1,400	N
28.38	Residence	1,581	N
28.44	Garage/Barn	1,602	N
28.78	Garage/Barn	1,458	SW
28.80	Residence	1,458	SW
28.81	Garage/Barn	1,639	SW
29.22	Residence	1,513	S
29.22	Residence	1,457	S
29.22	Residence	560	SW
29.22	Garage/Barn	555	SW
29.22	Garage/Barn	409	SW
29.22	Garage/Barn	449	SW

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width Revision 1			
Approximate Milepost ^a	Description ^b	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
^a	Mileposts for Alternative Route 2 are unofficial distances along the centerline from the Green Plains Ethanol Plant and are included here to help describe the location of noise sensitive receptors (NSR).		
^b	An asterisk (*) indicates an NSR that is within 1,600 feet of both Alternative Route 1 and Alternative Route 2.		

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: October 17, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: Preferably no later than October 31, 2023

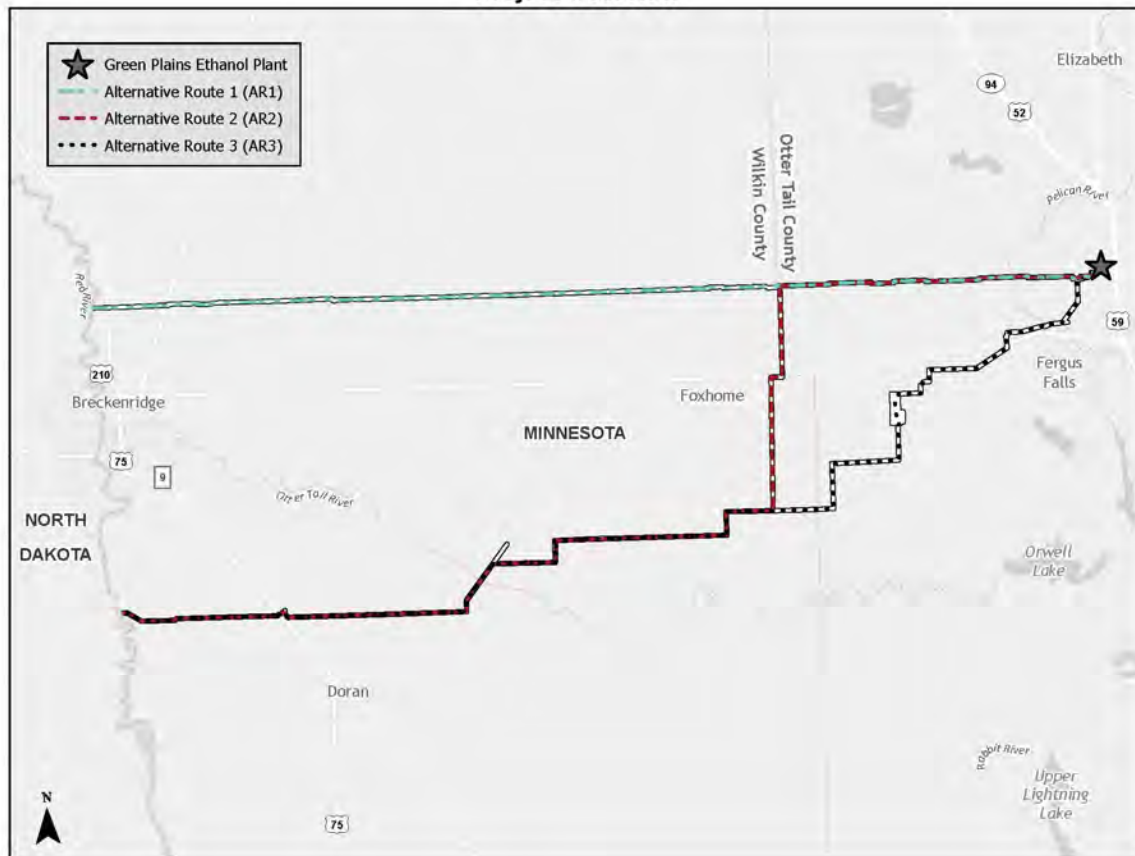
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Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: “*Requested information sent to whom by what means on date.*”

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

2. Provide a shape file and a listing (similar to Appendix J of the Scoping EAW) of noise sensitive receptors within 1,600 feet of the route width for Alternative Route 1 (previously referred to as CURE alternative route 2) and Alternative Route 2 (previously CURE alternative route 3) and Alternative Route 3 (Summit’s proposed route), see map below.

Project Overview



Summit has posted a folder of shapefiles to the Project Sharepoint site to replace the files provided on October 31, 2023. The new file is titled "Inquiry 2-2 Otter Tail to Wilkin Route Alternative NSRs_Rev2_20231115". The new files are intended to replace the previously provided files. Alternative 2 has been updated to address questions regarding distance to NSRs posed by EERA on November 14, 2023. A revised table that shows NSRs within 1,600 feet of the route width for Alternative Route 2 is included in Attachment 2-2 of this response.

Attachment 2-2
Revised Noise Sensitive Receptor Table for Alternative Route 2

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width Revision 2			
Approximate Milepost ^a	Description	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
0.01	Garage/Barn	1,607	SE
0.01	Garage/Barn	1,383	SE
0.01	Residence	1,491	SE
0.01	Garage/Barn	1,317	SE
0.07	Industrial	545	N
0.07	Industrial	752	N
0.08	Industrial	330	N
0.08	Industrial	662	N
0.10	Industrial	475	N
0.15	Business	245	N
0.23	Industrial	700	N
0.24	Garage/Barn	817	NW
0.24	Residence	930	NW
0.24	Garage/Barn	835	NW
0.24	Garage/Barn	979	NW
0.41	Garage/Barn	846	S
0.41	Garage/Barn	781	S
0.41	Garage/Barn	715	S
0.42	Residence	721	S
0.75	Industrial	296	N
0.75	Industrial	256	N
0.96	Garage/Barn	475	S
0.97	Residence	417	S
0.99	Garage/Barn	520	S
1.06	Residence	267	N
1.07	Garage/Barn	312	N
1.10	Garage/Barn	572	N
1.10	Residence	420	N
1.11	Garage/Barn	439	N
1.11	Garage/Barn	500	N
1.11	Garage/Barn	309	N
1.12	Residence	262	N
1.21	Residence	1,044	S
1.23	Garage/Barn	1,107	S
1.23	Garage/Barn	1,141	S
1.86	Garage/Barn	378	SW
1.89	Residence	295	NE

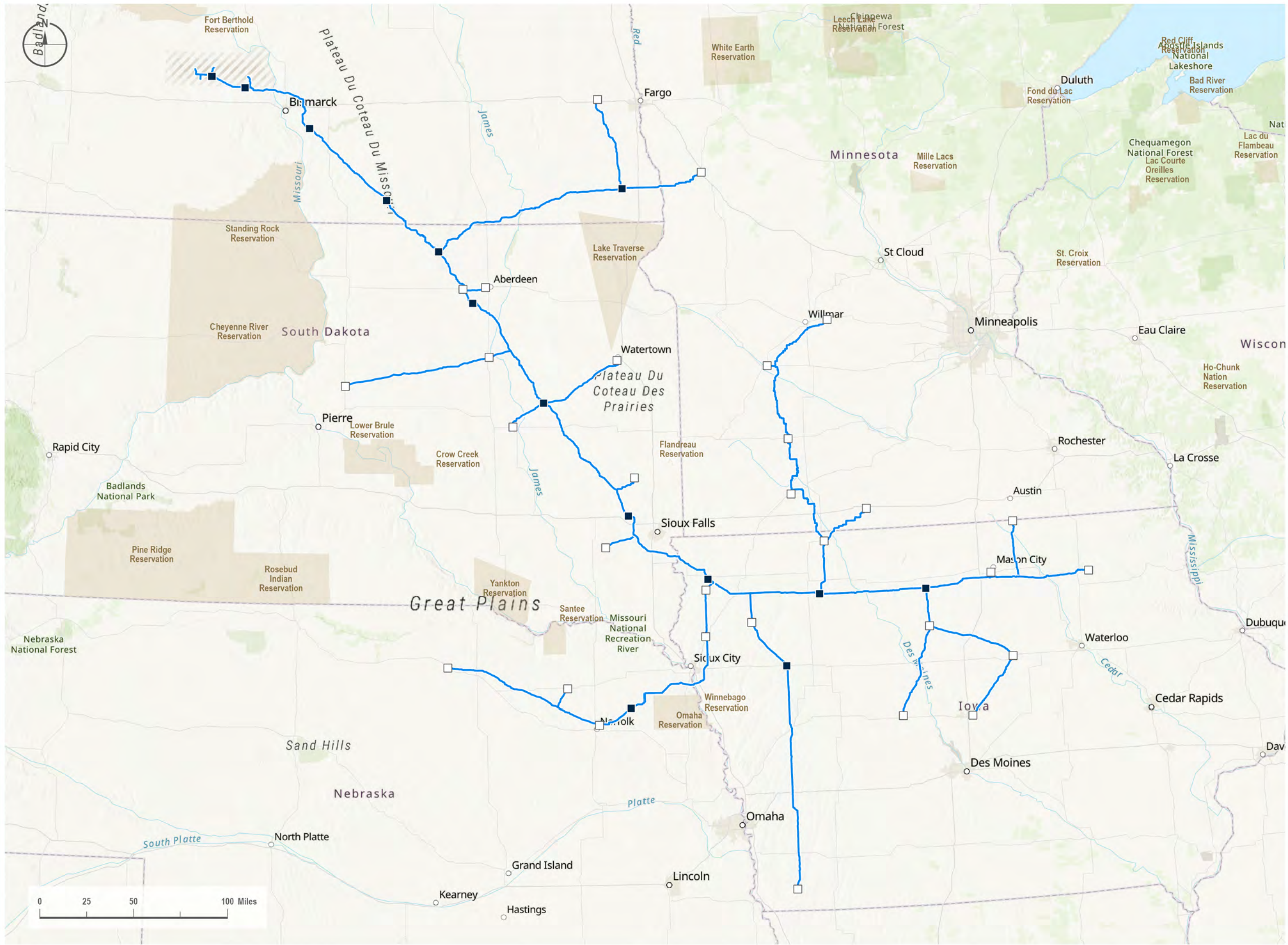
1.89	Garage/Barn	437	NE
1.96	Residence	279	S
1.97	Garage/Barn	476	S
1.97	Garage/Barn	398	S
1.98	Garage/Barn	592	S
2.01	Garage/Barn	391	S
2.01	Garage/Barn	483	S
2.04	Garage/Barn	912	N
2.06	Garage/Barn	973	N
2.07	Garage/Barn	1,142	N
2.07	Garage/Barn	1,096	N
2.08	Garage/Barn	305	S
2.09	Garage/Barn	1,018	N
2.09	Residence	920	N
2.09	Garage/Barn	350	S
2.09	Garage/Barn	1,071	N
2.09	Garage/Barn	196	S
2.10	Garage/Barn	446	S
2.10	Garage/Barn	1,117	N
2.11	Garage/Barn	286	S
2.11	Residence	382	S
2.97	Residence	381	NW
2.97	Garage/Barn	595	NW
3.09	Garage/Barn	681	N
3.09	Garage/Barn	473	N
3.10	Garage/Barn	757	N
3.11	Garage/Barn	505	N
3.57	Residence	1,542	S
3.59	Garage/Barn	1,496	S
3.60	Garage/Barn	1,539	S
3.61	Garage/Barn	1,652	S
3.98	Garage/Barn	877	N
4.00	Garage/Barn	807	N
4.05	Residence	468	N
4.05	Garage/Barn	724	N
4.06	Garage/Barn	538	N
4.07	Garage/Barn	709	N
4.89	Industrial	144	S
5.27	Industrial	966	N
5.30	Residence	976	N
5.31	Industrial	796	N
5.32	Industrial	981	N
5.34	Industrial	888	N

5.35	Industrial	935	N
5.36	Industrial	873	N
5.67	Garage/Barn	1,248	N
5.69	Garage/Barn	1,190	N
5.69	Residence	1,008	N
5.69	Residence	353	S
5.70	Garage/Barn	448	S
5.71	Garage/Barn	1,342	N
5.71	Garage/Barn	1,094	N
5.71	Garage/Barn	215	S
5.71	Garage/Barn	421	S
5.75	Garage/Barn	362	S
5.75	Garage/Barn	422	S
5.75	Garage/Barn	257	S
6.21	Garage/Barn	434	N
6.23	Garage/Barn	506	N
6.24	Garage/Barn	568	N
6.24	Residence	367	N
6.25	Garage/Barn	382	N
6.25	Garage/Barn	494	N
6.26	Garage/Barn	390	N
6.26	Garage/Barn	445	N
8.49	Garage/Barn	806	E
8.49	Garage/Barn	643	E
8.51	Residence	765	E
10.01	Industrial	408	W
14.51	Garage/Barn	1,571	S
14.53	Residence	1,147	S
14.54	Garage/Barn	1,392	S
14.56	Garage/Barn	1,270	S
15.30	Garage/Barn	1,126	S
15.32	Garage/Barn	966	S
15.33	Garage/Barn	1,202	S
15.33	Residence	1,054	S
19.62	Garage/Barn	2,626	N
19.62	Garage/Barn	2,725	N
19.65	Garage/Barn	2,929	N
19.67	Residence	2,574	N
19.75	Residence	3,837	N
19.76	Residence	1,542	S
19.77	Garage/Barn	3,945	N
19.78	Garage/Barn	1,704	S
19.78	Garage/Barn	1,638	S

19.78	Garage/Barn	4,082	N
20.96	Residence	973	NW
20.98	Garage/Barn	1,115	NW
23.40	Residence	1,047	S
23.41	Garage/Barn	1,315	S
23.41	Garage/Barn	1,219	S
24.38	Garage/Barn	183	N
24.43	Residence	262	N
25.23	Garage/Barn	542	N
25.25	Garage/Barn	583	N
25.43	Residence	493	NE
26.19	Garage/Barn	325	S
26.19	Garage/Barn	614	S
26.21	Residence	586	S
26.22	Garage/Barn	312	S
26.25	Garage/Barn	745	S
26.27	Residence	351	S
26.62	Garage/Barn	1,206	S
26.64	Residence	1,403	S
26.66	Garage/Barn	1,209	S
27.86	Garage/Barn	1,271	N
27.87	Residence	1,202	N
27.88	Garage/Barn	1,019	N
27.89	Garage/Barn	1,183	N
27.90	Garage/Barn	1,151	N
27.90	Garage/Barn	1,254	N
28.26	Garage/Barn	1,623	N
28.26	Garage/Barn	1,706	N
28.27	Garage/Barn	1,651	N
28.27	Garage/Barn	1,392	N
28.30	Residence	1,581	N
28.37	Garage/Barn	1,602	N
28.70	Garage/Barn	1,458	SW
28.73	Residence	1,458	SW
28.74	Garage/Barn	1,639	SW
28.98	Residence	1,758	SW
29.15	Residence	1,825	S
29.15	Residence	866	SW
29.15	Garage/Barn	836	SW
29.15	Garage/Barn	701	SW
29.15	Garage/Barn	702	SW
29.15	Garage/Barn	1,615	N
29.15	Garage/Barn	1,678	N

29.15	Residence	1,742	N
29.15	Garage/Barn	1,835	N
^a Mileposts for Alternative Route 2 are unofficial distances along the centerline from the Green Plains Ethanol Plant and are included here to help describe the location of noise sensitive receptors (NSR).			

OVERVIEW FIGURE FOR MIDWEST CARBON EXPRESS PROJECT



Disclaimer:

VICINITY MAP



LEGEND

- Proposed Project
- Capture Facility
- Pump Station
- Tribal Reservation
- Sequestration Area

REVISIONS

Date: 2023-10-25 Revised by: PD Checked by: JS

0 - Issued for Use

Issued figure for inclusion in EIS.

Date: Revised by: Checked by:

Date: Revised by: Checked by:

PREPARED BY

Summit Carbon Solutions

2321 North Loop Drive, Suite 221
Ames, Iowa 50010
United States of America

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SUMMIT CARBON
SOLUTIONS

MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Overview Figure
for the Midwest Carbon Express Project

Figure Number:

Scale:
1 : 3,250,000
1 inch equals 51.29 miles

Projection:
Transverse Mercator
NAD 1983 UTM Zone 14N F1

Sheet:
1
1 of 1

Drawing Number:
1002-06-027
Revision 0

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: October 18, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: Preferably no later than October 31, 2023

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

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Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. Consistent with the October 12 meeting between EERA staff, HDR staff, and Summit staff, please provide a discussion of the human and environmental impacts of constructing a 3-inch instead of a 4-inch pipeline. This discussion should include a description of any construction and operational changes that might occur. Mitigation should be discussed. A discussion of operational characteristics, for example, operating pressure, should also be included.

The human and environmental impacts of constructing a 3-inch pipeline will be the same as the impacts associated with constructing the proposed 4-inch pipeline as described in Sections 10 through 22 of the Environmental Assessment Worksheet (EAW). The construction workspace required for the construction of a 3-inch pipeline and a 4-inch pipeline would be nearly identical. The only potential difference is the length of the horizontal directional drills (HDDs), as a slightly shorter drill could be used for a 3-inch pipeline versus a 4-inch pipeline. Additionally, the construction duration would not change between the installation of a 3-inch versus a 4-inch pipeline. Summit would secure the same width for the permanent easement (50 feet) for a 3-inch or 4-inch pipeline.

Operational parameters of a 3-inch pipeline will be substantially different than a 4-inch pipeline. At the current design pressure (2,183 pounds per square inch [psi]), a 3-inch pipeline would not be capable of transporting the volume of carbon dioxide (CO₂) that will be captured at the Green Plains Ethanol Plant. To transport the same volume of CO₂ from the Green Plains Ethanol Plant, the design pressure would have

to be greater than 3,200 psi for a 3-inch pipeline than a 4-inch pipe. The time required for a 3-inch pipeline to vent from operating pressure to zero pounds would be shorter than for a 4-inch pipeline. In addition, In-Line-Inspection (ILI) technology (such as maintenance and smart tools) is not well developed for pipelines less than 4-inches in diameter, and is not as proven within the industry. Conversely, ILI technology for 4-inch diameter pipelines is well proven within the pipeline industry. Generally, the smaller the diameter of the pipeline, the greater the challenges and risks are associated with successfully passing ILI devices through the pipeline. As the pipeline diameter decreases, the likelihood of a tool becoming stuck increases due to the geometry of the fittings and internal diameter changes associated with fittings, valves, and heavier walled pipe. Generally, when a tool becomes stuck in a pipeline, that segment of the pipeline may need to be evacuated of product so that the pipeline can be excavated, the pipeline cut, and the tool cut out of the pipeline.

2. Consistent with the October 12 meeting between EERA staff, HDR staff, and Summit staff, please provide a discussion of the human and environmental impacts of constructing a 6-inch pipeline instead of a 4-inch pipeline. This discussion should include a description of any construction and operational changes that might occur. Mitigation should be discussed. A discussion of operational characteristics, for example, operating pressure, should also be included.

The human and environmental impacts of constructing a 6-inch pipeline will be the same as the impacts associated with constructing the proposed 4-inch pipeline as described in Sections 10 through 22 of the Environmental Assessment Worksheet (EAW). The construction workspace required for the construction of a 6-inch pipeline and a 4-inch pipeline would be nearly identical. The only potential difference is the length of the horizontal directional drills (HDDs), as a slightly longer drill could be used for a 6-inch pipeline versus a 4-inch pipeline. Additionally, the construction duration would not change between the installation of a 6-inch versus a 4-inch pipeline. Summit would secure the same width for the permanent easement (50 feet) for a 6-inch or 4-inch pipeline.

Operational parameters of a 6-inch pipeline will be substantially different than a 4-inch pipeline; however, the normal operating procedures will be the same. The design pressure (2,183 psi) would remain the same, but for a 6-inch pipeline the operating pressure will be approximately 1,320 psi, compared to approximately 1,750 psi for a 4-inch pipeline. The time required for a 6-inch pipeline to vent from operating pressure to zero pounds would be longer than for a 4-inch pipeline.

3. Consistent with the October 12 meeting between EERA staff, HDR staff, and Summit staff, please provide a discussion of the human and environmental impacts of reducing the throughput on the pipeline. This discussion should include a description of any construction and operational changes that might occur. A discussion of operational characteristics, for example, operating pressure, should also be included.

Reductions in throughput will not have any effect on construction activities.

During operation of the Project, there may be times when there is a temporary reduction in throughput on the pipeline based on fluctuations in operations at the Green Plains Ethanol Plant (e.g., temporary shutdowns for maintenance). When the throughput volume is reduced, but still high enough for operation of the pumps, the operating pressure and product velocity will be lower than when the throughput is higher. When the throughput volume is reduced below the required volume for safe operation of the pumps, then the pipeline segment will be shut-in, or isolated. When the pipeline is shut-in due to the

throughput volume being too low, the mainline valve (MLV) at the capture facility will be closed. During this shut-in period, there will still be CO₂ within the pipeline at a pressure typically above 1,200 psi.

The pipeline and associated equipment have been designed and sized to operate within optimized parameters. Permanent reductions in throughput would result in changes in operational parameters that may impact the ability to safely operate the pipeline. Permanent reductions in throughput may also hamper the ability to perform ILIs for pipeline integrity purposes. Reduced throughput will not allow ILI tool to move at its designed rate to optimally inspect the pipeline.

4. Please provide, to the extent possible, the average energy use of the ethanol plant. A range of years is preferred. List any energy efficiencies currently in place at the facility such as combined heat and power systems, co-generation, and use of renewable energy.

In 2021, the Green Plains Ethanol Plant ethanol production process was converted to a vacuum distillation process, which resulted in a significant reduction in natural gas consumption per gallon of ethanol. The vacuum distillation project resulted in an approximate 10% reduction in natural gas consumption per gallon of ethanol. The Green Plains Ethanol Plant has used an average of 134,620 million British thermal units (MMBtu) of natural gas per month and 3,171,885 kilowatt hours (kWh) of electricity per month over the past 24 months.

To: Scott O’Konek
Summit Carbon Solutions *Sent via email to sokonek@summitcarbon.com*

From: Andrew Levi
Energy Environmental Review and Analysis

Date: October 19, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: Preferably no later than October 31, 2023 (Please prioritize question 7 and provide when available.)

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

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1. Please provide, to the extent possible, information about the grain used at the ethanol plant. How much grain, on average, does the ethanol plant use per year? Does the ethanol plant calculate the carbon intensity (CI) score of the grain used? If so, how? If so, what is the range, mean, and median CI score of the grain used? Are premiums paid for deliveries of a lower CI grain? List any farming practices that might be required or encouraged by the ethanol plant of its producers. Provide any other information the applicant or Green Plains might find relevant.

The Green Plains Ethanol Plant in Fergus Falls can produce up to 65 million gallons of undenatured ethanol per year (MGY) under its air permit from the Minnesota Pollution Control Agency (MPCA). 65 million gallons per year translates into approximately 22.4 million bushels of corn per year (using an average conversion factor of 2.9 gallons per bushel).

Under the federal Renewable Fuels Standard (RFS) statute, all corn for use in ethanol production must be grown on cropland that has not been converted from forests or grasslands. Green Plains calculates the carbon intensity (CI) of its ethanol based on the Argonne Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model, the California Air Resources Board (CARB) GREET model, the Washington State GREET model, and Canada’s recently introduced Clean Fuel Regulations (CFR). Most of these models use a “plug” value for corn CI. However, when available, Green Plains has been gathering additional data on the farms from which its corn is sourced, so as to represent its CI more accurately.

Many of the Green Plains Ethanol Plant's farmer customers already utilize regenerative agricultural practices such as cover crops, conservation tillage, no till, and precision fertilizer application. The corn CI from the CARB Tier1 calculator is 6,442.02 grams of carbon dioxide equivalent per bushel of grain (gCO₂e/bu) and in the case of the Green Plains Ethanol Plant, this is equivalent to 21.44 grams of carbon dioxide equivalent per megajoule (gCO₂e/MJ). The Canadian CFR corn CI score for the Green Plains Ethanol Plant is 17.16 gCO₂e/MJ.

2. Does Green Plains have a fact sheet describing the ethanol production process? If yes, please provide a pdf version.

No.

3. The 2019 Air Permit (11100077-101) held by Green Plains for the ethanol plant requires certain rolling limits. Please describe Section 5.1.1; 5.1.2; and 5.1.4 and how they relate to ethanol production limits.

The Green Plains Ethanol Plant's total undenatured ethanol production is limited to 65 MGY on a rolling 12-month basis as described in the Air Permit, Section 5.1.1. Section 5.1.4 describes the denaturant volume in addition to the undenatured ethanol volume. Denaturant is a petroleum product, typically pentanes or conventional motor gasoline, which is added in small amounts (typically 2 to 5 volume percent) to the ethanol produced by an ethanol facility to make it unfit for human consumption. Therefore, the total denatured ethanol volume on a rolling 12-month basis is limited to the sum of the Section 5.1.1 (undenatured ethanol) and 5.1.4 (denaturant) limits, or 66.660 MGY of denatured ethanol volume. The grain receiving limit in Section 5.1.2 does not restrict ethanol volumes as it was derived using expected ethanol yield data per ton or bushel of corn.

4. What is the maximum amount of ethanol that can be produced at the facility per year? Is it 65 million gallons as indicated in Section 5.1.1 of the Air Permit?

As stated above, undenatured ethanol production is limited to 65 MGY. Total denatured ethanol (undenatured ethanol, plus denaturant) production is limited to 66.660 MGY.

5. Does the handling of dried distiller grains (DDG) impact the CI score of the ethanol produced? If so, how? What can be done to reduce the CI score related to DDG should it be a part of the CI score?

The CI of the Green Plains Ethanol Plant's ethanol is impacted by the volume of distillers grains that the Green Plains Ethanol Plant dries utilizing natural gas. The Green Plains Ethanol Plant can choose to produce wet distillers grains, modified distillers dried grains with solubles (DDGS), and/or dried DDGS, and the amount of each depends on the need in the local, regional, domestic, and international markets. Wet and modified DDGS is shipped locally via truck to livestock producers, and dry DDGS can be shipped via rail to meet regional, domestic, and international demand.

6. Approximately how much grain is needed to make 1,000 gallons of ethanol?

Generally, 2.9 gallons of ethanol can be produced from a bushel of corn, along with the other valuable co-products like DDGS, renewable corn oil, and CO₂. It takes approximately 355 bushels of corn (9 metric tonnes) to produce 1,000 gallons of ethanol.

7. Review Route Alternative 1 and Route Alternative 2 (shapefiles provided). Based on the company's familiarity with the project area, design expertise, and construction requirements associated with a proposed 4-inch pipeline, provide estimated valve locations along with locations of potential additional temporary workspace that is highlighted in Table 5 of the route permit application. Provide this information as a separate shapefile for each alternative, and include a written description of the spatial data provided. The information provided is not expected to be a detailed engineering, but rather a means to appropriately compare alternatives with the applicant's proposed route.

Route Alternative 1 and Route Alternative 2 shapefiles have been uploaded to the Otter Tail to Wilkin Project (Project) SharePoint site. Shapefiles include centerline, mile postings, permanent and temporary workspaces, temporary and permanent access roads, mainline valve (MLV) locations, and NWI wetland data.

8. Provide an assessment of anticipated noise levels at residences within 1,600 feet of HDDs. Describe mitigation measures (for example, barriers) that would be implemented to reduce noise.

Noise attenuation will vary per horizontal directional drill (HDD) location due to topography and weather conditions, but based on field measurements collected on active HDD operations, the noise level for a 4-inch pipeline HDD is expected to be less than 60 decibels (dB) at 1,320 feet (¼ mile), less than 55 dB at 2,640 feet (½ mile), and not audible at 5,280 feet (1 mile). If noise mitigation is required, temporary sound dampening barrier walls will be placed around the equipment.

9. Provide noise levels of capture facility equipment with and without mitigation (dBA at 50 feet) as well as the overall noise level of the capture facility with and without mitigation (dBA at 50 feet).

The predicted noise level of the compressors is 95 A-weighted decibels (dBA) at 3 feet. Compressors will be in an insulated building, which will serve as mitigation. Noise from capture equipment will comply with all local and state requirements.

10. Construction is expected to occur during daylight hours. Please define daylight hours. Is it based on actual sunrise and sunset or the times listed in the state noise standards?

Daytime hours are based on the MPCA's State Noise Standard – 7:00 a.m. to 10:00 p.m.

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: October 19, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: Preferably no later than October 31, 2023 (Please prioritize question 7 and provide when available.)

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Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

7. Review Route Alternative 1 and Route Alternative 2 (shapefiles provided). Based on the company’s familiarity with the project area, design expertise, and construction requirements associated with a proposed 4-inch pipeline, provide estimated valve locations along with locations of potential additional temporary workspace that is highlighted in Table 5 of the route permit application. Provide this information as a separate shapefile for each alternative, and include a written description of the spatial data provided. The information provided is not expected to be a detailed engineering, but rather a means to appropriately compare alternatives with the applicant’s proposed route.

Revised Route Alternative 1 and Route Alternative 2 shapefiles have been uploaded to the Otter Tail to Wilkin Project SharePoint site. Shapefiles include centerline, mile postings, permanent and temporary workspaces, temporary and permanent access roads, mainline valve locations, and National Wetlands Inventory wetland data.

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: October 27, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: Preferably no later than November 10, 2023

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: *“Requested information sent to whom by what means on date.”*

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. Provide the temperature of the pipeline during normal operating conditions.

During normal operating conditions, the pipeline will operate at between 115 degrees Fahrenheit (high) to 30 degrees Fahrenheit (low). The carbon dioxide (CO₂) captured from the ethanol fermentation process at the Green Plains Ethanol Plant will be near ambient air temperature. The CO₂ will then be compressed and dehydrated into a supercritical state. During this process, the temperature will be between 90 degrees Fahrenheit to 115 degrees Fahrenheit. Then the CO₂, once in a supercritical state, will be sent into the pipeline where it will then cool to the ground ambient temperature.

2. Provide information concerning the potential effects of frost-heaving (freeze and thaw cycle) on the pipeline and any proposed mitigation measures.

Frost heave is the result of the formation of ice lenses by segregation of water from the soil as the ground freezes. Ice lenses are lens-shaped masses of almost pure ice that form in frozen soil or rock. Lens formation takes place at, or a short distance behind, the freezing front at any depth where conditions are favorable and continues until those conditions change. The amount of vertical displacement (heave) is roughly equal to the combined thicknesses of the underlying ice lenses. This results in greater displacement at the surface when compared to areas of greater depth.

Three conditions must be met to create the possibility of frost heave to the extent that it could impact a pipeline's integrity:

- 1 The soil must contain a significant amount of silt (i.e., Silty Clay, Clayey Silt, Sandy Silt, Silty Sand, or Silt), to promote upward groundwater movement, via capillary action, to the freezing front;
- 2 There must be a source of groundwater near (immediately below) the freezing front; and
- 3 Soil freezing and ice lensing both need to occur at a depth below the bottom of the pipe.

If any of the three conditions listed above are not met, frost heave should not occur.

If these conditions were met, then frost heave could potentially lead to movement of the pipe, stress on the pipe, or deformation of the pipe. Welded carbon steel pipe is not as susceptible to failures due to frost heave, like water or sewer lines. Moreover, there is a long history of hydrocarbon pipelines installed throughout the frost-prone, northern tier of the United States that have operated without frost-related damage at the burial depths set out in the 49 CFR Part 195 regulations.

The applicable 49 CFR Part 195 pipeline safety regulations in the U.S. require a minimum of 30 inches of cover over a pipeline in rural areas and three feet in other locations unless the pipeline is in rock. This is for pipelines in all climates, including Minnesota. In Minnesota, and for the Project, Summit has committed to install the pipeline with a minimum depth of 54 inches (4.5 feet) as outlined in Section 3.2 of the Minnesota Environmental Construction Plan (Minnesota ECP). The minimum depth of cover over the pipeline will be increased to 60 inches at waterbody and drainage ditch crossings as well as private road crossings (as measured at the bottom of the road ditch, with a minimum of 60 inches of cover below the road surface). Additional conditions may be implemented if requested by local, state, or federal agencies in areas adjacent to wetlands or waterbodies or in sensitive habitat. Civil surveys will occur post-installation of the pipeline to ensure that the depth of cover meets state and federal requirements.

In addition to these depth of cover commitments, which will be consistent or exceed US Pipeline and Hazardous Materials Safety Administration (PHMSA) guidance, Summit will use geotechnical engineers during the design, construction, and ongoing operation of the pipeline system to ensure that sufficient information is available to avoid or minimize the impact of frost heave on the integrity of the pipeline system.

Summit is also providing a Frost Heave Study it previously provided to the North Dakota Public Service Commission. This study is included as Attachment 5-02 on the Otter Tail to Wilkin Project Sharepoint Site.

3. Provide a brief description of the steps for constructing the CO₂ capture facility. Include simplified figures of this process and capture facility that could be included in the EIS (8.5x11 portrait).

First, civil work occurs, consisting of dirt work, pilings, and concrete. Approximately one month after civil works begins, steel work, pipe spooling, and electrical work begins. These items are fabricated and installed at the capture facility. Major equipment is then brought in and set in place. Building contractors then begin erecting the compressor and pump buildings, creating a weather-tight working environment. At this time, the construction site will see the greatest number of employees on site. Upon completion of steel work, piping, and electrical work, commissioning activities will start with a planned duration of one month, followed by start-up of the capture facility. Overall, construction duration of the capture facility

(mobilization to demobilization) is anticipated to be 6-7 months. A simplified Capture Facility Construction Plan is included in Attachment 5-03 on the Otter Tail to Wilkin Project Sharepoint Site.

4. Similar to the information provided for the proposed route, provide an engineering cost estimate associated with the two pipeline route alternatives, to include planning/permitting; acquisition/permits; design; procurement; construction/restoration; and closeout. Provide the margin of error.

Engineering Cost Estimate		Engineering Cost Estimate	
North Route (23 miles MN, 10 miles ND)		Hybrid Route (29.1 miles)	
Work Item	Cost	Work Item	Cost
Planning / Permitting*	\$ 4,875,000	Planning / Permitting*	\$ 3,100,000
ROW Acquisition*	\$ 16,600,000	ROW Acquisition*	\$ 10,000,000
Engineering*	\$ 975,000	Engineering*	\$ 615,000
Procurement	\$ 3,000,000	Procurement	\$ 2,600,000
Construction	\$ 25,500,000	Construction	\$ 22,500,000
Closeout	\$ 1,750,000	Closeout	\$ 1,550,000
Total	\$ 52,700,000	Total	\$ 40,365,000
Estimate Accuracy: +/- 15%		Estimate Accuracy: +/- 15%	
* The estimate Includes realized costs to date, plus the estimated cost to complete work items for the 22.2 miles of alternative route proposed in MN and the 10.0 miles of new route that would be required in ND.		* The estimate Includes realized costs to date, plus the estimated cost to complete work items for the 11.5 miles of alternative route proposed in MN	

5. Provide an update on the status of the Midwest Carbon Express Project.

The Midwest Carbon Express Project is in the permitting phase across the 5-state footprint. In Iowa, hearings before the Iowa Utilities Board (IUB) are nearing completion, and a final decision is expected in Q1 2024. In South Dakota, Summit plans to submit a permit application to the South Dakota Public Utility Commission (SDPUC) by the end of the year. South Dakota's permitting process is anticipated to take up to one year to complete. In North Dakota, Summit is working to submit supplemental information and preparing for additional hearings as part of the reconsideration process before the North Dakota Public Service Commission (NDPSC). In Nebraska, permitting is underway and occurs at the county level. In Minnesota, a route permit application is pending before the Minnesota Public Utilities Commission (MPUC) for the Otter Tail to Wilkin Project, and Summit expects to submit additional route permit applications in the future. Summit submitted Pre-Construction Notifications to the United States Army Corps of Engineers (USACE) under Nationwide Permit (NWP) 58 in North Dakota, South Dakota, Nebraska, and Iowa, and Utility Regional General in Minnesota, and anticipates receiving authorization from the USACE in Q4 2024. Summit anticipates having permits for all pending applications in hand to facilitate a start of construction for portions of the project by Q4 2024 and plans to be operational by early 2026.

6. Confirm the estimate of the amount of electricity needed for operation of the project (39,297,350 kWh) and confirm the service provider. Additionally, how much electricity does the ethanol plant use on an annual basis?

Summit's present modeling indicates that its electricity needs are approximately 38,501,733 kilowatt hours (kWh) per year. The service provider is Lake Region Electric Cooperative. The electricity use of the Green Plains Ethanol Plant is 3,171,885 kWh of electricity per month over the past 24 months, or 38,062,620 kWh per year.

7. Section 6.2.2.1 of the RPA states that “Operational electrical service requirements for the Project will use existing service lines. The operational needs of the Project are not anticipated to require the addition of power generation capacity” and “Adequate power supplies exist to support the Project; therefore, there will be no impact from new infrastructure.” Provide a summary of any coordination with the Lake Region Electric Cooperative, Otter Tail Power Company, or other utilities regarding the ability of the utility to provide the amount of electricity needed for the operation of the project.

Lake Region Electric Cooperative intends to install fans on an existing transformer or install an additional transformer within the existing substation footprint to support the Project load without issue.

8. Provide a discussion of potential subsidence along the pipeline alignment following restoration and mitigation measures that would be implemented in case of subsidence. Detail should be provided in for preventing excessive crowning or subsidence above the restored centerline, and for addressing excessive crowning or subsidence if it is discovered during post-construction monitoring.

In agricultural lands, as stated in Section 6.11 of the Minnesota Agricultural Protection Plan (Minnesota APP), following completion of construction, Summit will restore the construction workspace to as close to the original pre-construction contours as practicable. If uneven settling occurs or surface drainage problems develop as a result of pipeline construction, Summit will provide additional land leveling services after receiving a landowner's written notice, weather and soil conditions permitting. Alternatively, Summit will negotiate with the landowner for reasonable compensation in lieu of restoration.

Normal Conditions in Agricultural Lands

Section 6.5 of the Minnesota APP states that backfilling will follow lowering the pipe into the trench. During trench backfilling, subsoil material will be replaced first, followed by topsoil. To prevent subsidence, subsoil will be backfilled and compacted. Compaction by operating construction equipment along the trench is acceptable.

Frozen Conditions in Agricultural Lands

Section 6.3 of the Minnesota APP states that Summit will minimize final clean-up activities in frozen conditions. Frozen conditions can preclude effective topsoil replacement, removal of construction debris, removal of excess rock, decompaction of soil as required, final grading, and installation of permanent erosion control structures. If seasonal or other weather conditions preclude Final Clean-up activities, the trench will be backfilled, stabilized, and temporary erosion control measures will be installed until restoration can be completed. Frozen topsoil would not be placed back into the trench until thawing has occurred to prevent settlement of soil in the trench. If topsoil/spoil piles remain throughout the winter, the topsoil/spoil piles will be stabilized methods approved by the regulatory authority. To prevent subsidence, backfill operations will resume when the ground is thawed, and the subsoil will be compacted (as needed) prior to final clean-up activities. The construction contractor must monitor these areas until final restoration is complete.

Through the implementation of the mitigation measure describe above, Summit does not anticipate that crowning or subsidence will be an issue across the majority of the Project, as most of the land impacted by construction is regularly tilled/plowed as it is in annual agricultural production.

For non-agricultural lands, Summit will monitor areas where stabilization and restoration methods are implemented in accordance with requirements in state permits and landowner agreements as stated in

Section 8.2 of the Minnesota ECP. Monitoring will identify areas where remedial measures are required to establish a stable surface for reclamation to be successful. This may include regrading, re-seeding, re-mulching, and additional monitoring.

9. Provide an updated permit table incorporating information from MPCA in its comment letter of May 16, 2023, and any other new information as applicable.

Summit has updated Table 9-1 and Table 9-2 from the Scoping EAW which state the permits and approvals needed for the pipeline and for the capture facility, respectively. Updates are shown in bold.

Updated Table 9-1
Permits and Approvals Required – Pipeline

Unit of Government/Agency	Type of Application	Status
USACE – St. Paul District	Section 10/404 – Utility Regional General Permit (RGP)	Ongoing; Updated materials submitted March 2023
	Section 408 Permission	Ongoing; Updated materials submitted October 2022
USDOT	Highway Crossing Permit	To be submitted
USFWS	Section 7 ESA Consultation for federally listed threatened or endangered species	Ongoing; Biological Assessment to be submitted to USACE for MCE Project
MPUC	Pipeline Route Permit	EIS in preparation
MDNR	Work in Public Waters Permit – Public Water Wetlands on Private Lands	To be submitted
	Utility License to Cross Public Waters	To be submitted
	Water Appropriation Permit for Trench Dewatering	To be submitted
	Water Appropriation Permit for HDD/Hydrostatic Testing	To be submitted
	Water Appropriation Permit for Dust Suppression	To be submitted
	NHIS Consultation, NHIS Review and Avoidance Plan	NHIS update letter submitted May 2023 MDNR response received August 2023
MDA	Minnesota APP	Met with MDA September 2023; no Minnesota APP edits expected
MnDOT	Road Crossing Permits	To be submitted
MPCA	Section 401 Water Quality Certification	Coverage granted under Section 404/10 USACE Utility RGP
	Individual NPDES/SDS Permit – Hydrostatic Testing	To be submitted
	Construction Stormwater NPDES/SDS Permit – Pipeline (General Permit MNR100001)	To be submitted
Minnesota SHPO	Section 106 Consultation	Ongoing

Unit of Government/Agency	Type of Application	Status
Minnesota Department of Labor and Industry	Electrical Permitting	Pending applicability at the capture facility and remote operated valve sites
Bois de Sioux and Buffalo Red River Watershed Districts	Watershed District/Drainage Permits	To be submitted
WCA LGUs and BWSR	Notification of Intent to Use Federal Utilities Exemption	Notice of intent to use Federal Utilities Exemption provided October 2022
Wilkin County	Floodplain Permit	To be submitted
Otter Tail County	Ditch Crossing Permit	To be submitted
County and Township	Road Crossing Coordination	Ongoing

Updated Table 9-2
Permits and Approvals Required – Capture Facility

Unit of Government/Agency	Type of Application	Status
MPCA	Air Quality Permit Applicability Determination	Response Received December 2022
	Air Quality Permit – Option D Registration Permit	Submitted February 2023
	Construction Stormwater NPDES General Permit (MNR10000)	To be submitted
	Coverage under Industrial Stormwater NPDES General Permit MNR050000 (new standalone General Permit coverage) or modification of existing Green Plains Ethanol Plant Individual NPDES Permit which includes stormwater	Ongoing Review of Permitting Approach
	Individual Industrial Wastewater NPDES Permit (stand-alone new permit separate from the Green Plains Ethanol Plant NPDES permit)	Ongoing Review of Permitting Approach
MDNR	Water Appropriation Permit	Ongoing Review of Permitting Approach
Minnesota Department of Labor and Industry	Electrical Permitting	Pending applicability at the capture facility and remote operated valve sites
Otter Tail County	Building/Structure Permit	To be submitted

10. As noted by MPCA, please confirm that the project crosses five impaired waters, not four, to include the intersection of Judicial Ditch 2 at mile post 10.9 and immediately at the start of the impaired reach as indicated above. Provide the proposed crossing method for Judicial Ditch 2.

The Project crosses the following four impaired waterbodies when the Project is intersected with the MPCA Impaired Waters data layer. These are the:

- Pelican River at MP 1.9
- Otter Tail River at MP 19.5
- Unnamed Creek (Doran Slough) at MP 25.0
- Bois de Sioux River at MP 28.1

Regarding Judicial Ditch 2, as stated by the MPCA on page 3 of its May 16, 2023 letter, “Milepost 10.8 (#MAJ-09023556) and MP 10.9 (#MAJ-09022356) are both separate reaches of Judicial Ditch 2. The “reaches” are intersected by 190th Street and now the Project centerline. South of the centerline is the impaired reach AUID 09020103-764 [extending] from 190th Street [south] to the Otter Tail River.” The centerline crosses north of a reach not presently designated as impaired. However, Summit has incorporated the information regarding this crossing in an updated waterbody crossing table, with a relevant footnote as part of Summit’s response to 5-17, below. The proposed crossing method for this feature is open cut.

As required by the MPCA’s Section 401 Authorization as part of the USACE Section 404 Utility Regional General Permit, Summit will ensure that the authorized activities do not exacerbate any existing impairments of a CWA 303(d) listed impaired water. Prior to beginning any authorized activities, Summit will first identify whether the Project area is in, or near, any impaired waters and waters with the USEPA-approved TMDLs. When working in, or near, impaired waters, Summit will deploy redundant best management practices (BMPs) as necessary to ensure the authorized construction activities will not exacerbate existing impairments.

11. Address MPCA’s comments on open trench crossings of waterbodies:

- Please clarify how it is determined when flow is unlikely between disturbance and stabilization of nonflowing open cut crossings and when flowing open cut crossings should be used instead.
- Please explain how open cut crossings are allowed when flowing, if they are expected to result in an increase in sediment loading and negative impacts to downstream habitat. Discuss feasibility of alternate methods to be used instead of flowing (and nonflowing) open cuts such as such as the flume or dam and pump dry crossing methods.

Waterbodies where open cuts are planned are generally small ephemeral, intermittent, or low-flow perennial features where field survey has confirmed there is a high likelihood that the stream will have little to no flow at the time of construction. Prior to execution of the crossing, Summit’s Environmental Inspector (EI), in coordination with the Contractor, will review the crossing to confirm conditions and review upcoming weather patterns. If a dry period appears to hold, work will move forward as planned. In-stream construction activities (specifically trenching, pipeline installation, backfill, and restoration of the streambed contours) at waterbodies 0-10 feet in width are generally completed in under 24 hours as

outlined in Section 4.4 of the Minnesota ECP. Intermediate waterbodies 10-100 feet in width are generally completed in under 48 hours.

If sufficient flow appears during the time of construction of the crossing, or where water flow is expected during construction across the waterbody, the flowing open cut construction method would be used. Even in these instances, the work would be planned during a time of low stream flow (i.e., it would not occur during periods of high flow). This method entails pre-work to stage the crossing equipment outside the waterbody, weld the pipe segment for the crossing in adjacent uplands, trenching across the waterbody, carrying the made-up pipe into the trench, and then backfilling the trench and restoring the stream banks. Summit's Contractor would complete in-stream construction activities as expediently as practicable. Because this line is a small diameter line that will be placed into a trench dug with a single backhoe bucket, the time working to create the trench within the stream will be minimized. Work will be completed per the time windows outlined in Section 4.4 of the Minnesota ECP.

Temporary impacts from in-stream trenching during a flowing open cut can include an increase in the sediment load downstream of crossing locations. To help mitigate the flow and deposition of sediments into waterbodies, Summit's Contractor would properly install and maintain redundant sediment control measures immediately after clearing and prior to initial ground disturbance at waterbodies located within 50 feet of the Project and where stormwater flows to a waterbody. Soft trench plugs would be installed at the edge of stream banks to control water flow and prevent trench sloughing as shown on Figure 10 of the Minnesota ECP. Additional measures are included in Section 12.b.iv.b of the Scoping EAW. These actions would minimize sediment loading and negative impacts to downstream habitat.

Alternative methods include the flume or dam and pump dry crossing methods (Sections 4.5.4 and 4.5.5 of the Minnesota ECP, respectively). These are both feasible methods for similar sized streams. The flume method presents benefits as compared to the dam and pump as it will not require the use of sheet piling to create a dam. However, each method has an increased time for set-up, execution, and cleanup at the waterbody as compared to the nonflowing or flowing open cut, and additional workspace impacts to accommodate the materials and equipment necessary to execute the crossing.

12. Address the following comment from MPCA: Text at the top of page 65 in Scoping EAW states, "In most circumstances, SCS's Contractor would contain and clean up a release. However, when mud releases to a waterbody, it quickly disperses into the water and can migrate downstream." This does not seem to be compliant with Minnesota Statute 115.061 subpart (a) which requires immediate notification of a discharge which "may cause pollution of waters of the state" and the subsequent recovery "as rapidly and thoroughly as possible such substance or material."

This statement, in context of the larger discussion from which it was pulled, was intended to acknowledge that, while infrequent, releases can occur in water or in upland or wetland locations in the vicinity of the drill. If the release occurs on land (which is most common, or, as stated in the Scoping EAW, "in most circumstances"), the Contractor would be able to contain and clean up the release. Regarding the next sentence, "However, when mud releases to a waterbody, it quickly disperses into the water and can migrate downstream", this was intended to disclose in the Scoping EAW that in between the time a release within a waterbody occurs, is identified, and a response action is taken, there will inevitably be some dispersion of drilling mud into the waterbody. The magnitude of this release is dependent on several factors, including but not limited to the size and location of the release and the flow rate of the waterbody. If a release of drilling mud into a waterbody occurs, Summit will immediately mobilize a response to such a waterbody release "as rapidly and thoroughly as possible." Indeed, as the next paragraph after the

subject sentence states, “SCS’s Contractor would develop a contingency plan to address inadvertent return or release of drilling fluid within wetlands, waterbodies, and areas immediately adjacent to wetlands and waterbodies, such as stream banks or steep slopes, where drilling fluid releases can quickly reach surface waters. Containment, response, and clean-up equipment would be available at both sides of an HDD crossing location and one side of a bore prior to commencement to assure a timely response in the event of an inadvertent release of drilling fluid.” This would also include notification to the Minnesota Duty Officer as outlined in Section 9.1.3 of the Minnesota ECP and Section 8.2 of the Minnesota Winter Construction Plan (see response to Inquiry No. 5-13). Additional information on contingency planning is included in response to Inquiry No. 5-23.

13. While we understand the company does not intend to construct the project during frozen conditions, potential impacts could be substantially different than during non-frozen conditions. Please discuss potential differences.

Summit has prepared a Winter Construction Plan for Minnesota and has included it in Attachment 5-13.

14. Provide additional details for the approved disposal locations and methods for excess subsoil and Horizontal Directional Drill (HDD) fluids. Also, clarify who is responsible for tracking or regulating the disposal of waste materials from the construction workspace.

If any excess subsoil remains after the backfilling process, it will be removed and disposed of at a Summit-approved waste management facility or recycling center that accepts dirt. Given the small diameter of pipe proposed on the Project, Summit does not expect that there will be excess subsoil that would need to be disposed.

Excess uncontaminated HDD fluids consisting of soil and water (drilling mud) that have not been mixed with an additive may be land-applied, or spread, over the construction right-of-way in upland locations (see response for Inquiry No. 5-15) with landowner permission. This activity does not require a permit or approval from MPCA. Land application of drilling mud mixed with additives that are approved by the Minnesota Department of Health (MDH) or that meet ANSI/NSF Standard 60 (Drinking Water Well Material Standards) also does not require an MPCA permit or approval. Drilling mud mixed with additives that are not on the MDH approved additive list and/or do not meet ANSI/NSF Standard 60 must be disposed of as a solid waste at an approved facility or Summit must obtain a land application permit from MPCA.

In all cases, the Contractor may choose to contain and then transfer drilling mud off the construction right-of-way and dispose of the drilling mud at a waste management facility that is authorized to accept drilling mud and is approved by Summit.

These waste management facilities and recycling centers have yet to be identified or approved by Summit and will be determined based on need closer to the time of construction. The Contractor is responsible for tracking and disposing of waste material from the construction workspace.

15. Explain how drill cuttings and drilling mud would be spread over the construction right-of-way and what constitutes “approved” as described in section 4.5.6 of the Environmental Control Plan.

The response to Inquiry No. 5-14, above, outlines how Summit will manage excess drilling mud based on the contents of the mud. Considering that response, in Section 4.5.6 of the Minnesota ECP, an “approved

upland location” is a location approved by Summit and the landowner where drilling mud without additives or drilling mud with additives that are approved by the MDH or that meet ANSI/NSF Standard 60 can be land-applied. Once the location is identified, drill cuttings and drilling mud would be spread over the construction right-of-way at an extent and depth so that the material can be reincorporated into the soil such that no material would migrate off the workspace and the soil remained suitable for restoration and revegetation. If these conditions could not be met, the Contractor will contain the materials and transfer the materials off the construction right-of way and dispose of them at a solid waste management facility that accepts drill cuttings and drilling mud and is approved by Summit.

16. Figure 12 of the Environmental Control Plan is incorrect. Provide the corrected figure.

An updated version of the Minnesota Environmental Control Plan (Rev 1) is included as Attachment 5-16. It contains requested revision (added Figure 12), added the correct corresponding *Notes* page for Figure 11, and one minor edit in Section 7.2.1.

17. MPCA listed 11 bullets in its comment of May 16, 2023, identifying inconsistencies in Table 12-2 (Waterbody Crossings) in Scoping EAW and Appendix F (Impaired Waterbodies and Receiving Waterbodies within One Mile. Provide a detailed response to each of the 11 inconsistencies identified by MPCA.

Attachment 5-17 and the included revised tables provide the requested responses.

18. Provide an analysis of the risks to animal health from high concentrations of CO₂ in the event of a rupture. Is there information available on CO₂ concentration levels for wildlife?

There is limited information specifically pertaining to the potential impact of concentrations of CO₂ on wildlife or organisms, specifically in the region of this Project. Animals exposed to elevated CO₂ concentrations would likely experience similar effects as humans, such as hypercapnia and asphyxiation resulting in respiratory distress, narcosis, and mortality. The impacts would be different across species, depending on behavior (e.g., ability to evacuate area, hibernation) and size (DNV, 2020). In the recent study investigating CO₂ tolerability and toxicity in rats and men that was mentioned above, van der Schrier et al. (2022) concluded that rats were able to tolerate concentrations of 30% and higher, but were associated with CO₂ narcosis, epilepsy, poor oxygenation and, at 50% CO₂, spontaneous death. Lung hemorrhage and edema were observed in the rats at inhaled concentrations of 30% and higher. Euthanasia using CO₂ has been studied in feral swine (18% chamber volume per minute for 5 minutes; Kinsey et al., 2016), rabbits (30-60%, but typically 45% for at least 1 hour; Hayward and Lisson, 1978), and birds (%CO₂ not measured; Tidemann and King, 2009), thus underpinning the fact that when exposed to high concentrations of CO₂, some mortality among these species would be expected. In the 1986 Lake Nyos incident, where approximately 1.6 million tonnes of CO₂ were released into the atmosphere from a volcanic CO₂ seep that had been dissolving into a stratified lake that underwent a rapid overturning, fatalities were noted to have included mammals, birds, amphibians, and reptiles (Tuttle et al., 1987).

References:

DNV, 2020. Guidance on CCS CO₂ Safety and Environment Major Accident Hazard Risk Management – Level 3. Partners in CO₂RISKMAN Joint Industry Project. Date of issue 30 January 2013 (Reissued 15 June 2020, Rev 2). Project No. PP018465. Report No. I3IJLJW-2, Rev. 2

Hayward JS and Lisson PA (1978). Carbon Dioxide Tolerance of Rabbits and Its Relation to Burrow Fumigation. *Wildlife Research* 5, 253-261.

Kinsey JC, Foster JA, and Reitz RL. Development of a self-contained carbon dioxide euthanasia trailer for large-scale euthanasia of feral swine. *Wildl Soc Bull.* 2016; 40:316-320. [doi:10.1002/wsb.664](https://doi.org/10.1002/wsb.664)

Tidemann Christopher R., King Daryl H. (2009) Practicality and humaneness of euthanasia of pest birds with compressed carbon dioxide (CO₂) and carbon monoxide (CO) from petrol engine exhaust. *Wildlife Research* 36, 522-527 <https://doi.org/10.1071/WR09039>

Tuttle, Michele L., Clark, Michael A., Compton, Harry R., Devine, Joseph D., Evans, William C., Humphrey, Alan M., Kling, George W., Koenigsberg, Edward J., Lockwood, John P., and Glenn N. Wagner. (1987). The 21 August 1986 Lake Nyos Gas Disaster, Cameroon. Final Report of the United States Scientific Team to the Office of U.S. Foreign Disaster Assistance of the Agency for International Development

van der Schrier R., M. van Velzen, M. Roozkrans, E. Sarton, E. Olofsen, M. Niesters, C. Smulders, A. Dahan., 2022. Carbon dioxide tolerability and toxicity in rat and man: A translational study. *Frontiers in Toxicology*. Volume 4, 13 October, 2022. <https://doi.org/10.3389/ftox.2022.1001709>

19. Provide information on the Doran Creek Rehabilitation Project, planned by the Bois de Sioux Watershed District.

Following a discussion with the Bois de Sioux Watershed District on November 6, 2023, the Doran Creek Rehabilitation Project will be subject to a Minnesota Environmental Assessment Worksheet (EAW) and the MDNR will be the Responsible Governmental Unit. The project proposer has not yet initiated the EAW process. The Bois de Sioux Watershed District stated that the information on their website regarding the project scope is still accurate:

<http://www.bds wd.com/PDF/2023.01.26%20Doran%20Creek%20Presentation.pdf>

20. Please describe measures to prevent French drain effects via the pipeline trench. Does the company utilize Pennsylvania standards for trench breaker placement? If not, why?

Permanent trench breaker placement is discussed in Section 2.9.1 of the Minnesota ECP. As committed to the MDNR in Enclosure 2 of its September 1, 2022 Project introduction letter (see Route Permit Application, Appendix 8), Summit is presently proposing to install trench breakers at the entry and exit from every public water crossing, except for at HDD crossings. In addition, as outlined Section 5.5 of the Minnesota ECP, trench breakers will be installed at wetland boundaries where the pipeline trench may cause a wetland to drain, or the trench bottom will be sealed to maintain wetland hydrology.

Summit plans to select the location of trench breakers across the Project based on field conditions at the time of construction and will consider the degree and length of slope, presence of down-slope sensitive resource areas such as wetlands and waterbodies, and proximity to other features such as roads and/or railroads. Generally, slopes are higher in the eastern portion of the Project, while the majority of the Project, and particularly the western portion of the Project, is located in areas where slope is not a concern (0.001-6.71 degree slope; see Figure 11-3 of the Scoping EAW).

Trench breakers do not need to be installed at waterbodies crossed by the HDD method. The HDD method is a trenchless method that involves no direct excavation of the features crossed. Furthermore, at the point that the HDD crosses the waterbody feature, it is generally located between 30 to 40 feet below the stream bed. Here, installation of a trench breaker is not necessary and would be impractical.

Use of this field condition review will ensure that Summit will not install trench breakers where they would not provide the intended benefit (i.e., on steep slopes where trench line erosion has the risk of occurring and at slopes adjacent to wetlands and waterbodies).

The “Pennsylvania standards” for trench breaker (plug) placement can be found in the Pennsylvania Department of Environmental Protection (DEP)’s “Erosion and Sediment Pollution Control Program Manual” (DEP Manual)¹ in Standard Construction Detail #13-4, and as shown below in Table 13.1 of the Manual.

PA DEP

TABLE 13.1
Maximum Spacing and Materials for Trench Plugs

Trench Slope (%)	Spacing L (FT)	Plug Material
< 5	1,000	* Clay, Bentonite, or Concrete Filled Sacks
5 - 15	500	* Clay, Bentonite, or Concrete Filled Sacks
15 - 25	300	* Clay, Bentonite, or Concrete Filled Sacks
25 - 35	200	* Clay, Bentonite, or Concrete Filled Sacks
35 - 100	100	* Clay, Bentonite, or Concrete Filled Sacks
> 100	50	Cement Filled Bags (Wetted) or Mortared Stone

***TOPSOIL MAY NOT BE USED TO FILL SACKS.**

Impervious trench plugs are required for all stream, river, wetland, or other water body crossings.

The Manual describes the materials within as BMPs and design standards to minimize accelerated erosion and sediment pollution associated with construction activities in Pennsylvania, and to ensure compliance with Pennsylvania regulations found at 25 Pa. Code Chapter 102 (DEP Manual, p. i and ii). The policies and procedures in the Manual are “not an adjudication or a regulation. There is no intent by DEP to give the rules in these policies that weight or deference” (DEP Manual, p. i). The DEP Manual offers Pennsylvania users the options to utilize alternate BMPs that are not listed in this manual but that provide the same (or greater) level of protection (DEP Manual, p. i).

When describing the occurrence of the “French Drain” effect, DEP noted that the backfill considered was “usually permeable aggregate” (DEP Manual, p. 286). The Project will not backfill the trench with permeable aggregate but with native material, which on the Project will be subsoil and topsoil soil free from rocks or other materials that would damage the pipeline. There are no locations in which the Project would use permeable aggregate to backfill the Project, although this practice is used in other parts of the United States where rocky, stony, or bedrock trenches are excavated and filled with coarse material that would be more likely to cause the “French Drain” effect.

¹ <https://www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=4680>

It is not practical, nor would it provide any additional protection, to install of trench breakers at “all stream, river, wetland, or other waterbody crossings” as suggested in the DEP Manual. Summit’s commitment to installation of trench breakers in specific locations as outlined in the Minnesota ECP, and additional site review considering slope and other conditions, will adequately prevent “French Drain” effects via the pipeline trench. Prior to construction, Summit will identify the general location of trench breakers on construction alignment sheets with a note to “Field Verify” the precise location through coordination between Summit’s EIs and the Contractor. The trench breaker may be moved short distances in either direction from the location identified on the construction alignment sheets to more stable soils, or to accommodate other site-specific conditions. Additional trench breakers may also be added depending on site-specific conditions. Summit will require the Contractor to have additional materials on hand to install additional trench breakers as needed.

21. Describe plans for wildlife escape routes from the pipe trench and for removing wildlife from the open trench.

As described in Section 3.2 of the Minnesota ECP, to allow the passage of wildlife, livestock, and to facilitate the natural drainage pattern, spoil piles will have gaps that align with the breaks of the strung pipe. Plugs of subsoil in the ditch will be left or bridges may also be constructed to allow the passage of wildlife and livestock.

If a large mammal such as a deer or bear becomes entrapped in the trench, Summit will contact U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA APHIS), Wildlife Service Minnesota State Office to assist with removal (1-866-4USDAWS or 651-224-6027). Summit will also notify the MDNR through its 24-hour hotline (1-888-646-6367).

22. Provide any information on other raptor nests (e.g., osprey) that was collected during the bald eagle survey. Discuss the potential for raptor nest removal.

The species targeted by the aerial raptor nest survey conducted in April 2022 included (but were not limited to) bald eagles, ospreys, red-tailed hawks, and great horned owls. Aside from the two active bald eagle nests (located beyond the disturbance buffer distance of 0.125 mile for active bald eagle nests in Minnesota, as described in the Scoping EAW), no other raptor nests were documented within one mile of the Project centerline and associated facilities. Aerial raptor nest surveys will be conducted again prior to construction.

An active (“in-use”) nest (as defined in the Bald and Golden Eagle Protection Act (BGEPA), 50 CFR 22.6) is a nest characterized by the presence of one or more eggs, dependent young, or adult eagles on the nest in the preceding ten days during the breeding season. An inactive (“alternate”) nest is defined as one of potentially several nests within a nesting territory that is not an in-use nest at the current time. When there is no in-use nest, all nests in the territory are alternate nests. If an additional bald eagle nest is found in pre-construction surveys, Summit would not plan to remove it, whether active or inactive.

Similarly, Summit does not anticipate removing osprey nests if one is found in pre-construction surveys. Osprey nests are regulated in the State by Minnesota’s Nongame Wildlife Nest Removal Permit program, which prohibits removal of both occupied and unoccupied osprey nests without a permit.²

² <https://files.dnr.state.mn.us/wildlife/research/permits/nest-removal-permit-application.pdf>

If any non-eagle, non-osprey raptor nest is found in pre-construction surveys, Summit may consider removing it, if inactive. All occupied nests of migratory birds are protected by the federal Migratory Bird Treaty Act (MBTA) and in Minnesota by the Nongame Wildlife Nest Removal Permit program. Removal of an inactive, non-eagle, non-osprey raptor nest is legal under the MBTA and Minnesota's regulations. Summit would plan the removal, in coordination with the landowner or land management agency, for the fall of the year ahead of construction, such that removal would avoid the Minnesota bird nesting season (April 1 to August 31). Summit would ensure that inactive nests are dismantled so as to prevent possession of nest materials, which is illegal under the MBTA.

23. Describe how a possible release of pressurized drilling mud during HDD crossings would impact threatened fluted-shell mussels and any proposed mitigation measures to reduce impacts of a potential release.

Summit provided MDNR with an updated Natural Heritage Information System review on May 19, 2023. MDNR responded on August 23, 2023. These letters are included as Attachment 5-23. Because the letters contain nonpublic, sensitive Natural Heritage information, public and NONPUBLIC versions of the letters have been provided. The documented occurrences of fluted-shell mussels are discussed in both Summit's letter and MDNR's response.

In the May 19, 2023 letter, Summit noted the presence of fluted-shell mussel element occurrences near the Project. The occurrences are from 1991 and 2004. The potential for impact to this species is low because Summit will use the HDD method at the relevant crossing locations. In their letter from August 23, 2023, MDNR identified the main threats to fluted-shell mussel as stream crossings, including crushing from rip rap, stranding from dewatering, and smothering from sediment loading. MDNR recommended effective erosion and sediment control practices near the rivers and tributaries. To further protect the mussels, MDNR recommended directionally boring these rivers, placing bore pits away from the water's edge, and erosion control measures to prevent material from entering the water. Summit has incorporated MDNR's recommendations in crossing design as well as implementation of construction measures in its Minnesota ECP to prevent sedimentation in the rivers.

In the event that an inadvertent release was to occur within an aquatic resource Summit will notify all appropriate agencies according to the respective agency's regulatory requirements and its Contractor will implement the mitigation measures outlined in the Minnesota ECP, as well as all applicable federal and state permits and authorizations, to quickly identify, stop, and contain the release. As stated in response to Inquiry 2-2, Summit will develop a contingency plan to address the unintended release of drilling mud to the environment during the execution of each HDD. This plan will include, among other things, measures to reduce the risk for an inadvertent return to occur and procedures to monitor for inadvertent returns during drilling. The Contractor will develop a contingency plan to address an inadvertent return during a directional drill; these plans will identify BMPs for an inadvertent return and requirements following the incident. Section 12.b.iv.b of the Scoping EAW also states that the contingency plan would outline containment, response, and clean-up equipment that would be available at both sides of an HDD crossing location prior to commencement to assure a timely response in the event of an inadvertent release of drilling fluid.

The use of the HDD method is a preferred method of the MDNR to minimize the impacts of construction on the fluted-shell mussel. The Contractor's contingency plans would further ensure that in the unlikely event of an inadvertent release within a waterbody, the impacts would be minimized and responded to effectively so as to prevent impacts to aquatic resources, including the fluted-shell mussel.

24. Discuss potential impacts to fish and other aquatic organisms from a release of CO₂ into a river or other waterbody. Include possible quantities of CO₂ released and the corresponding magnitude of effect for the waterbody and mortality of fish and other aquatic organisms. In your response consider proposed valve placements and assess if additional shut-off valves can reduce the magnitude of fish or aquatic organism mortality associated with a CO₂ release into a waterbody, as well as the likelihood of release, the amount of CO₂ likely to be released, and distance of stream affected by a release under different flow/temperature conditions.

The potential for accidental release of CO₂ into the aquatic environment from a pipeline rupture is very low based on the frequency of pipeline ruptures in general and the fact that open water habitats represent a small percent of the Project, but such a release, were it to occur, could have some impacts on the aquatic communities. The magnitude of the impacts of a release will be contingent upon the volume of the release and the size and flow of the waterbody (dilution), but in general will be expected to be low. The release of CO₂ will cause the concentration of dissolved CO₂ in the water column to increase with consequent decreases in pH. Fish appear to be less sensitive to the physiological impacts of acidification than invertebrates with carbonate shells, and adult fish less sensitive than eggs and juvenile fish. Motile adult fish will also likely move away from the release (Suzuki 2020) but CO₂ concentrations near the source could increase to toxic levels and result in morbidity or mortality on fish that do not move away and on sessile invertebrates. Most impacts will be short-term, ameliorating soon after the release is stopped, but re-colonization by invertebrates could take a year or longer.

The most probable adverse effect of a CO₂ release into a flowing stream is a lowering of pH and direct toxicity effects. According to Henry's Law, at 25 ° C, an equilibrium concentration of CO₂ and water would approach 0.55 parts per million which would not constitute a significant adverse impact to most fish species. Oversaturation could occur adjacent to the leak site with CO₂ concentration levels potentially going as high as 1,500 parts per million. While CO₂ concentrations at these levels would be extremely toxic to fish, the possibility of many fish being killed would still be remote or virtually nonexistent because (1) fish are mobile and most waterbodies crossed will move the CO₂ downstream as well as dilute it, (2) a bubble stream from a leak would cause fish to avoid the area, (3) a CO₂ leak would be short term because of block valve safety precautions, and (4) a leak or blowout is unlikely to occur at all. Sessile species (e.g., mollusks) would be more vulnerable to increases in CO₂ levels in the water column because of their inability to move locations. The CO₂ increases would have to occur consistently over a long period of time (months) for impacts to be seen. In addition, when CO₂ dissolves in water, about one percent of it forms carbonic acid (H₂CO₃), which almost immediately dissociates to bicarbonate anions and protons (HCO₃⁻). This produces a solution of bicarbonate. Because surface waters are in equilibrium with atmospheric CO₂ there is a constant concentration of H₂CO₃ in the water. The presence of limestone and other calcium carbonate rock in lakes and streams helps to maintain a constant pH because the minerals react with the excess acid. When water is in equilibrium with both CO₂ and carbonate containing rock, the pH of the water is buffered to a pH of 8.3, close to the pKa of the weak acid bicarbonate HCO₃⁻ (pKa = 8.4). Due to the presence of alkaline soils and limestone bedrock, South Dakota surface waters average a pH of 8.2. The solubility of CO₂ in water is a function of both the temperature and the salinity of the water, where CO₂ is more soluble in freshwater than seawater, and solubility decreases with increasing temperature.

25. The project would be connected to the Operations Control Center (OCC) in Ames, Iowa through the best available public communications network." Clarify what the "best available public communications network" would be.

Summit will utilize the fastest, most reliable communication methods available in the area. Summit is considering the following communication method: Fiber Optic, Cellular, T1, and VSAT. Summit intends to have redundant communication methods, utilizing the best option for primary communications, and the next best option will be utilized for secondary communications.

26. For the final hydrostatic testing of the completed pipeline, clarify whether the entire 28.1-mile-long pipeline would be hydrostatically tested at once or in smaller sections.

The pipeline will be tested in two sections.

27. Provide the estimated peak number of construction workers that would be working at the capture facilities and on the pipeline. Please estimate the number of these workers who would be hired locally (i.e., within commuting distance of the project). Provide discussion of plans to use union labor.

Approximately 80-100 construction workers will be used to build the capture facility at the peak construction phase. Approximately 150 construction workers will be used to build the pipeline at the peak construction phase. For the construction of the Project, 100% of the workforce will be union employees with 50% of the personnel sourced from the local union halls.

28. Provide information on the casing that would be used for piping under MnDOT right-of-way.

Summit is currently proposing to cross Minnesota TH 210 and US Highway 75 via HDD. Summit does not recommend requiring the use of cased crossings at Minnesota TH 210 and US Highway 75. Requiring cased crossings at these locations will result in greater impacts to privately owned land during and after construction, increased installation times, increased risk to pipeline integrity, and actually less depth of cover over the pipeline with the road ROWs. Additional justification is provided below.

Greater impacts to privately owned land during and after construction

- In order to install the casing pipe with a minimum depth of cover of 10 feet below the lowest point within the road ROWs (as recommended by Minnesota Department of Transportation (MNDOT), bell holes approximately 15-20 feet deep by 10-20 feet wide by 20-40 feet long will need to be excavated on both sides of the roadways, on privately owned agricultural land. The bell holes are required to accommodate the equipment and installation of the casing pipe. The large volume of excavated soils will have to be stored onsite during construction.
- In addition to the bell hole excavations, tail ditches will have to be excavated on both sides to gradually slope the pipeline up from the casing depth to the normal pipeline depth of 4.5 feet. Due to MNDOT's recommendation to require the casing maintain a minimum of 10 feet of cover under the lowest point within the road ROW, the casings will be 12-16 feet deep at the edges of the road ROW.
- Larger construction workspace may be needed to accommodate excavation spoils and equipment during installation.

Increased installation times

- The items described above will also lead to longer installation time, increasing the impacts to private landowners.

Increased risk to pipeline integrity

- Casing pipe shields carrier pipe from the induced current cathodic protection system by eliminating contact between the carrier pipe and the electrolyte (soil). This means that the pipeline's cathodic protection system will not protect the pipe within the casing.
- Metallic shorts between the casing pipe and the carrier pipe are also common, especially within longer casings. This occurs when the casing pipe comes into contact with the carrier piping and can be caused by earth movement or settlement over time. This situation can lead to additional corrosion and stress on the carrier pipe.
 - Due to railroad ROW abutting the road ROW for both Minnesota TH 210 and US Highway 75, the cased crossings will be approximately 250-270 feet long each.
- There would be increased maintenance requirements associated with casings over the life of the pipeline in order to ensure integrity. Vent pipes, end seals and centralizers may require maintenance (excavation required) to ensure integrity of the casing and carrier pipe throughout the life of the pipeline system.
- Encasement of pipelines is an outdated technique that was utilized prior to the introduction of trenchless technologies. Modern pipeline design and corrosion guidelines such as *ASME B 31.4 – Pipeline Transportation Systems for Liquids and Slurries* and *NACE RP0200 Steel-Cased Pipeline Practices* recommend avoiding pipeline casings.

Less depth of cover over the pipeline with the road ROWs

- MNDOT is recommending requiring 10 feet of cover for the casing, which far exceeds the minimum requirements in the MNDOT Utility Accommodation and Coordination Manual Table II – Utility Facilities on Minnesota Highway Rights of Way – Minimum Depths (requires 5 feet of cover below the pavement and 3 feet of cover below the ditch). See image below.

AUGUST 2016

UTILITY ACCOMMODATION

31

Table II

UTILITY FACILITIES ON MINNESOTA HIGHWAY RIGHT OF WAY

MINIMUM DEPTHS

Crossings

	Under Pavement Surface	Under Original Ditch Grade
All Underground, except Power (Cased and Uncased)	5'	3'
Power (Cased and Uncased)	5'	3.5'

In summary, Summit's preliminary HDD designs for these crossings have been designed to provide a minimum depth of cover of 20 feet below the lowest points within the road ROWs, would result in less impact to the private landowners, and would allow for the protection afforded by the cathodic protection

system. Per the MNDOT Utility Accommodation and Coordination Manual Section VIII(D)(3)(c)(ii), pipelines placed by trenchless technologies may be approved on a case-by-case basis if certain criteria are met. Summit's preliminary HDD designs meet and exceed all the criteria laid out in the MNDOT Utility Accommodation and Coordination Manual. Summit intends to continue to work with MNDOT regarding the crossing methodology at these locations.

29. Confirm that Summit would comply with the requirements for depth and setbacks stated in MnDOT's letter of May 18, 2023. Confirm Figure 13 of the Minnesota ECP complies with these requirements.

The MNDOT's letter states the following regarding depths and setbacks (p. 2):

Boring pits should be located outside of MnDOT rights-of-way. Bore depth will be required to be at a minimum of 10 feet under the lowest existing elevation of the road profile. The CO₂ line will need to be at full depth under the entire right-of-way. The CO₂ line should be located no less than 3 feet from existing buried utilities in the area(s) and located no less than 15 feet from any drainage pipe or structure within MnDOT right-of-way. The CO₂ line should avoid being placed near the intersection of other roads and MnDOT rights-of-way.

Summit will comply with these depth and setback requirements. Figure 13 of the ECP (Guided Bore Detail) is intended to be a general "typical" drawing. As stated in the Notes sections, Crossing Permit Packages for each road will include additional notes, details, dimensions, construction requirements, and conditions. Federal, state, and local agencies having more stringent regulations will supersede the materials in the Minnesota ECP, including typicals (see Minnesota ECP, Section 1.0). Summit intends to continue to work with MNDOT regarding road crossings under its jurisdiction.

30. Confirm that Summit would conduct all coordination with MnDOT that is described in MnDOT's letter of May 18, 2023.

Summit will continue to coordinate with MNDOT regarding the Project, including as outlined in MNDOT's May 18, 2023 letter.

31. Provide a shapefile or kmz file that shows the proposed pipeline route centerline from the capture facility west to the first MLV in North Dakota.

A kmz file that shows the proposed pipeline route centerline from the capture facility west to the first MLV in North Dakota has been uploaded to the Otter Tail to Wilkin Project Sharepoint Site.

32. Provide the pipe diameter and wall thickness of the pipe west up to the first MLV in North Dakota.

- Pipe Size (outside diameter): 4.5-inch outside diameter
- Pipe Type: High-strength carbon steel (API 5L)
- Nominal Wall Thickness in Inches: 0.189 inch
- Pipe Design Factor: 0.72
- Longitudinal or Seam Joint Factor: 1.00

33. Provide a copy of the IRR file (Internal Case Input File) used to determine rupture dispersion.

Summit has placed a copy of the requested dispersion model internal case input file on the Otter Tail to Wilkin Sharepoint site as NONPUBLIC Attachment 5-33. Given the nature of this file, there is no public version, as it contains modeling inputs used in the CANARY dispersion model. The data was created by Summit and its consultant, Audubon Field Solutions. In accordance with Minn. R. 7829.0500 and Minn. Stat. Ch. 13, Summit has classified the file as NON-PUBLIC DATA – SECURITY INFORMATION under the Minnesota Data Practices Act (“Act”) definition in Minn. Stat. §13.37, subd. 1(a).

The Act provides that “security information” is nonpublic data, defining “security information” as “government data the disclosure of which the responsible authority determines would be likely to substantially jeopardize the security of information, possessions, individuals or property against theft, tampering, improper use, attempted escape, illegal disclosure, trespass, or physical injury.” Summit requests that the above-referenced attachment be classified as security information under the Act because the attachment contains detailed and specific location, facility information, and model inputs, the disclosure of which would substantially jeopardize the security of Summit’s proposed facilities against tampering or physical injury.

Summit regularly protects this information from public disclosure because of potential safety and security risks, and Summit’s practices are consistent with its treatment under federal law. Specifically, Summit created this file to comply with the Emergency Response Plan (“ERP”) and Integrity Management Plan (“IMP”) requirements of the Pipeline and Hazardous Materials Safety Administration (“PHMSA”). See 49 C.F.R. §§ 195.402(e), 195.408 and 195.452. PHMSA is directed by Congress to establish safety standards for, namely, the design, construction, testing, operation, and maintenance of carbon dioxide pipelines, and is responsible for administering a compliance and enforcement program over these standards. See 49 U.S.C. § 60101 et seq.

As part of its submittal of the modeling assumptions to PHMSA, Summit will seek protections for these materials, including under the Freedom of Information Act (“FOIA”) and other authorities. Specifically, the modeling assumptions qualify for protection under FOIA Exemptions 4 and 7(F). See 5 U.S.C. §§ 552(b)(4) and 552(b)(7)(F). Exemption 4 protects confidential commercial information that is customarily kept private. Exemption 7(F) protects information that could reasonably be expected to endanger the life or physical safety of any individual. This modeling data is also subject to protection under a U.S. Department of Homeland Security (“DHS”) program for protection of transportation-related Sensitive Security Information (“SSI”). See 49 C.F.R. Part 1520. When submitted to PHMSA, these materials may qualify as part of a vulnerability assessment under DHS regulations. In addition, they contain certain attribute information that PHMSA and DHS have jointly agreed require confidential treatment and special handling in an SSI-compliant environment, including identification of which segments could affect High Consequence Areas under PHMSA’s safety standards, as well as the location of critical pipeline components, such as mainline and block valves. See 49 CFR §§ 1520.5(b)(5) and 1520.9; 80 Fed. Reg. 52,084, 52,092 (August 27, 2015). Given the confidential commercial nature of the modeling data, and, more importantly, the utility of such materials to those who may wish to damage to pipeline facilities, Summit expects to receive federal protections against public release of these materials.

There is a substantial threat that providing this information publicly could put Summit’s pipeline and facilities, and the surrounding environments, at risk of tampering, trespass, or physical injury from individuals intent on doing harm to the pipeline and associated facilities. A determination that this

information constitutes nonpublic security information is likewise consistent with other interpretations of the Act.

For the reasons set forth above, Summit considers the modeling data to be sensitive security information and, therefore, requests that it be classified as security information under the Act.

34. Provide a copy of the aerial dispersion analysis report that discusses inputs, assumptions, and considerations, and results.

This study has been uploaded to the Otter Tail to Wilkin Project Sharepoint Site as NONPUBLIC Attachment 5-34. Because the Report contains nonpublic, security information, public and nonpublic versions of the report have been provided.

35. Provide an update regarding any coordination with local emergency first responders.

Summit has recently met with the Otter Tail and Wilkin County Commissioners and Emergency Managers to discuss planning for emergencies and scheduling training of first responders in their respective areas. These meetings occurred on September 12, 2023 for Wilkin County and September 25, 2023 for Otter Tail County.

Summit will work with the county Emergency Managers to plan for training of first responders around the time of MPUC route permit issuance, prior to, and during construction so that emergency responders will be prepared once the project goes into operation. Training will include discussions of CO₂ pipeline operations, use of monitoring equipment, potential response actions, and will incorporate tabletop exercises and drills. Handheld CO₂ and oxygen (O₂) monitors will be necessary to safely respond to a CO₂ incident. Additional needs for each county will be discussed on a case-by-case basis.

36. Could an odorant be added to the CO₂ transported in the pipeline? Explain why or why not.

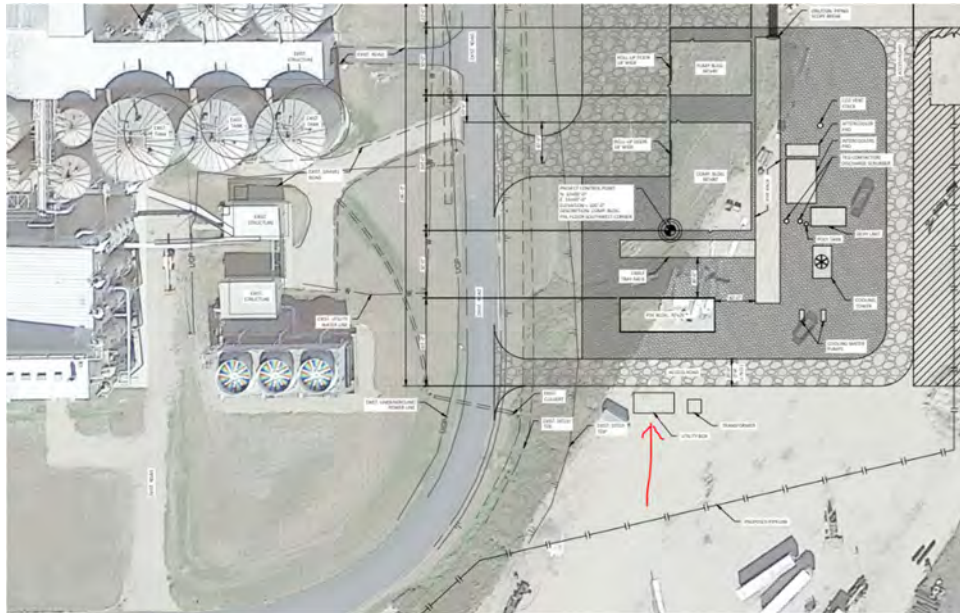
Summit does not currently plan to add an odorant to the pipeline. 49 CFR Part 195 does not identify a requirement for the use of odorant in hazardous liquid or carbon dioxide pipelines. Odorant requirements typically apply to low pressure natural gas distribution pipelines and are primarily intended to alert occupants of a gas leak occurring inside of a residence or structure. If federal regulations are amended in the future to require the use of an odorant in CO₂ pipelines, Summit believes that mandate will be preceded by research establishing whether the combination of CO₂ and commercially available odorants will compromise the integrity of pipeline systems and sequestration facility components.

Presently, the primary component in many odorants is concentrated Methyl Mercaptan. This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). Odorizing a pipeline system would require multiple injection facilities and would introduce additional logistic and design changes needed for the safe storage and overland transport of concentrated Methyl Mercaptan.

37. Would aboveground cathodic protection components be fenced? If so, please describe the fence.

Cathodic protection components will be located within mainline valve (MLV) sites. MLV sites will have a 6-foot-tall security fence around the perimeter with a locked gate.

Summit is not aware that Lake Region Electric Cooperative has finalized its plans, but generally, they intend to bring 12.47kV power from the substation approximately 850 feet to the area designated as “Utility Box” on the south part of the image below. Power will be supplied from the substation via buried cable. A disconnect will likely be placed at the area designated as “Utility Box”, and Summit will distribute the power for the Capture Facility from that location.



The Green Plains Ethanol Plant is designed to process USDA #2 Yellow Corn (field corn), but in theory, it could process sorghum (milo) and other grains.

Nearly all corn arrives at the Green Plains Ethanol Plant by truck, the majority by semi (tractor and trailer) with some arriving via straight truck. All of this trucked corn comes from local farmers and grain elevators/ farmer co-ops within trucking distance (approximately 40 miles). It is rare for corn to be delivered by rail to the Green Plains Ethanol Plant, but when it is, it also comes from local co-ops within 25 miles of the Plant. Approximately 12 rail cars are delivered per year, which equates to 48 truckloads (48,000 bushels). This is approximately 0.2% of annual corn purchases.



SUMMIT CARBON SOLUTION PIPELINE PROJECT

GULF PROJECT NUMBER: 1927

FROST HEAVE STUDY



GULF DOCUMENT NO.: 1927-000-PL-STY-0004

SCS DOCUMENT NO.: GPLUS-GENL-ENG-STY-GIE-0004

Revision	Date	Revision Description	Prepared By	Reviewing Engineer	Project Manager	Client Approval
0	04/17/2023	Issued for Information	David Ammerman	Lance Thomas	David Ammerman	
GULF INTERSTATE ENGINEERING			REVISION LOG			



PROJECT: MIDWEST CARBON EXPRESS PROJECT

REPORT NUMBER:

GPLUS-GENL-ENG-STY-GIE-0004

GULF PROJECT NO.:

1927

TITLE:

Frost Heave Study

Provide a brief description of changes for all revisions following Rev. 0

Filename: GPLUS-GENL-ENG-STY-GIE-0004-E-Frost Heave-23-04-06

REV.	DATE	REVISION DESCRIPTION



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1 PURPOSE

The purpose of this Frost Heave Study is to address Summit Carbon Solutions Pipeline Project objectives involving pipeline integrity when installing and operating pipelines in regions where frozen soil and frost depths may require additional consideration.

2 PROJECT DESCRIPTION AND SCOPE OF STUDY

Summit Carbon Solutions (SCS) plans to develop a new interstate CO₂ capture, transportation, and sequestration project. The Project will capture CO₂ from multiple sources throughout Iowa, Minnesota, Nebraska, South Dakota, and North Dakota and deliver the CO₂ to injection sites in North Dakota for permanent geological sequestration.

The main objectives of this Study are to assess potential impacts to the proposed pipeline from permafrost and frost heave across the five-state footprint.

3 PERMAFROST POTENTIAL IMPACTS

Permafrost is rock or soil that remains completely frozen for at least two straight years. Areas shaded in blue in Figure 3-1 are underlain by permafrost. As Figure 3-1 shows, the SCS pipeline system does not traverse any areas underlain by either continuous or discontinuous permafrost.

Therefore, permafrost is not an issue that needs to be addressed by this project and will not be discussed further in this study.

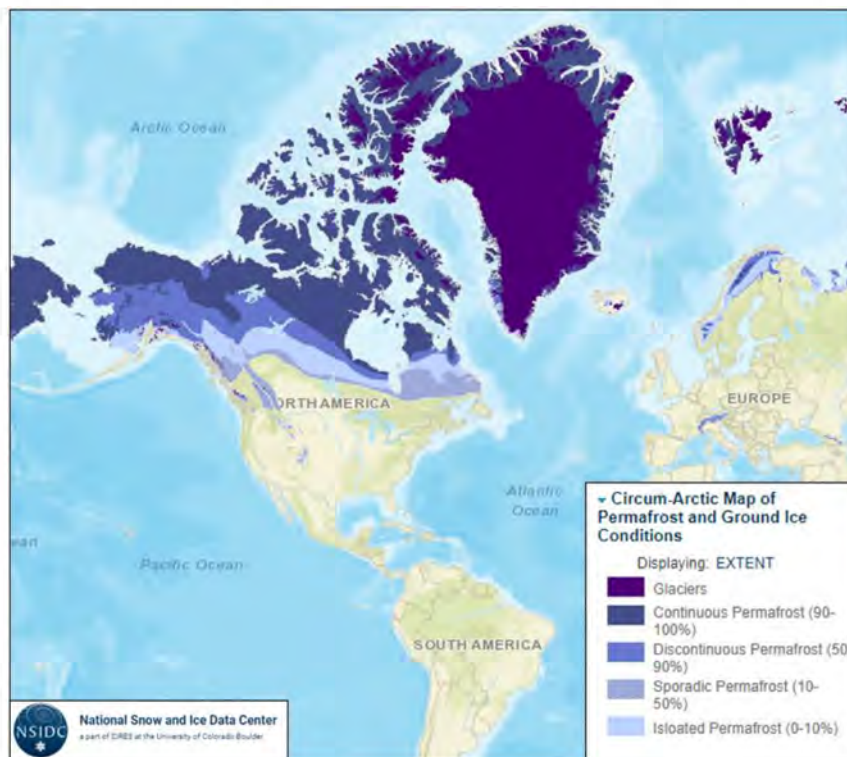


Figure 3-1: Arctic Map of Permafrost and Ground Ice Conditions

4 FROST HEAVE

4.1 Description

Frost heave is the result of the formation of ice lenses by segregation of water from the soil as the ground freezes¹. Ice lenses are lens-shaped masses of almost pure ice that form in frozen soil or rock. Lens formation takes place at, or a short distance behind, the freezing front at any depth where conditions are favorable and continues until those conditions change.² Lens growth may be sustained by the addition of groundwater drawn from warmer zones below the freezing front. The amount of vertical displacement (heave) is roughly equal to the combined thicknesses of the underlying ice lenses. This results in greater displacement at the surface when compared to areas of greater depth.

4.2 Frost Heave Conditions

Three conditions must be met to create the possibility of frost heave to the extent that it would threaten the pipelines integrity:

1. The soil must contain a significant amount of silt (i.e. Silty Clay, Clayey Silt, Sandy Silt, Silty Sand, or Silt), to promote upward groundwater movement, via capillary action, to the freezing front;
2. There must be a source of groundwater near (immediately below) the freezing front; and
3. Soil freezing and ice lensing both need to occur at a depth below the bottom of the pipe.

If any of the three conditions listed above are not met, frost heave should not occur.

4.3 Frost Penetration

Several factors influence seasonal frost penetration depth:

1. Vegetation cover (vegetation tends to insulate and retard frost penetration);
2. Snow cover (snow cover tends to insulate and retard frost penetration);
3. The number of degree days below freezing;
4. Soil grain size (coarse grained soils are more conductive, allowing greater frost penetration than fine grained soils); and
5. Moisture content (the higher the moisture content, the more time it takes for a given soil to freeze).

The United States Department of Agriculture records soil temperature at various depths at monitoring stations located throughout the US³. Five USDA locations spread throughout the project footprint were utilized to gather ground temperature data. Each location was reviewed, but the Mandan location was selected for this report as it is the furthest north and most likely to see the greatest frost depth.

This station records soil moisture and temperature to a depth of 40-inches.

Figure 4-2 depicts daily soil temperature at a depth of 40-inches over the last decade. As the graph shows, the soil approaches freezing conditions in most years but does not drop below the freezing point for any extended duration.



Figure 4-1: USDA's Mandan Station

¹ Taber, S., 1929, Frost heaving: Journal of Geology, v. 37, p. 428-461.

² Manz, L., July 2011, Frost Heave, Geo News, p. 18-24

³ <https://www.nrcs.usda.gov/resources/data-and-reports/soil-climate-analysis-network>



Mandan #1 (2020) North Dakota SCAN Site - 1930 ft Reporting Frequency: Daily; Date Range: 2013-04-01 to 2023-04-11

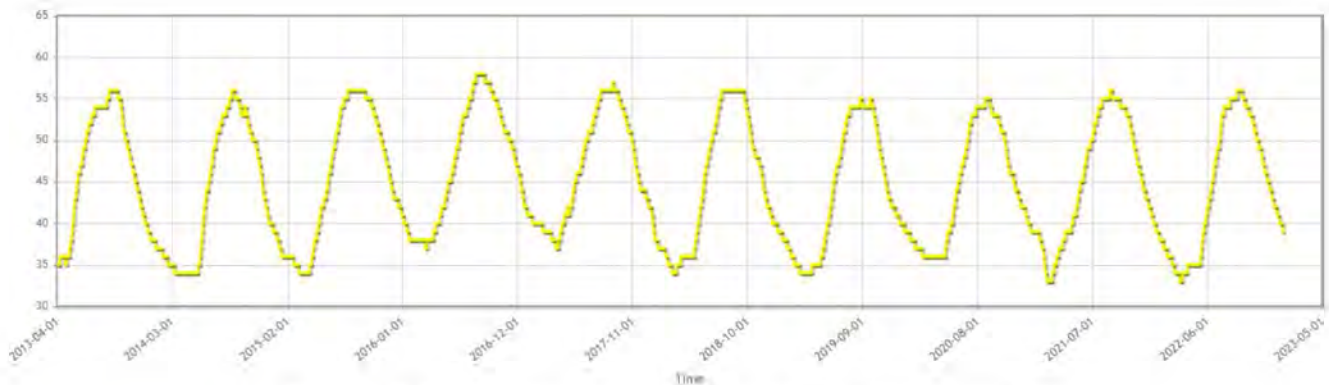


Figure 4-2: Soil Temperature at 40-inches Depth During Last Decade

5 Frost Heave Considerations

5.1 Soil Types and Ground Water

Based on the USDA Soil Survey Geographic Database, there are soils that could be classified as frost susceptible where 10% or more particles pass through a No. 200 sieve⁴.

Ground water heights can range significantly across the pipeline route and can also fluctuate seasonally. Geotechnical reports reviewed show ground water ranging from 6.5 to over 100 feet below ground surface⁵.

5.2 Pipeline Depth of Cover

SCS will be installing the pipelines with a minimum depth of cover of 48 inches from top of pipe. The bottom of the pipelines will range from 51 inches to 72 inches minimum dependent upon the diameter of the pipe installed. This depth of cover significantly reduces the risk of multiple underlying ice lenses forming beneath the pipeline and resulting frost heave. As shown by the USDA monitoring station data, the historical data for each of the five monitoring stations across the project footprint shows that the soil temperatures necessary to create frost to a depth greater than 51 inches is not probable. At the Mandan location, which is the most likely to see the greatest frost depths, the soil temperature nears the freezing point at 40 inches of soil depth over some of the years reviewed but not for extended durations that would indicate frost penetration beyond 51 inches.

5.3 Construction Practices and Operating History

While vintage pipelines operating in similar areas and conditions have a proven track record of reliability, the implementation of modern pipeline materials, welding practice and installation procedures only further increase the starting integrity of modern pipeline systems. SCS pipe materials all meet specific ductility requirements, and the installed pipeline welds will be fully evaluated by non-destructive testing. Due to the advancement of material testing and construction requirements, the ability of a pipeline to withstand deformation (plastic strain) due to external loads such as frost heave is increased due to better ductility of the pipe material and better welding practices.

6 Conclusion

For frost heave to occur three conditions must be met. The soil needs to contain a significant amount of silt, groundwater needs to be present, and the depth of freezing must occur below the pipe. Due to the depth of

⁴ <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

⁵ Professional Service Industries, Inc., Geotechnical Data Report, PSI Project No. 599103-1



burial alone, the likelihood of frost heave on any buried portion of the SCS system is highly unlikely. Where conditions may allow frost to reach beyond 51 inches, the likelihood of the soil being susceptible to frost heave (silt) is also unlikely given that frost penetration occurs more slowly with fine-grained soils of high moisture content.

Water table depths vary from location to location across the pipeline from over a hundred feet below the pipe to depths above assumed trench bottom. The likelihood of frost depths significantly beyond 51 inches with a water table slightly below is probabilistically small. In a situation where frost could reach beyond 51 inches, the amount of movement expected at such a depth would be very small given the relation to the thickness of any underlying ice lenses and the unconstrained expansion that would occur above.

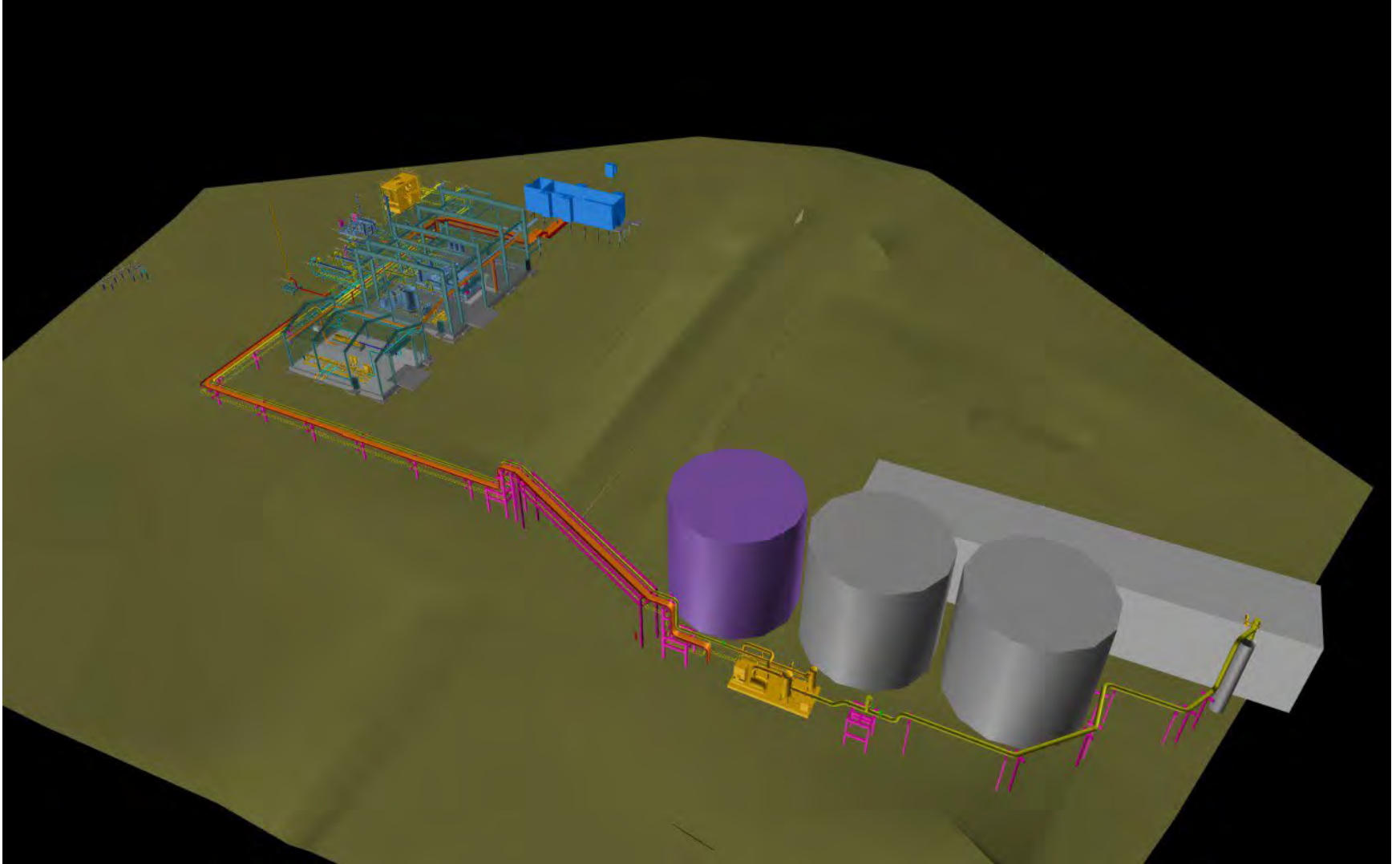
Today's materials and construction practices have evolved including the introduction of more ductile steels allowing greater allowable deformation (strain) due to external loads (frost heave) thus further preventing any likelihood of frost heave creating a pipeline integrity issue.



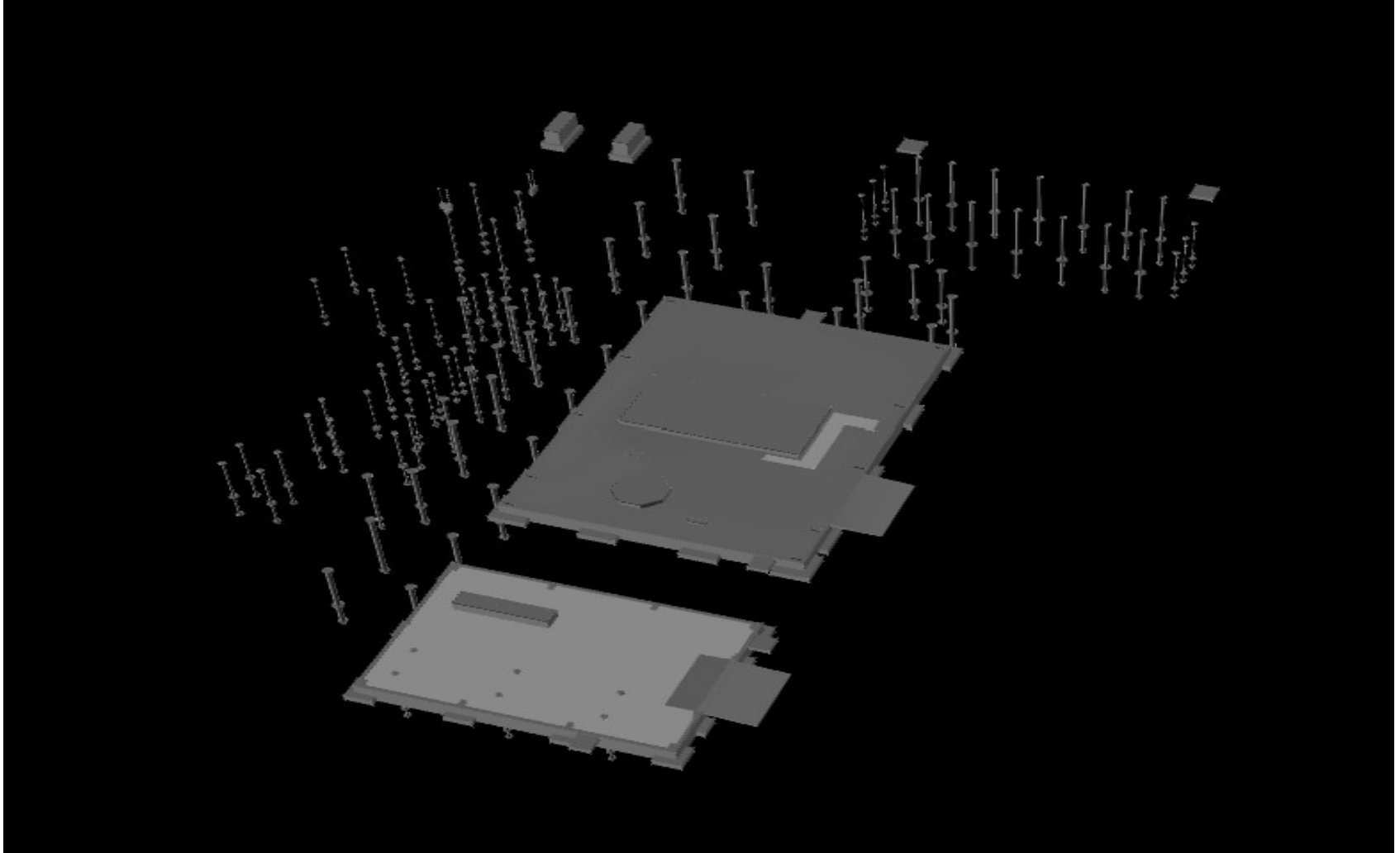
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Otter Tail Construction Plan
November 2023

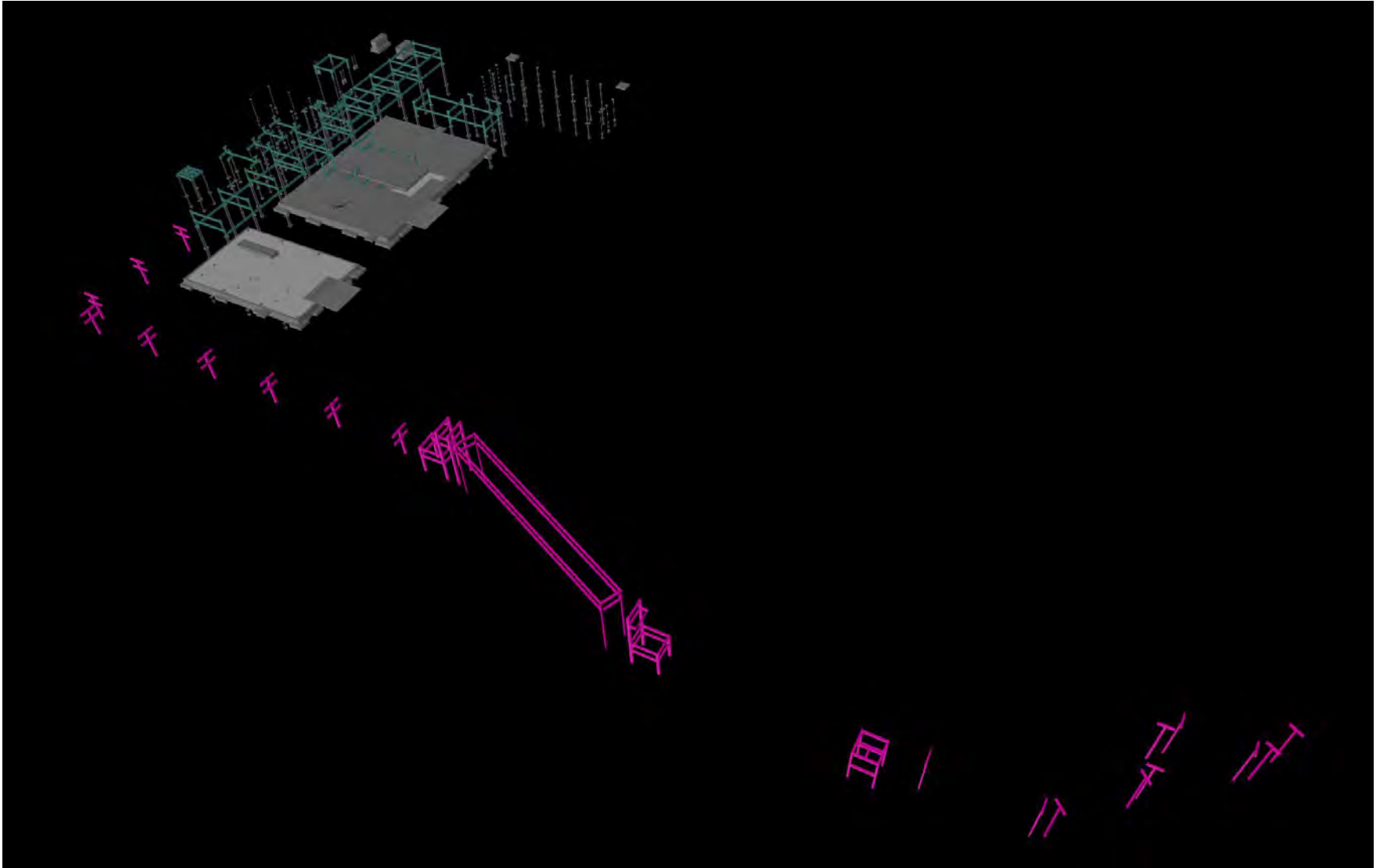
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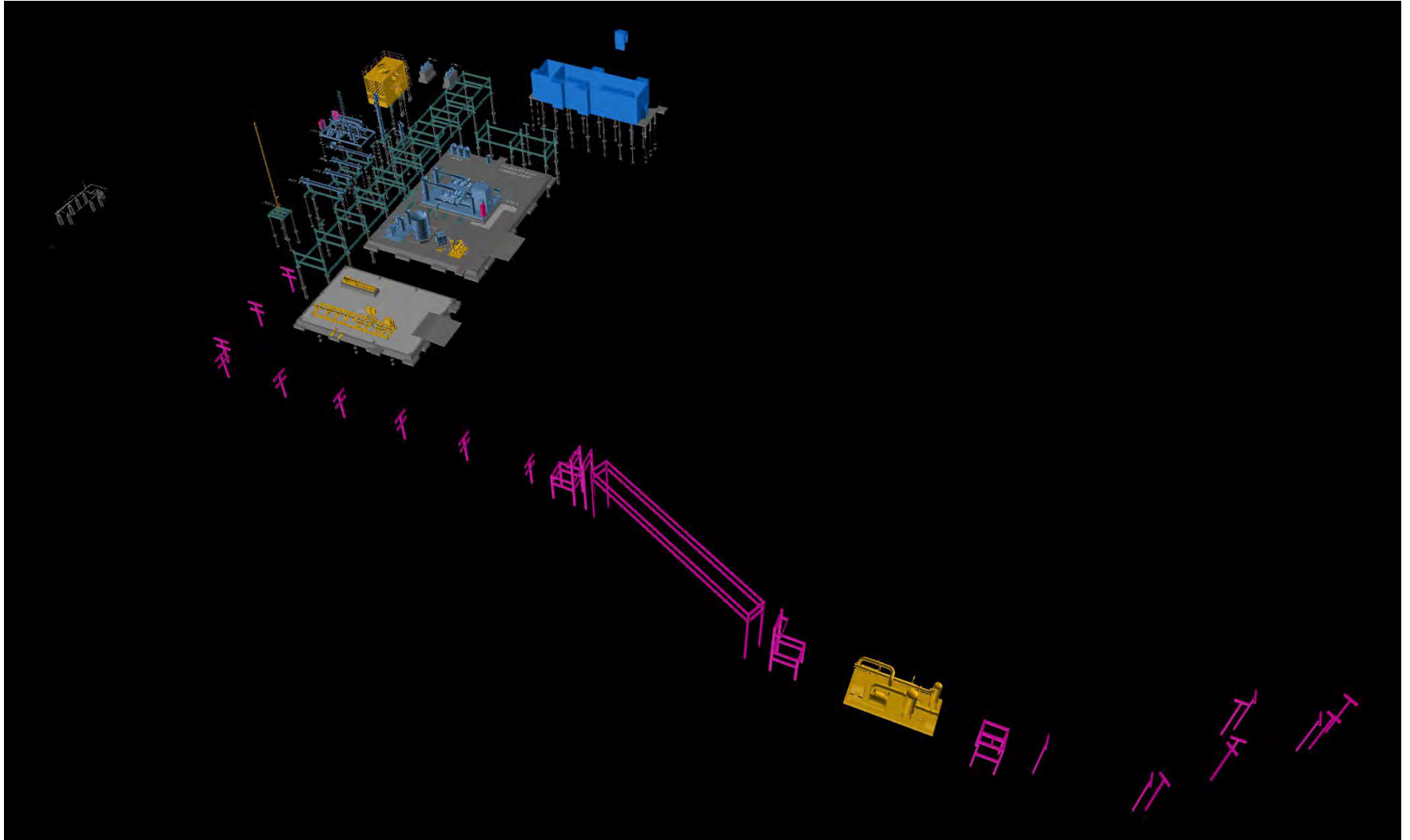
Concrete and Piling Work Plan



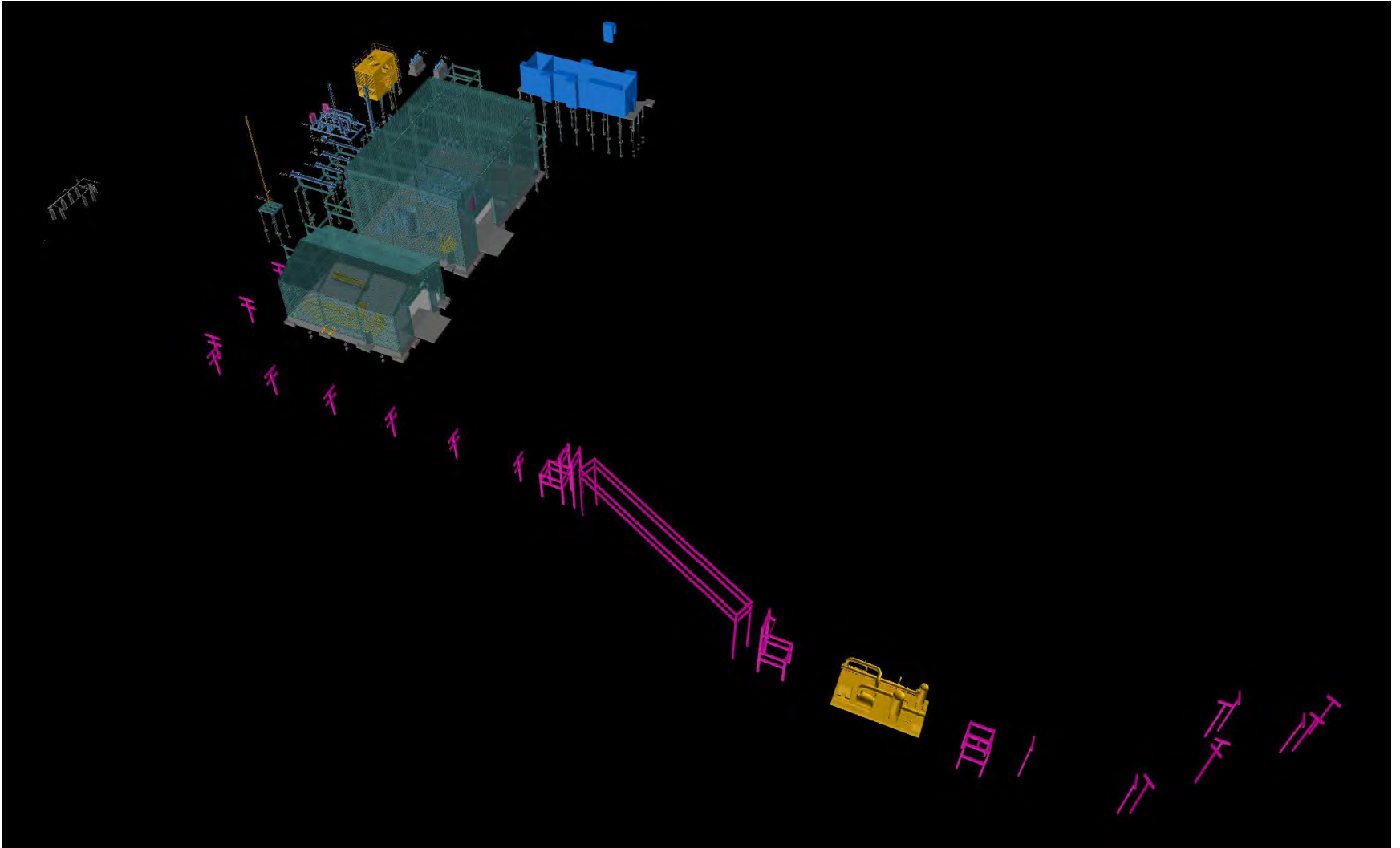
Structural Work Plan



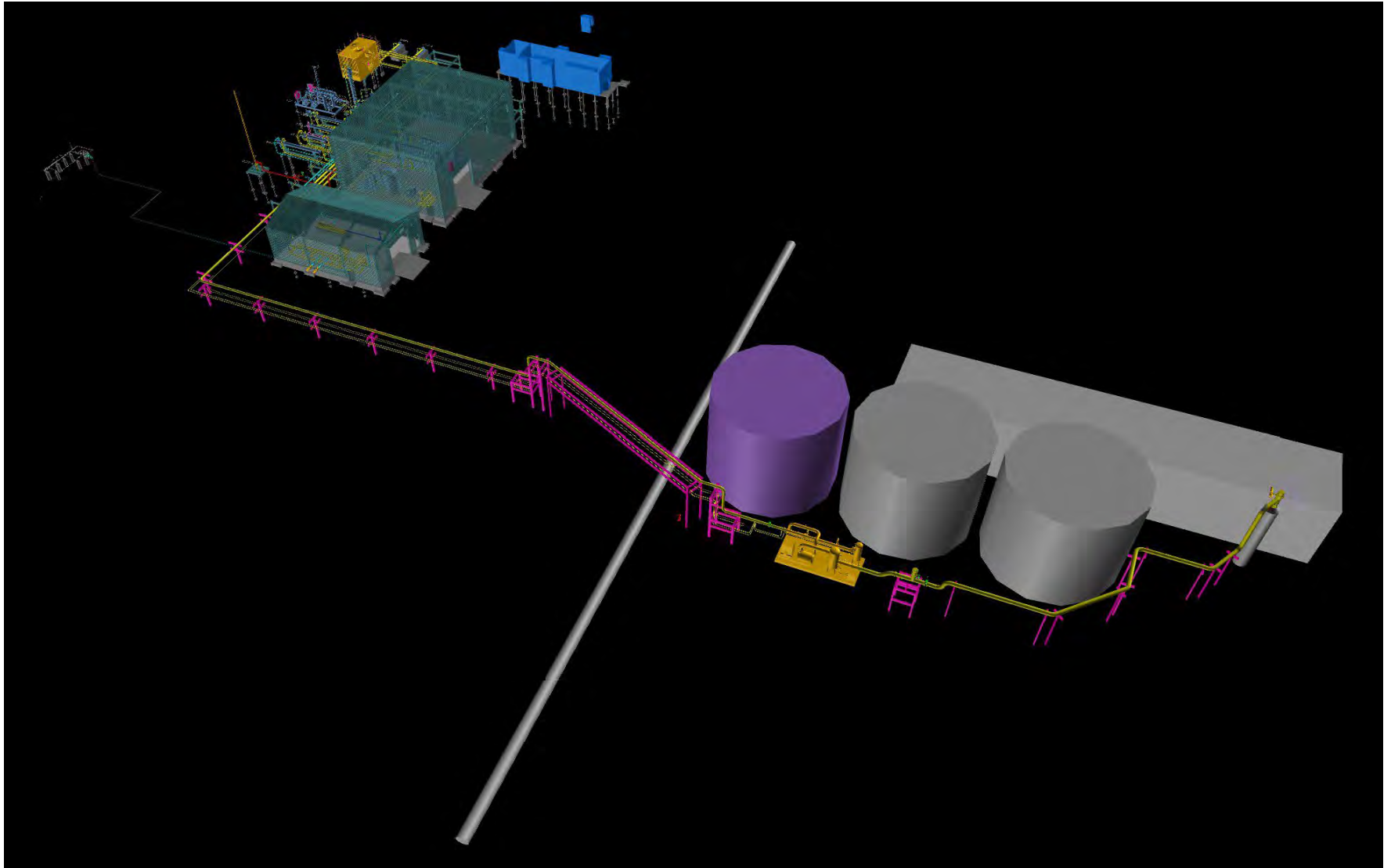
Equipment Work Plan



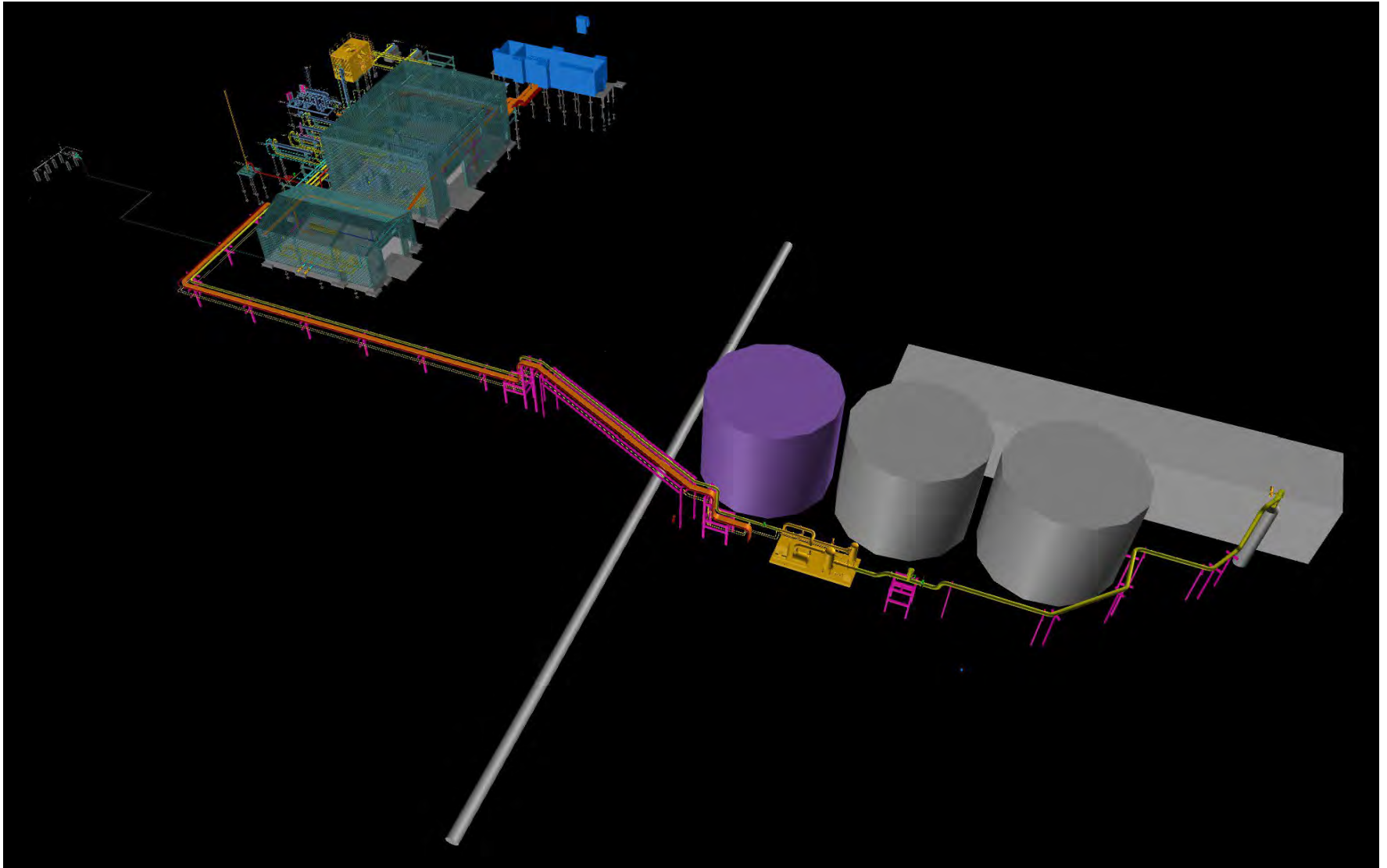
Buildings Work Plan



Piping Work Plan



Electrical Work Plan





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See Appendix F
Winter Construction Plan

See Appendix D

Minnesota Environmental Construction Plan

Detailed response to MPCA’s 11 Inconsistencies in Table 12-2 (Waterbody Crossings) in Scoping EAW and Appendix F (Impaired Waterbodies and Receiving Waterbodies within One Mile) from May 16, 2023 comment letter:

1. Several waterbodies are indicated as intersecting the centerline in Appendix F but are not indicated with proposed crossing methods in Table 12-2. Please clarify why all waterbodies intersected by the project centerline are not included on Table 12-2.

The data presented in Table 12-2 was intended to show waterbodies crossed by the Project centerline using Summit’s surveyed or desktop waterbody locations. Therefore, the mileposts (MPs) in this table were/are true representations of crossing locations.

The EAW Appendix F - Receiving Waters table was intended to be a “list of receiving waterbodies within 1 mile of the Project route that could potentially receive runoff.” The EAW Appendix F – Impaired Waters table was intended to show “waterbodies that are included on the Impaired Waters list and are within 1 mile of the Project.”

Because Summit did not complete field delineations or a desktop waterbody inventory for all features within a mile on either side of the Project (a 2-mile-wide area) and did not want to use multiple datasets, Summit relied wholly on MDNR’s Hydrography dataset for Appendix F – Receiving Waters, and on the MPCA’s Impaired Waters dataset for Appendix F – Impaired Waters, which are not the same as the field or desktop data used in Table 12-2 and will not return the same locational results in all instances. Also, because the Appendix F tables were not intended to be centerline analyses (as was done in Table 12-2) and the intent was to indicate waterbodies within a large 2-mile-wide area around the centerline, the mileposts in Appendix F did not always show points of crossing (as were shown in Table 12-2) because some waterbodies within the area of analysis did not cross the pipeline, and some which did meandered within the 2-mile-wide area. In these cases, a general MP location (nearest location within the 2-mile wide area) was given.

To clarify the data presented, Summit has compared Table 12-2 (included below as “Revised Table 12-2”) to the original Appendix F tables.

- The included “Revised Filtered Appendix F – MDNR Hydrography Receiving Waters”, below, presents these receiving waters filtered to only include features crossed by the Project, with updated MPs where the feature crosses the centerline using field or desktop location, not the MDNR Hydrography line location (similar to how the data is presented in Table 12-2). Refer to the Revised Filtered Appendix F – MDNR Hydrography Receiving Waters table, below, for the requested clarification.
- The Revised Appendix F – Impaired Waters table was also updated to include MPs where the feature crosses the centerline using field or desktop location, not the MPCA Impaired Waters line location (similar to how the data is presented in Table 12-2). Refer to the Revised Appendix F – Impaired Waters table, below, for the requested clarification.

Note that on May 19, 2023, the USACE St. Paul District reviewed Summit’s wetland and waterbody survey data and provided a list of specific locations state-wide where potential wet signatures appeared to be present and asked that Summit review those locations. Along this Project, one additional historical wetland was flagged as needing to be added to the wetland crossing table. Where applicable, USACE

review information is included in the Revised Filtered Appendix F – MDNR Hydrography Receiving Waters table.

2. Mile post 14.3 with identification # MAJ-09022827 is an unnamed intermittent stream with MPCA Assessment Unit Identifier (AUID) 09020103-626 and which should also be included on Table 12-2.

The MDNR Hydrography feature at MP 14.3 was surveyed on 6/1/2022 and delineated as a wetland (ID: W1016WI002), not a waterbody/intermittent stream due to the lack of a defined ordinary high-water mark. However, to address the comment from MPCA, Summit included footnote “d” in the Revised Table 12-2.

3. Two waterbodies at mile posts 4.2 and 4.7 are indicated as not intersecting the centerline in Appendix F but these mile posts are indicated as open cut crossings in Table 12-2.

To clarify the data in response to Inquiry No. 1, above, the mileposts in the included Revised Filtered Appendix F – MDNR Hydrography Receiving Waters table were updated to present the milepost where the feature crosses the centerline (similar to how the data is presented in Table 12-2).

4. Two waterbodies at mile posts 6.5 and 6.7 are indicated as not intersecting the centerline in Appendix F with no indication of a crossing at mile post 6.6, but mile post 6.6 is indicated as an open cut crossing on Table 12-2.

To clarify the data in response to Inquiry No. 1, above, the mileposts in the included Revised Filtered Appendix F – MDNR Hydrography Receiving Waters table were updated to present the milepost where the feature crosses the centerline (similar to how the data is presented in Table 12-2). Also, the feature referenced at the Inquiry as located at MP 6.6 is now located at the latest Project milepost 6.5.

5. Appendix F lists an intermittent stream at mile post 7.9 as not intersecting the centerline with the next listed crossing at mile post 9.0, while Table 12-2 lists mile post 8.0 as an ephemeral stream with an open cut crossing.

The data presented in Table 12-2 is field and/or desktop verified data and won’t always align with the location of a feature within the MDNR Hydrography Dataset. Summit confirmed the presence of the unnamed ephemeral stream referenced in this Inquiry as located at MP 8.0 is correct. Note that this is now located at the latest Project milepost 7.9.

6. Milepost 10.8 (#MAJ-09023556) and MP 10.9 (#MAJ-09022356) are both separate reaches of Judicial Ditch 2. The “reaches” are intersected by 190th street and now the project centerline. South of the centerline is the impaired reach AUID 09020103-764 from 190th Street to the Otter Tail River. Table 12-2 should include the *E. coli*, DO, and FishesBio impairments for Judicial Ditch 2. Appendix F, impaired waterbodies within 1 mile, should be corrected to include the AQL affected use impairments of Dissolved Oxygen and FishesBio as category 5 with TMDLs required, and the *E. coli* impairment is category 4A with a TMDL completed and approved.

As stated by MPCA, the centerline crosses north of the reach not presently designated as impaired. However, as requested by MPCA, Summit has made note of the adjacent impairment in the Revised Table

12-2 with a note as footnote “c,” and has included this information in a Revised Appendix F – Impaired Waters table with a note as footnote “b”, below.

7. Milepost 17.2 is indicated as not intersecting the centerline in Appendix F, but mile post 17.2 is indicated as an open cut crossing on Table 12-2.

To clarify the data in response to Inquiry No. 1, above, the mileposts in the included Revised Filtered Appendix F – Receiving Waters table were updated to include the milepost where the feature crosses the centerline (similar to how the data is presented in Table 12-2).

8. The Otter Tail River is indicated at three different mile posts in three different tables: MP 19.3 in the impaired waterbodies table, MP 19.4 in the receiving waterbodies table, and MP 19.5 in Table 12-2.

The receiving waterbodies table and impaired waterbodies tables used different datasets for their analysis. The surveyed centerline crossing of the Otter Tail River is at MP 19.5. The mileposts in the Revised Filtered Appendix F – MDNR Hydrography Receiving Waters table and the Revised Appendix F – Impaired Waters table (where applicable) were updated to include the milepost where the feature crosses the centerline (similar to how the data is presented in Table 12-2).

9. Approximate milepost 23.3 is start of County Ditch 35 (AUIDs 09020101-531/-532) running adjacent to proposed centerline. Please describe how the two will be co-located. Please clarify if the County Ditch is on one side of the road and the project centerline is on the other side of the road.

County Ditch 35 is located along the north edge of Summit’s construction right-of-way. As required by the Minnesota NPDES/SDS Construction Stormwater General Permit (MNR100001), Summit will install and maintain sediment controls immediately after clearing and prior to initial ground disturbance where the Project is co-located with the county ditch. The county ditch is located adjacent to the non-working side of the construction right-of-way (25 feet from the Project centerline). Note that this county ditch was surveyed on 5/9/2022 and delineated as a wetland (ID: W1019WI002), not a waterbody/intermittent drainage ditch due to the lack of a defined ordinary high-water mark.

10. Milepost 26.1 (Unnamed Creek (Doran Slough)) in Appendix F, impaired waterbodies, should include the AQL affected use impairment Dissolved Oxygen as category 5 with a TMDL required, and the *E. coli* impairment is category 4A with a TMDL completed and approved. Table 12-2 has this crossing as milepost 25.0 instead of 26.1.

The impairment data in the Revised Appendix F – Impaired Waters table has been updated accordingly. As noted above, where applicable, the mileposts in the Revised Appendix F – Impaired Waters table were updated to include the milepost where the feature crosses the centerline (similar to how the data is presented in Table 12-2).

11. Milepost 28.1 (Bois de Sioux River) in Appendix F, impaired waterbodies, should show all listed impairments as category 4A with a TMDL completed and approved, and should also include an AQR impairment of *E. coli* as category 5 with a TMDL required.

The requested updates have been made to the Revised Appendix F – Impaired Waters table.

Revised Table 12-2 Waterbody Crossings						
County	Milepost ^d	Waterbody Name	Flow Regime	Agency Designation	303(d) Impairment ^a	Proposed Crossing Method
Otter Tail	1.9	Pelican River	Perennial	Public Water (H-026-081-012); 303(d) Impaired; Infested water (zebra mussel)	E. coli	HDD
Otter Tail	4.2	Unnamed Stream	Intermittent	--	--	Open Cut (Nonflowing/Flowing)
Otter Tail	4.7	Unnamed Stream	Intermittent	--	--	Open Cut (Nonflowing/Flowing)
Otter Tail	5.0	Unnamed Stream	Intermittent	--	--	Open Cut (Nonflowing/Flowing)
Otter Tail	5.5^b	Unnamed Stream	Intermittent	—	—	Open Cut (Nonflowing/Flowing)
Otter Tail	6.5 ^e	Unnamed Stream	Perennial	--	--	Open Cut (Nonflowing/Flowing)
Otter Tail	7.9 ^e	Unnamed Stream	Ephemeral	--	--	Open Cut (Nonflowing/Flowing)
Otter Tail	10.8	Judicial Ditch L 2	Perennial	County Ditch; 303 (d) Impaired ^c	DO; E.coli; FishesBio	Open Cut (Nonflowing/Flowing)
Wilkin	17.2	Unnamed Stream	Intermittent	--	--	Open Cut (Nonflowing/Flowing)
Wilkin	19.5	Otter Tail River	Perennial	Public Water (H-026-081); 303(d) Impaired; Infested water (zebra mussel); Section 408, State Water Trail	InvertBio; T	HDD
Wilkin	25.0	Unnamed Creek	Intermittent	Public Water (H-026-082); 303(d) Impaired	DO; E. coli	Bore
Wilkin	28.1	Bois de Sioux River	Perennial	Public Water (H-026); 303(d) Impaired; Section 10	DO; E. coli; FishesBio; Hg-F; Nutrients; T	HDD
<p>^a Impairment: DO – dissolved oxygen; E. coli – Escherichia coli; FishesBio – fish bioassessments; Hg-F: mercury in fish tissue; InvertBio – benthic macroinvertebrate bioassessments; Nutrients – nutrients; T – Turbidity</p> <p>^b Summit surveyed this area in 2023. There was no evidence of a waterbody at this location. Therefore, this feature, once considered a “desktop” waterbody, will no longer be considered as a waterbody feature. Refer to Summit’s response to Supplemental Inquiry #2.</p> <p>^c As stated by the MPCA on page 3 of its May 16, 2023 letter, “Milepost 10.8 (#MAJ-09023556) and MP 10.9 (#MAJ-09022356) are both separate reaches of Judicial Ditch 2. The “reaches” are intersected by 190th Street and now the project centerline. South of the centerline is the impaired reach AUID 09020103-764 from 190th Street to the Otter Tail River.” The centerline crosses north of the reach not presently designated as impaired. However, as requested by MPCA, Summit has included the adjacent impairment.</p> <p>^d MPCA Assessment Unit Identifier (AUID) 09020103-626 was noted by MPCA to occur at MP 14.3. This feature was delineated in the field as a wetland and was listed in Appendix 10 (Wetland Crossing Table) of the Route Permit Application. It was treated as a wetland in the USACE Section 404 application.</p> <p>^e The feature presented at MP 6.6 in the Route Permit application is now located closer to Project MP 6.5. The feature presented at MP 8.0 in the Route Permit application is now located closer to Project MP 7.9.</p> <p>Note: Revisions compared to the Scoping EAW Table 12-2 are in bold.</p>						

Revised Filtered Appendix F – MDNR Hydrography Receiving Waters MDNR Hydrography Receiving Waters within 1 Mile of the Project (filtered to only include MDNR Hydrography features crossed by the Project)				
County	MDNR Unique ID or Kittle No.	MDNR Basin or Kittle Name	Crossing Milepost ^a	Notes
Otter Tail	MAJ-09023305	Stream (Intermittent)	1.6	Summit surveyed this area in 2022. There was no evidence of a waterbody. Furthermore, USACE did not flag this area in its review
Otter Tail	H-026-081-012	Pelican River	1.9	This waterbody is listed in Table 12-2
Otter Tail	MAJ-09023534	Stream (Intermittent)	3.6	Summit surveyed this area in 2021. There was no evidence of a waterbody. Furthermore, USACE did not flag this area in its review
Otter Tail	MAJ-09023534	Drainage Ditch (Intermittent)	4.2 and 4.7	This feature intersects the Project centerline twice (MP 4.2 and 4.7). Both crossings of this waterbody are listed in Table 12-2
Otter Tail	MAJ-09022525	Stream (Intermittent)	5.0 and 5.3	The MDNR Hydrography Dataset feature intersects the Project centerline twice (MP 5.0 and 5.3). Summit surveyed this area in 2023. Waterbody signatures were documented during survey at MP 5.0. This waterbody is listed in Table 12-2. Wetland signatures were documented during survey at MP 5.3 (see Appendix 10 (Wetland Crossing Table) of the Route Permit).
Otter Tail	MAJ-09023593	Stream (Intermittent)	5.7	Wetland signatures were documented during survey (see Appendix 10 (Wetland Crossing Table) of the Route Permit Application)
Otter Tail	MAJ-09023571	Stream (Intermittent)	6.5^b	This waterbody is listed in Table 12-2
Otter Tail	MAJ-09023619	Stream (Intermittent)	9.8	Summit surveyed this area in 2022. There was no evidence of a waterbody. Furthermore, USACE did not flag this area in its review
Otter Tail	MAJ-09023556	Drainage Ditch (Intermittent)	10.8	This waterbody is listed in Table 12-2
Wilkin	MAJ-09022982	Drainage Ditch (Intermittent)	12.8	Wetland signatures were documented during survey (see Appendix 10 (Wetland Crossing Table) of the Route Permit Application)
Wilkin	MAJ-09022827	Drainage Ditch (Intermittent)	14.3	Wetland signatures were documented during survey (see Appendix 10 (Wetland Crossing Table) of the Route Permit Application)
Wilkin	MAJ-09022943	Stream (Intermittent)	15.3	Summit surveyed this area in 2022. There was no evidence of a waterbody. Furthermore, USACE did not flag this area in its review
Wilkin	MAJ-09022585	Drainage Ditch (Intermittent)	15.8	Summit surveyed this area in 2022. There was no evidence of a waterbody. Furthermore, USACE did not flag this area in its review

Revised Filtered Appendix F – MDNR Hydrography Receiving Waters MDNR Hydrography Receiving Waters within 1 Mile of the Project (filtered to only include MDNR Hydrography features crossed by the Project)				
County	MDNR Unique ID or Kittle No.	MDNR Basin or Kittle Name	Crossing Milepost ^a	Notes
Wilkin	MAJ-09022807	Drainage Ditch (Intermittent)	17.2	This waterbody is listed in Table 12-2
Wilkin	MAJ-09022834	Stream (Intermittent)	18.1	Summit surveyed this area in 2022. There was no evidence of a waterbody. Furthermore, USACE did not flag this area in its review
Wilkin	H-026-081	Otter Tail River	19.5	This waterbody is listed in Table 12-2
Wilkin	MAJ-0902439	Drainage Ditch (Intermittent)	22.8	Wetland signatures were documented during survey (see Appendix 10 (Wetland Crossing Table) of the Route Permit Application). The milepost in Appendix 10 is approximate as this wetland also runs parallel to the Project design.
Wilkin	MAJ-0902316	Drainage Ditch (Intermittent)	23.3	Wetland signatures were documented during survey (see Appendix 10 (Wetland Crossing Table) of the Route Permit Application). The milepost in Appendix 10 is approximate as this wetland also runs parallel to the Project design.
Wilkin	MAJ-0902388/ MAJ-0902329	Drainage Ditch (Intermittent)	23.5	Multiple MDNR Hydrography Dataset features run adjacent to the Project from MP 21.5 to MP 24.3. As stated by the MPCA on page 3 of its May 16, 2023 letter, approximate milepost 23.3 is start of County Ditch 35 (AUIDs 09020101-531/-532) running adjacent to the proposed centerline. The county ditch was surveyed in 2022 and delineated as a wetland, not a waterbody/intermittent drainage ditch due to the lack of a defined ordinary high-water mark. The Project doesn't cross the county ditch until MP 24.3 (refer to that MP crossing).
Wilkin	MAJ-0902461	Drainage Ditch (Intermittent)	23.8	Summit surveyed this area in 2022. There was no evidence of a waterbody. Furthermore, USACE did not flag this area in its review
Wilkin	MAJ-0902329/ MAJ-0902336	Drainage Ditch (Intermittent)	24.3	As stated by the MPCA on page 3 of its May 16, 2023 letter, approximate milepost 23.3 is start of County Ditch 35 (AUIDs 09020101-531/-532) running adjacent to the proposed centerline. Note that this segment of the county ditch was surveyed on 5/9/2022 and delineated as a wetland (ID: W1019WI002), not a waterbody/intermittent drainage ditch due to the lack of a defined ordinary high-water mark (see Appendix 10 (Wetland Crossing Table) of the Route Permit Application). The milepost in Appendix 10 is approximate as this wetland runs parallel to the Project design.
Wilkin	H-026-082	Unnamed Creek	25.0	This waterbody is listed in Table 12-2
Wilkin	H-026	Bois de Sioux River	28.1	This waterbody is listed in Table 12-2

Revised Filtered Appendix F – MDNR Hydrography Receiving Waters MDNR Hydrography Receiving Waters within 1 Mile of the Project (filtered to only include MDNR Hydrography features crossed by the Project)				
County	MDNR Unique ID or Kittle No.	MDNR Basin or Kittle Name	Crossing Milepost ^a	Notes
Source: https://gisdata.mn.gov/dataset/water-dnr-hydrography ^a Revisions compared to the Scoping EAW Appendix F are bold. Crossing mileposts have been updated to reflect where the feature crosses the Project centerline based on survey or desktop data. ^b The feature presented at MP 6.6 in the Route Permit application is now located closer to Project MP 6.5.				

Revised Appendix F - Impaired Waters Impaired Waters within 1 Mile of the Project									
County	Name	Reach Description	Use Classification	Category	Affected Use	Approved TMDL Plan	Impairments	Crosses Centerline (Y/N)	Milepost ^a
Otter Tail	Otter Tail River	Unnamed lk (56-0821-00) to Pelican R	1C, 2Bdg	4A	AQR	E.coli	E.coli	N	1.7
Otter Tail	Pelican River	Reed Cr to Otter Tail R	2Bg	4A	AQR	E.coli	E.coli	Y	1.9
Wilkin	Judicial Ditch 2	Unnamed ditch along 190th St to Otter Tail R	2Bg	4A 5	AQR AQL	E.coli N/A	E.coli; DO; FishesBio	Y ^b	10.8
Wilkin	Otter Tail River	JD 2 to Breckenridge Lk	1C, 2Bdg	4A	AQL	InvertBio; T	InvertBio; T	Y	19.5
Wilkin	Unnamed Creek (Doran Slough)	Headwaters to Bois de Sioux R	2Bg	4A 5	AQR AQL	E.coli Required	E.coli DO	Y	25.0
Wilkin	Bois de Sioux River	Rabbit R to Otter Tail R	2Bg	5 4A	AQR AQC,AQL	Required DO; FishesBio; Hg-F; Nutrients; T	E.coli DO; FishesBio; Hg-F; Nutrients; T	Y	28.1
Source: https://www.pca.state.mn.us/air-water-land-climate/minnesotas-impaired-waters-list ^a Revisions compared to the Scoping EAW Appendix F are bold. Crossing mileposts have been updated to reflect where the feature crosses the centerline based on survey or desktop data. ^b As stated by the MPCA on page 3 of its May 16, 2023 letter, "Milepost 10.8 (#MAJ-09023556) and MP 10.9 (#MAJ-09022356) are both separate reaches of Judicial Ditch 2. The "reaches" are intersected by 190th Street and now the project centerline. South of the centerline is the impaired reach AUID 09020103-764 from 190th Street to the Otter Tail River." The centerline crosses north of the reach not presently designated as impaired. However, as requested by MPCA, Summit has included the adjacent impairment.									



Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

August 23, 2023

Correspondence # MCE 2023-00306

Sarah Stai
Merjent, Inc.

RE: Natural Heritage Review of the proposed SCS – Otter Tail to Wilkin Project,
Otter Tail and Wilkin Counties

Dear Sarah Stai,

As requested, the [Minnesota Natural Heritage Information System](#) has been reviewed to determine if the proposed project has the potential to impact any rare species or other significant natural features. Based on the project details provided with the request, the following rare features may be impacted by the proposed project:

Ecologically Significant Areas

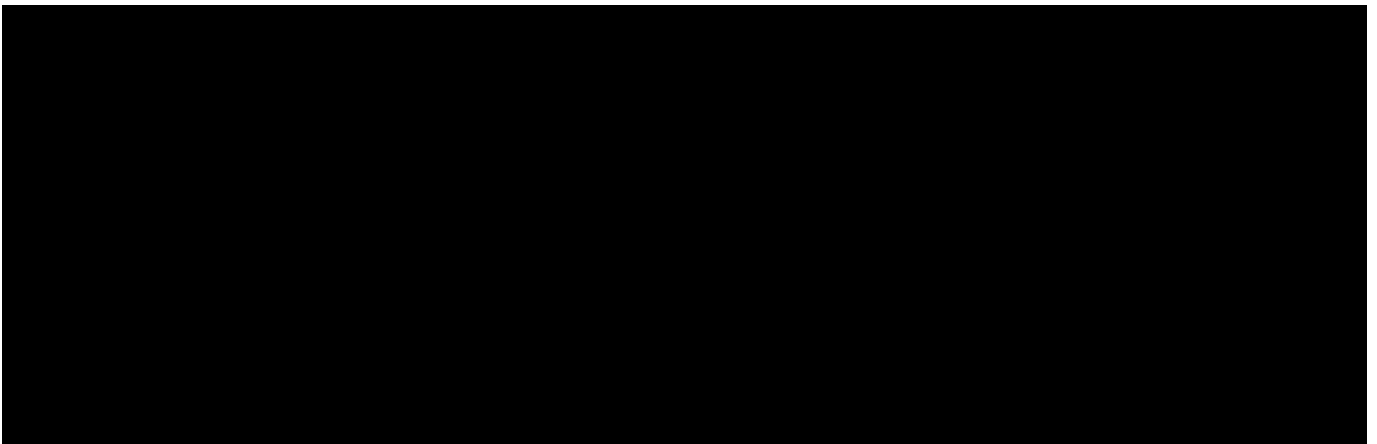
- The Minnesota Biological Survey (MBS) has identified two Sites of *Moderate* Biodiversity Significance adjacent to the proposed project. These are in T132N R44W Sections 8 and 9. Sites of Biodiversity Significance have varying levels of native biodiversity and are ranked based on the relative significance of this biodiversity at a statewide level. Sites ranked as *Moderate* contain occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery. The MBS Site in Section 9 has a mapped example of UPn23b – Mesic Prairie (Northern), which has a state conservation rank of S2: Imperiled and a rare [REDACTED] a species of special concern that is often found in mesic prairies. More than 99% of the prairie that was present in the state before settlement has been destroyed, and more than one-third of Minnesota's endangered, threatened, and special concern species are now dependent on the remaining small fragments of Minnesota's prairie ecosystem. Therefore, we feel that all prairie remnants merit protection. We encourage you to consider project alternatives that would avoid or minimize disturbance to these ecologically significant areas.

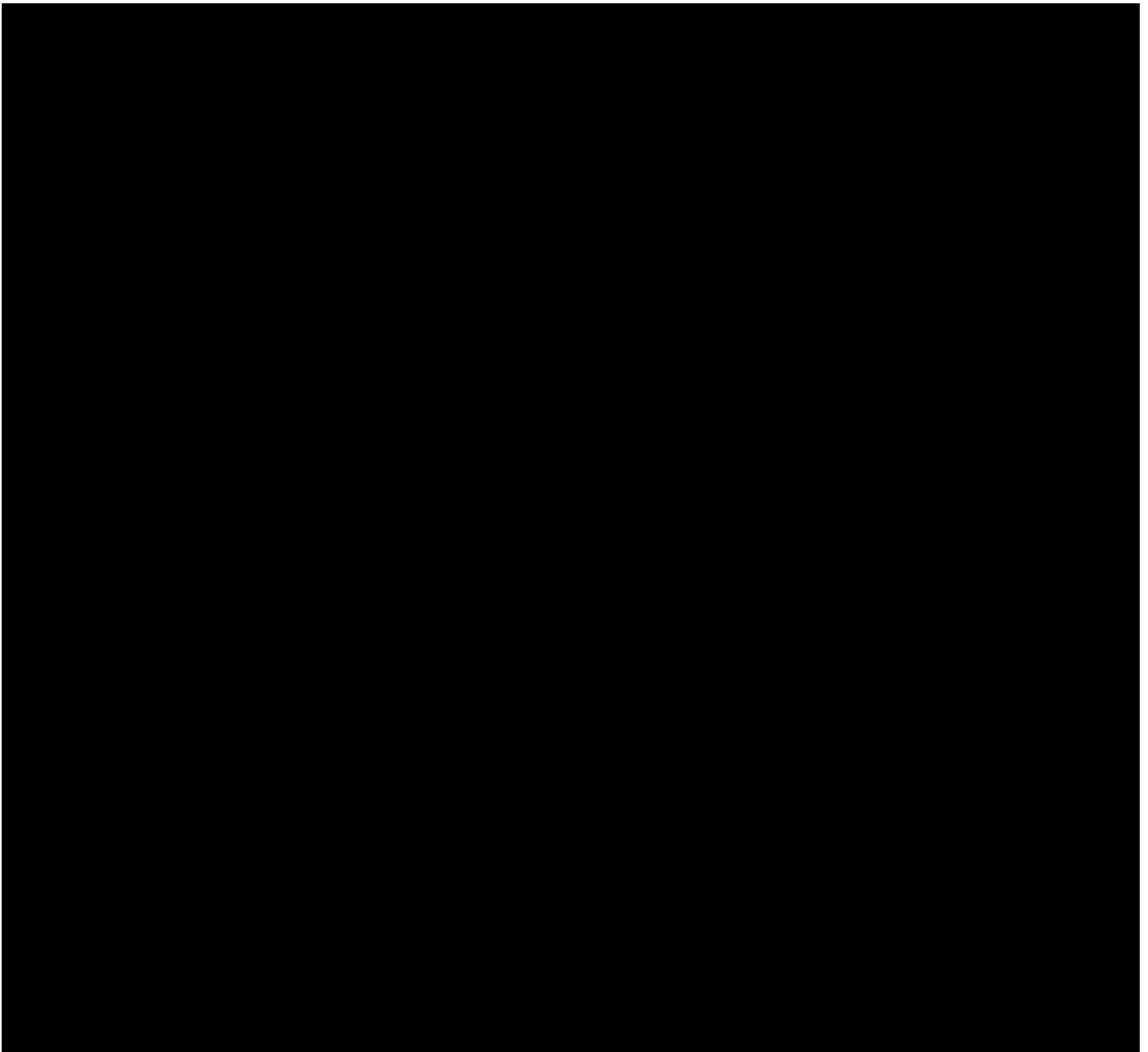
- As much as possible, operate within already-disturbed areas;
- Retain a buffer between proposed activities and the MBS Site;
- Minimize vehicular disturbance in the area (allow only vehicles necessary for the proposed work);
- Do not park equipment or stockpile supplies in the area;
- Do not place spoil within MBS Sites or other sensitive areas;
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species;
- If possible, conduct the work under frozen ground conditions;
- Use effective erosion prevention and sediment control measures;
- Revegetate disturbed soil with [native species suitable to the local habitat](#) as soon after construction as possible; and
- Use only weed-free mulches, topsoils, and seed mixes. Of particular concern is birdsfoot trefoil (*Lotus corniculatus*) and crown vetch (*Coronilla varia*), two invasive species that are sold commercially and are problematic in prairies and disturbed open areas, such as roadsides.

MBS Sites of Biodiversity Significance and DNR Native Plant Communities can be viewed using the [Minnesota Conservation Explorer](#) or their GIS shapefiles can be downloaded from the [MN Geospatial Commons](#). Please contact the [NH Review Team](#) if you need assistance accessing the data. Reference the [MBS Site Biodiversity Significance](#) and [Native Plant Community](#) websites for information on interpreting the data.

- Approximately the eastern half of the proposed project is within an area identified as *Prairie Corridor* in the [Minnesota Prairie Conservation Plan](#), a twenty-five year strategy for accelerating prairie conservation in the state. To meet the Plan's goals, areas within *Prairie Corridor* Areas will need to include restoration. As such, any efforts toward [prairie or grassland restoration](#) after project construction are encouraged.

State-listed Species





- Please visit the [DNR Rare Species Guide](#) for more information on the habitat use of these species and recommended measures to avoid or minimize impacts. For further assistance with these species, please contact the appropriate [DNR Regional Nongame Specialist](#) or [Regional Ecologist](#).

Federally Protected Species

- To ensure compliance with federal law, conduct a federal regulatory review using the U.S. Fish and Wildlife Service's (USFWS) online [Information for Planning and Consultation \(IPaC\) tool](#).

Environmental Review and Permitting

- Please include a copy of this letter and the MCE-generated Final Project Report in any state or local license or permit application. Please note that measures to avoid or minimize disturbance

to the above rare features may be included as restrictions or conditions in any required permits or licenses.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location and project description provided with the request. If project details change or the project has not occurred within one year, please resubmit the project for review within one year of initiating project activities.

The Natural Heritage Review does not constitute project approval by the Department of Natural Resources. Instead, it identifies issues regarding known occurrences of rare features and potential impacts to these rare features. Visit the [Natural Heritage Review website](#) for additional information regarding this process, survey guidance, and other related information. For information on the environmental review process or other natural resource concerns, you may contact your [DNR Regional Environmental Assessment Ecologist](#).

Thank you for consulting us on this matter and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

A handwritten signature in black ink that reads "James Drake". The signature is written in a cursive, flowing style.

James Drake
Natural Heritage Review Specialist
James.F.Drake@state.mn.us

Cc: Owen Baird



May 19, 2023

Ms. Lisa Joyal
Endangered Species Review Coordinator
NHIS Data Distribution Coordinator
Division of Ecological and Water Resources
Minnesota Department of Natural Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155

Subject: Summit Carbon Solutions Otter Tail to Wilkin Project
Review of NHIS and Sensitive Biological Resource Data and Request for Concurrence
Minnesota Conservation Explorer #2023-00306

Dear Ms. Joyal:

Summit Carbon Solutions (SCS) is proposing to build a new carbon capture, pipeline, and storage project referred to as the Midwest Carbon Express (MCE) Project. The MCE Project will capture and transport carbon dioxide (CO₂) from industrial facilities located across Minnesota, Iowa, Nebraska, North Dakota, and South Dakota and transport the CO₂ to a sequestration area in North Dakota, where the CO₂ will be safely and permanently stored. Once operational, the MCE Project will include approximately 2,000 miles of pipeline.

In Minnesota, as part of the larger MCE Project, SCS is proposing five pipeline laterals. One of these laterals is referred to as the Otter Tail to Wilkin Project (the Project, also referred to as lateral "MNL-321"). The Project will capture and transport CO₂ from the existing Green Plains Otter Tail Ethanol Plant near Fergus Falls, Minnesota, to the Minnesota and North Dakota border, where it will connect to SCS infrastructure in North Dakota. The Project includes construction of approximately 28.1 miles of 4-inch diameter carbon steel pipeline, a CO₂ capture facility located at the Green Plains Ethanol Plant, mainline valves, and access roads (Figure 1).

SCS submitted a Route Permit Application to the Minnesota Public Utilities Commission (MPUC) in September 2022 and will submit state permit applications later in 2023. SCS proposes to construct the Project between the third quarter of 2024 and the fourth quarter of 2024. Construction timing is contingent on receipt of all required permits and authorizations. Construction of the pipeline would take approximately 3 months.

SCS has contracted Merjent, Inc. (Merjent) to conduct environmental surveys and permitting related to the Project. SCS and Merjent first met with representatives of the Minnesota Department of Natural Resources (MDNR) regarding the larger MCE Project on September 30, 2021. SCS submitted a letter to MDNR on April 5, 2022, requesting consultation for Natural Heritage Information System (NHIS) data for the larger MCE Project as well as approval of a survey protocol for sensitive [REDACTED] species. MDNR responded to the letter on May 13, 2022, providing a response to SCS's NHIS review and approving SCS's



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survey protocol (Correspondence # MCE 2022-00341). SCS then completed sensitive [REDACTED] surveys in 2022 under the MDNR-approved protocol.

SCS is pursuing separate permitting paths for the Minnesota laterals due to distinct construction timelines and geographic areas. In early 2023, Merjent and SCS advised MDNR that they would be providing an updated Project footprint from which MDNR could update its review of the Project, as the Project design had changed since MDNR's initial review. The updated Project footprint was provided on May 19, 2023, and the same design was used in the analysis contained herein.

The purpose of this letter is to update Merjent's review, completed on behalf of SCS, of state-listed species¹ and other sensitive biological resources that may be found in the Project area. This letter includes a review of the MDNR data sources listed in Table 1. This review was also informed by sensitive [REDACTED] surveys completed by SCS in 2022 under the MDNR-approved survey protocol. SCS requests MDNR concurrence with the results of this review and input on the impact avoidance and minimization approach outlined in this letter.

Table 1 Sensitive Biological Resource Data Sources		
MDNR Data	Source	Content Date
NHIS	License Agreement 1066 (Merjent)	2/15/2022
Minnesota Biological Survey (MBS) Sites	Minnesota Geospatial Commons	2/16/2023
Native Plant Community (NPC)		2/10/2023
Railroad Rights-of-Way (RR ROW) Prairie		7/27/2017
Calcareous Fens	Minnesota Geospatial Commons and MDNR List of Known Calcareous Fens ^a	3/22/2023
^a http://files.dnr.state.mn.us/eco/wetlands/calcareous_fen_list.pdf - Last Update 10/2021		

Merjent also reviewed the Project in the Minnesota Conservation Explorer on April 14, 2023. The NHIS occurrences in Minnesota Conservation Explorer within 1 mile of the Project were consistent with the NHIS features listed in Table 2 below. The Project was assigned ID #2023-00306.

The Conservation Planning Report generated by Minnesota Conservation Explorer on the same date was consistent with the MBS site and NPCs summarized below in Tables 4 and 5. The report also noted the presence of two Minnesota Prairie Conservation Plan areas within 330 feet of the Project. Regarding other ecologically sensitive areas within the automated search distances, there were no MDNR Old Growth Stands or Lakes of Biological Significance within 330 feet, no Important Bird Areas within 1 mile, and no Calcareous Fens within 5 miles. According to the U.S. Fish and Wildlife Service Regulatory Layers section of the report, there were no Rusty Patched Bumblebee High Potential Zones within the search area.

Project Construction and Operations

The width of the construction workspace will range from 25 to 100 feet wide. Generally, a 100-foot-wide construction workspace will be used when crossing uplands, and a 75-foot-wide construction workspace will be used when crossing wetlands and waterbodies, plus additional temporary workspace (ATWS) as

¹ The status of state-listed species is based on http://files.dnr.state.mn.us/natural_resources/ets/endlist.pdf, dated August 19, 2013.

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needed. The construction workspace will be further reduced to 50 feet wide at horizontal directional drill (HDD) or bore crossings of waterbodies, roads, and railroads if a travel lane is not needed across the feature. For HDDs and bores of waterbodies where there will not be a travel lane within the right-of-way (ROW) (i.e., use of a bridge), there will be no clearing over the HDD path. SCS may trim vegetation using hand tools where necessary to access a water source to withdraw water for HDD operations and/or hydrostatic testing of the pipeline and/or to place the HDD guidewires. Temporary access roads will be used to access the construction workspace from adjacent roads.

Following construction, the permanent ROW will be 25-50 feet wide, centered on the pipeline, and will be wholly contained within the construction workspace. SCS will maintain permanent access roads to access valve sites. During operations, SCS will maintain an herbaceous corridor within the permanent ROW along the pipeline by removing woody shrubs and trimming branches that obscure visual inspection of the pipeline approximately every 3 to 5 years. Adjacent to waterbodies, post-construction vegetation maintenance will be limited to promote the growth of the riparian buffer. Only vegetation within a 10-foot-wide corridor centered over the pipeline will be maintained in an herbaceous state. Vegetation between HDD or bore entry and exit points where there is no travel lane will not be routinely cleared or mowed.

Review of NHIS and Sensitive Biological Resource Data

The next several paragraphs and tables summarize the following five components of the sensitive resources review.

- 1) The NHIS records within 1 mile on either side of the construction footprint (i.e., the construction workspace [including ATWS] and access roads) are listed in Table 2.
- 2) The results of 2022 Project-specific surveys for state-listed [REDACTED] are provided in Table 3.
- 3) The MBS sites, NPCs, and RR ROW Prairies within 330 feet on either side of the construction footprint are in Tables 4, 5, and 6, respectively.
- 4) The results of review of calcareous fens within 5 miles of the construction footprint are stated.
- 5) The Minnesota Prairie Conservation Plan areas are addressed in the last paragraph before the *Impact Avoidance and Minimization Approach* section of this letter.

Following the summary of the data review is an outline of SCS's approach for avoiding and minimizing Project construction impacts on sensitive features. SCS requests MDNR concurrence with the results of this review and the impact avoidance and minimization approaches outlined in this letter.

1) NHIS Review

There are NHIS records for [REDACTED] species within 1 mile of the construction footprint. The species are listed in Table 2, in order by the nearest milepost (MP) for each species.



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Table 2 NHIS Records of State-listed Species Within 1 Mile of the Project			
Nearest MP	MN Species State Status County (Last Observed Year) ^a	Location Relative to Project	Potential for Impact
[REDACTED]	[REDACTED]	[REDACTED]	Avoided
	Special Concern Otter Tail County (2017)		Avoided
			Avoided
			Avoided
			Avoided
			Avoided
			Avoided
	[REDACTED]		Avoided
	Threatened [REDACTED] Otter Tail County (1991) [REDACTED] Wilkin County (2004)		Avoided
	[REDACTED]		Avoided
	Special Concern Otter Tail County (2000)		Avoided
			Avoided
	[REDACTED]		Avoided
	Special Concern Otter Tail County (2004)		Avoided
	[REDACTED]		Avoided
	Special Concern Wilkin County (2012)		
^a For species with more than one NHIS occurrence within 1 mile, the most recent of the last observed years is given. Survey Implication: ^b The presence of [REDACTED] within 1 mile prompted the selection of three survey sites within the environmental survey area in 2022 (see Table 3). ^c No survey is planned because the [REDACTED] will be crossed with a trenchless method. ^d MDNR has not requested surveys for these species.			

2) 202 [REDACTED] Survey Findings

Merjen [REDACTED] surveyed for state-listed [REDACTED] using a protocol with which MDNR concurred on May 13, 2022. As part of the same effort [REDACTED] assessed potential habitat for the [REDACTED] a species for which SCS is consulting



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with the U.S. Fish and Wildlife Service because of the federal status of this species. Merjent submitted a report of the 2022 survey results to MDNR on February 28, 2023.

Table 3 Findings of 2022 State-listed [REDACTED] Surveys				
Nearest MP	Species or <u>Habitat</u>	Status	Result	Potential for Impact
[REDACTED]	Habitat only: [REDACTED]	Threatened (Federal), Endangered (State)	Wet prairie/sedge meadow and mesic prairie habitats were located [REDACTED] [REDACTED] habitats overlap the construction workspace. No individuals were observed.	Habitat Crossed
[REDACTED]	[REDACTED]	Special Concern (State)	[REDACTED]	Individuals Avoided

3) Sensitive Ecological Communities

There is one MBS site within 330 feet on either side of the construction footprint (Table 4), a portion of which is crossed by the construction footprint.

Table 4 MBS Sites Within 330 Feet of the Project					
Nearest MP	Site Name	Biodiversity Significance	MDNR Status	Location Relative to Project	Potential for Impact
7.1-7.9	Orwell 9	Moderate	Final	The MBS site occurs in two parts relative to the Project. MPs 7.1-7.5: The west side of the Project construction workspace is adjacent to the MBS site, with ~200 feet of overlap near MP 7.5 and otherwise 0-200 feet apart. MPs 7.5-7.9: The east side of the Project construction workspace is adjacent to the MBS site, ~40-90 feet apart.	Crossed in One Area

There are two NPCs of the same type within 330 feet on either side of the construction footprint (Table 5). This type is designated as Native Prairie and has a State Conservation Status Rank (s-rank) of S2. The NPCs are located within the portion of the MBS site listed in Table 4 that is not crossed by the construction footprint.

Table 5 NPCs Within 330 Feet of the Project				
Nearest MP	Related MBS Site	NPC Type	Location Relative to Project	Potential for Impact
7.5-7.9	Orwell 9	UPn23b - Mesic Prairie (Northern)	The NPC has the same boundaries as the Orwell 9 MBS site that is east of the Project construction workspace; therefore, it is ~40-90 feet away from the construction workspace.	Avoided



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There are two RR ROW Prairies within 330 feet of the Project (Table 6); both are crossed by the construction footprint.

Table 6 RR ROW Prairie Within 330 Feet of the Project				
Nearest MP	Related MBS Site	Railroad, Prairie Type, Quality (Year)	Location Relative to Project	Potential for Impact
3.3	None	Ottertail Valley Railroad, Wet Mesic Prairie, Fair (1998)	Crossed by the Project construction workspace.	Avoided with Construction Method
24.5	None	Burlington Northern and Santa Fe Railroad, Mesic Prairie, Good (1998)	Crossed by the Project construction workspace.	Avoided with Construction Method

4) Calcareous Fens

There are no Calcareous Fens within 5 miles of the construction footprint.

5) Minnesota Prairie Conservation Plan Areas

According to the Conservation Planning Report from Minnesota Conservation Explorer, the Prairie Conservation Plan is a 25-year strategy for accelerating prairie conservation in Minnesota. The Plan identifies Corridors in which to focus protection, enhancement, and restoration efforts for grassland and wetland habitat, with the goal of providing small “stepping stones” of habitat between larger areas of habitat called Corridor Complexes and Core Areas.

There were two Corridors overlapping the Project, one designated as Alexandria Moraine (approximate MPs 0.3-4.4) and the other as Agassiz Beach Ridges (approximate MPs 4.4-11.9). The Project generally crosses agricultural land where it overlaps the Alexandria Moraine Corridor, except for potential grassland and wetland habitat where the Project crosses the Pelican River at MP 1.9. The Project also crosses agricultural land where it overlaps the Agassiz Beach Ridges Corridor, except where the route is associated with the Orwell 9 MBS site (MPs 7.1-7.9).

Impact Avoidance and Minimization Approach

SCS will seek to avoid and minimize impacts from construction of the Project on state-listed species, the MBS site, its associated NPCs, and the RR ROW Prairies. The MBS site and the RR ROW Prairies represent the areas most likely to play a role in conservation efforts associated with the Minnesota Prairie Conservation Plan.

Generally, impacts on ecologically sensitive features will be avoided and minimized by clear marking in the field of construction workspace boundaries; the short duration of construction activities in any given area; restoration to pre-construction conditions after construction; and restriction of operational activities to the 50-foot-wide permanent easement.

More specific impact avoidance and minimization and measures are discussed below, first for the four locations where features identified above overlap the Project construction workspace [REDACTED] and then to address the remaining features (from Table 2).



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MP 1.9

Minnesota Prairie Conservation Plan Alexandria Moraine Corridor

There is potential grassland and wetland habitat where the Project intersects [REDACTED] within the Alexandria Moraine Corridor. SCS will cross the [REDACTED] with a trenchless HDD method, and construction vehicles will not travel between the HDD [REDACTED] exit points. Because any potential grassland and wetland habitat is located between the HDD entry and exit points, there will be no habitat impacts.

MP 3.3

Ottertail Valley Railroad

[REDACTED] CS will cross the railroad and the RR ROW Prairie habitat with a trenchless HDD method, and construction vehicles will not travel over the operating railroad and the adjacent habitat. Therefore, there will be no impacts on the RR ROW Prairie habitat.

MP [REDACTED]

Orwell 9 MBS site, NPC UPn23b [REDACTED]

[REDACTED] and Minnesota Prairie Conservation Plan Agassiz Beach Ridges Corridor

Between MPs [REDACTED] which is within the Agassiz Beach Ridges Corridor, the construction workspace overlaps the MBS site, including the [REDACTED] between MPs [REDACTED] and the NPC is within about 40 feet [REDACTED]

[REDACTED] The likelihood and magnitude of impact on these resources is limited. The overlap between the MBS site and the construction workspace extends only for approximately 200 feet [REDACTED]

The likelihood and magnitude of impact on the MBS site and [REDACTED] between MPs [REDACTED] is also limited because of best management practices (BMPs) to which SCS has committed in its Route Permit Application as well as in its Minnesota Environmental Construction Plan (Minnesota ECP). These BMPs, proposed for MBS sites and NPCs by MDNR in feedback provided on May 13, 2022, include the following.

- Do not park equipment, stockpile supplies, or place spoil within the MBS sites.
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species.
- Use effective erosion prevention and sediment control measures.
- Revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible.
- Use only weed-free mulches and seed mixes.

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Given the [REDACTED] in the vicinity of the Project, it is possible that individuals of this species could be impacted during construction, depending on the timing. Wildlife such as [REDACTED] may be temporarily displaced by the noise and disturbance of [REDACTED] co [REDACTED] o species mobility, the impacts would likely be small, highly localized, and short-term. Also, as requested by MDNR in the feedback provided on May 13, 2022, SCS has committed to the use of wildlife-friendly erosion and sediment control BMPs that contain biodegradable netting (Category 3N or 4N natural fibers) and to avoid the use of plastic mesh. Both BMPs help to minimize wildlife mortality resulting from the use of erosion and sediment control materials.

MP 24.5*Burlington Northern and Santa Fe Railroad*

[REDACTED] CS will cross the railroad and the RR ROW Prairie habitat with a trenchless HDD method, and construction vehicles will not travel over the operating railroad and the adjacent habitat. Therefore, there will be no impacts on the RR ROW Prairie habitat.

Other Features From Table 2

[REDACTED]
The potential for impacts on these species is generally low due to the predominance of agricultural land within the construction footprint and thus the overall lack of suitable habitat for sensitive [REDACTED] species. Additionally, as discussed for [REDACTED] above, any impacts would depend on construction timing (and if they did occur, would likely be small, highly localized, and short-term) and would be limited by implementing the wildlife-friendly BMPs recommended by MDNR.

[REDACTED]
The potential for impacts on this species is also low, because SCS will use a trenchless HDD method to cross the [REDACTED] HDD entry and exit points will be placed away from the water's edge, and SCS will follow its Minnesota ECP and Stormwater Pollution Prevention Plan to prevent sediment from entering waterbodies and to prevent spills. SCS will restore these areas following construction as outlined in its Minnesota ECP. In its NHIS comments from May 13, 2022, MDNR stated that the potential impacts from the release of CO₂ into waterbodies should be studied in the Environmental Assessment Worksheet for the Project. Potential impacts from a release of CO₂ in waterbodies are presented in the Minnesota Department of Commerce, Energy and Environmental Review and Analysis (DOC-EERA) April 2023 Scoping Environmental Assessment Worksheet² and have been proposed for additional study in the Environmental Impact Statement for the Project, as stated in the April 2023 Draft Scoping Decision Document.³

² <https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={001E6D87-0000-CE10-B0F1-200C8EC9747A}&documentTitle=20234-194669-01>

³ <https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={20FA7087-0000-C910-A654-35B08E623FA9}&documentTitle=20234-194680-01>



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Conclusion

SCS reviewed the Project using Minnesota Conservation Explorer; reviewed NHIS occurrences of state-listed species within 1 mile of the Project construction footprint; conducted Project-specific field surveys in 2022; evaluated occurrences of MBS sites, NPCs, RR ROW Prairies, and other ecologically sensitive areas within 330 feet of the construction footprint; and checked for Calcareous Fens within 5 miles of the construction footprint. This letter provides a summary of that review and an outline of SCS's approach to avoid and minimize potential impacts. SCS requests MDNR concurrence with the results of this review and input on the impact avoidance and minimization approach outlined in this letter. Please contact Jason Zoller at 515-384-0958 or JZoller@summitcarbon.com should you have any questions regarding the Project.

Thank you for your consideration.

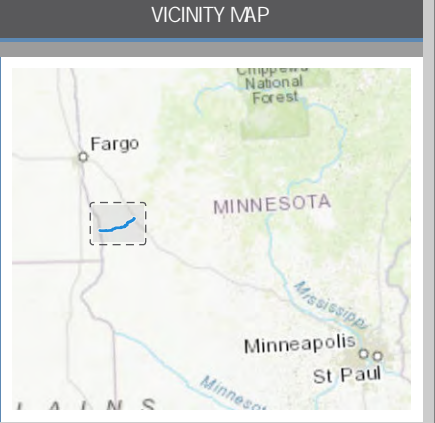
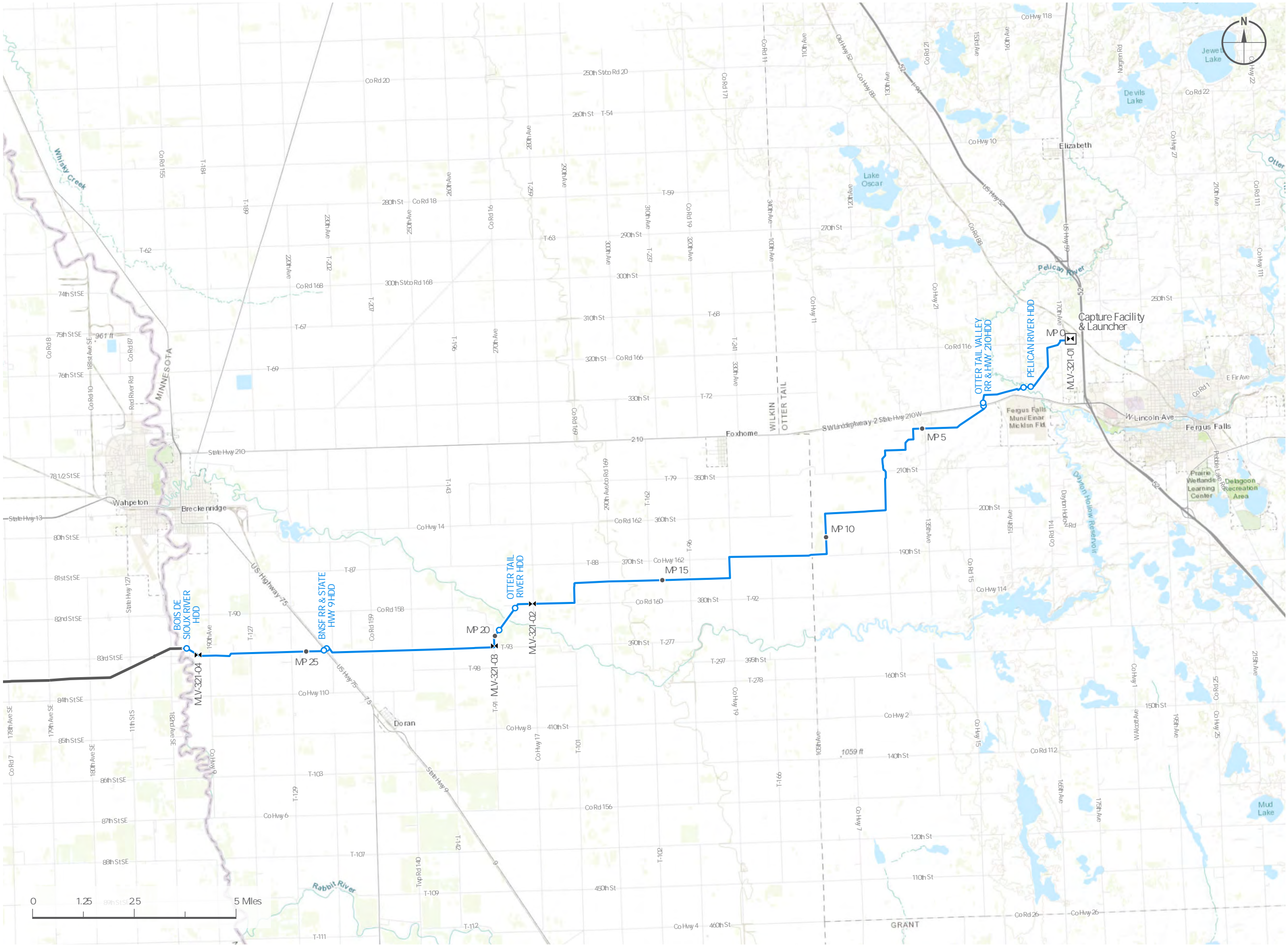
Sincerely,

John Satterfield
Summit Carbon Solutions

Enclosure: Figure 1 – Project Overview

Cc (email): Cynthia Warzecha, MDNR
Owen Baird, MDNR
Sarah Stai, Merjent
Britta Bergland, Merjent
Jason Zoller, SCS
Eric Lindeen, SCS

OVERVIEWFIGURE FOR THE SUMMT CARBON SOLUTIONS OTTER TAIL TO WLKIN PROJECT



LEGEND

- Horizontal Directional Drill (HDD) Entry/Exit
- Valve
- Capture Facility
- Milepost
- Proposed Otter Tail to Wilkin Project
- Other Proposed SCS Pipeline

REVISIONS			
Date:	2022-09-01	Revised by:	GS
0 - Issued for Use			
Issued figure for use in MNPUC.			
Date:	2023-03-29	Revised by:	PD
1 - Issued for Use			
Revised figure for use in MDNR permit application.			
Date:		Revised by:	

PREPARED BY

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Ames, Iowa 50010
United States of America
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SUMMIT CARBON SOLUTIONS PROJECT	
Figure Title:	Overview Figure for the Summit Carbon Solutions Otter Tail to Wilkin Project
Figure Number:	Figure 1
Scale:	1 : 150,000 1 inch equals 2.37 miles
Projection:	Transverse Mercator NAD 1983 UTM Zone 14N F.T.
Sheet:	1 of 1
Drawing Number:	1002-06-005 Revision 1

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: November 9, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: Preferably no later than November 17, 2023

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: *“Requested information sent to whom by what means on date.”*

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. Please provide the anticipated depth of each proposed HDD.

Pending completion of all studies and final design, the anticipated depths of each proposed HDD are as follows:

- **BNSF Railroad & Highway 75** – the HDD will provide for a minimum of 20 feet of cover below the railroad and roadway.
- **Bois De Sioux River** – the HDD will provide for a minimum of 25 feet of cover at the deepest point of the river.
- **Otter Tail River** – the HDD will provide for a minimum of 25 feet of cover at the deepest point of the river.
- **Otter Tail Valley Railroad & Highway 210** – the HDD will provide for a minimum of 20 feet of cover below the railroad and roadway.
- **Pelican River** – the HDD will provide for a minimum of 25 feet of cover at the deepest point of the river.

2. Provide results of the geotechnical investigations (reports) conducted for the Otter Tail River and Bois de Sioux River HDD crossings. Provide a description of the subsurface geology at the Pelican River HDD and a preliminary assessment of feasibility and likely depth of the HDD based on available literature.

The geotechnical reports for the Bois de Sioux and Otter Tail River crossings have been posted to the Otter Tail to Wilkin Project Sharepoint site Attachment 6-02.

According to the USDA Web Soil Survey, the soils in the area of the proposed Pelican River crossing consist of loam and silty to sandy loam from 0-60 feet deep. Based on soil data and professional knowledge/experience of this area, Summit does not have any constructability concerns for the proposed HDD crossing of the Pelican River. The depth of the HDD at the Pelican River crossing will be a minimum of 25 feet below the deepest point of the river. Summit's drilling contractor will prepare the final design of the HDD once geotechnical data is collected at the site.

3. Provide information on any equipment or training to be provided to local emergency responders. Also provide information on any reimbursement for training or equipment costs that would be offered to local emergency responders. Identify the distance from the pipeline any equipment, training, or reimbursement would be offered.

Summit will provide CO₂ air monitoring equipment to ensure the safety of first responders. Preparedness training will be focused on responders' duties to protect the public. Initial response tactics will be developed and exercised with Summit operations staff. All costs associated with CO₂ training and air monitoring equipment will be paid by Summit. The distance to which the equipment, training, and reimbursement would be provided will be discussed and decided with Emergency Managers and first responders during preparedness training, based on the location of nearest residents and the capabilities of the first responders.

4. Provide a summary of coordination with PHMSA. This summary should include a detailed description of the process for completing PHMSA review of design, engineering, and operational safety. Provide a summary of the data the company will provide PHMSA and a listing of any data/information the company has received from PHMSA. List necessary PHMSA approvals. Describe what process steps still remain to complete necessary PHMSA approvals.

PHMSA will audit a variety of tasks throughout manufacturing, construction, and operation to ensure compliance with federal regulations. PHMSA has stated they plan to be involved in Summit's pipe manufacturing process, including inspecting the pipe mills and validating that the pipe manufacturers are following the specifications that Summit has outlined. PHMSA will also be heavily involved during construction. Summit has included the PHMSA Form 7 link attached below, which is used for construction inspection.

<https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/Evaluation%20Report%20of%20Liquid%20Pipeline%20Construction.pdf>

Some of the design, engineering, and operational safety items PHMSA may audit include: welding; coating; Material Test Reports; inspection (e.g., ensuring they meet construction specs); Nondestructive Examination (NDE); hydrotest documentation; survey data (e.g., depth of cover under foreign utilities); procedural manual for operations, maintenance, and emergencies; emergency response training; maps

and records; maximum operating pressure; communications; line markers; valve maintenance; pipeline repairs; pipe movement; overpressure safety devices and overfill protection systems; signs; security of facilities; public education; damage prevention program; Computational Pipeline Monitoring (CPM) leak detection; control room management; qualification of pipeline personnel; and corrosion control. This list is not exhaustive as PHMSA has broad audit authority.

Summit met with PHMSA on September 15, 2022 to discuss Summit's Fracture Control Plan. Summit, plus Summit's metallurgists, met with PHMSA employees. The meeting focused on reviewing Summit's Fracture Control Plan, and Summit answered questions posed by PHMSA about how the Fracture Control Plan was developed. No action, approval, or documents were exchanged. The Control Room Manager met with PHMSA as well.

Summit received correspondence from Alan K. Mayberry with PHMSA on September 15, 2023. The letter has been saved to the Otter Tail To Wilkin SharePoint site at Attachment 6-04.

PHMSA requires reporting under subpart B—Annual, Accident, and Safety-Related Condition Reporting; operators must report as follows:

- 195.49 Annual report.
- 195.50 Reporting accidents.
- 195.52 Immediate notice of certain accidents.
- 195.54 Accident reports.
- 195.55 Reporting safety-related conditions.
- 195.56 Filing safety-related condition reports.
- 195.440 Public awareness plan.

Operators must submit their completed programs to PHMSA upon request. The operator's program documentation and evaluation results must be available for periodic review by appropriate regulatory agencies.

5. Provide the Excel spreadsheet(s), data, equations and calculations included in analysis of Air Quality and GHG Operating and Construction Emissions used to create Appendix 12 in the route permit application. To the extent not already provided in Appendix 12 tables, this should include the numbers and types of construction vehicles included, construction rate, emissions data, roadway data to calculate emissions, hours used, power, load, handling time, average exposed area, emission factors, and other applicable required data to complete the emissions calculations, assumptions used in calculating the emissions, and name of model or equation used for calculating the emissions.

Summit has provided the requested information on the Otter Tail to Wilkin Project Sharepoint Site at Attachment 6-05.

6. During the process of separating CO₂, are any of the remaining byproducts greenhouse gases? If so, how are they being managed?

The separating process will remove water from the gas stream. After separation, the remaining gas (99% pure CO₂) will be compressed into a supercritical phase and then injected into the pipeline for transportation. A small portion of the CO₂ may be released to the atmosphere during the separation

process. This release of CO₂ will be minimized by proper operations and routine maintenance of the equipment at the capture facility. There are no other byproducts of this process that are considered greenhouse gases.

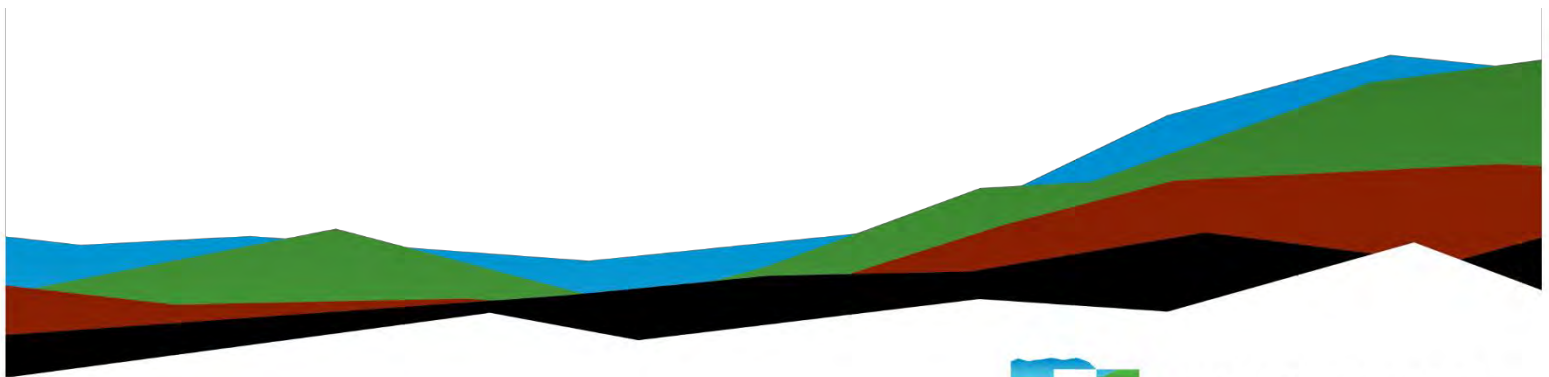
SCS Carbon Transport Pipeline – Bois de Sioux River MP 27

Geotechnical Data Report

April 26, 2023 | Terracon Project No. 13225068.25

Prepared for:

SCS Carbon Transport
2321 North Loop Drive, Suite 221
Ames, IA 50010



Nationwide
Terracon.com

- Facilities
- Environmental
- Geotechnical
- Materials



3105 Capital Way, Suite 5
Cedar Falls, IA 50613
P (319) 277-4016
Terracon.com

April 26, 2023

SCS Carbon Transport
2321 North Loop Drive, Suite 221
Ames, IA 50010

Attn: Brady Greer
P: (515)-203-3212
E: bgreer@summitcarbon.com

Re: Geotechnical Data Report
SCS Carbon Transport Pipeline – Bois de Sioux River MP 27
83rd Street SE
Richland County, North Dakota and Wilkin Co., MN
Terracon Project No. 13225068.25

Dear Mr. Greer:

We have completed the scope of Geotechnical Data services for the Bois de Sioux River MP 27 site in general accordance with Terracon Proposal No. PT225007Rev1, dated August 31, 2022. This report presents the findings of the subsurface exploration and results of the laboratory testing for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

[Terracon](http://Terracon.com)

Gregory M. Decker
Staff Engineer

Jason P. Heinz
Principal

Table of Contents

Introduction.....	1
Project Description.....	1
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General Site Geology.....	2
Subsurface Profile.....	4
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Corrosivity	5
General Comments	6


Attachments

Exploration and Testing Procedures

Site Location and Exploration Plans

Exploration and Laboratory Results

Supporting Information

Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the  Terracon logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

Refer to each individual Attachment for a listing of contents.

Introduction

This report presents the results of our subsurface exploration and Geotechnical Data services performed for the Bois de Sioux River pipeline crossing planned crossing the Red River northeast of the intersection of 83rd Street SE and 182nd Avenue SE from Richland County, North Dakota to Wilkin County, Minnesota. The purpose of Terracon's services is to provide information and geotechnical data relative to:

- Subsurface soil conditions
- Groundwater conditions

The geotechnical scope of services requested for this project included the advancement of two test borings, laboratory soil testing, and preparation of this geotechnical data report. Plans showing the site and boring location are shown on the attached [Site Location](#) and [Exploration Plan](#). The results of the laboratory testing performed on soil samples obtained from the site during our subsurface exploration are included on the boring logs and as a separate graph in the attached [Exploration and Laboratory Results](#).

Project Description

Item	Description
Project Description	A carbon dioxide pipeline crossing is planned beneath the Red River via horizontal directional drilling.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic mapping.

Item	Description
Site Location	A pipeline crossing is planned at the Bois de Sioux River, northeast of the intersection of 83rd Street SE and 182 nd Avenue SE crossing from Richland County, North Dakota to Wilkin County, Minnesota Refer to the Site Location .

Item	Description
Tract IDs	<ul style="list-style-type: none"> ■ ND-RI-321-078.000 ■ MN-WI-321-077.000
Existing Improvements	None known
Current Ground Cover	Cropland, various vegetation, and the Bois de Sioux River
Existing Topography	Based on the ground surface elevations that were estimated from LiDAR at the boring locations, the grades are relatively flat.

Geotechnical Characterization

General Site Geology

Based on a publication by John Bluemle presented in 1977 that is entitled **“The Face of North Dakota”**, the project site is located in the Red River Valley physiographic region of North Dakota. The origin of the Red River Valley extends beyond the Red River itself and is believed to be about 9,000 years in age. United States Geological Survey (USGS) mapping indicates that under the glacial drift and lake sediments is a deep cut valley within the bedrock where bedrock changes from the Belle Fourche-Skull Creek Undivided of the Lower to Upper Cretaceous to the Precambrian Bedrock all within about 5 miles within this general area. The project site area has been mapped by the USGS within the Belle Fourche-Skull Creek Undivided. The Belle Fourche-Skull Creek Undivided of the Lower to Upper Cretaceous generally consists of gray shale with interbedded sandstone layers with depth.

The project site lies within the Red River Valley geomorphic physiographic region. The Red River Valley physiographic region lies within what geologists believe was the footprint of the former Lake Agassiz. This region extends inward from the eastern border of North Dakota about 40 miles and is characterized by vast plains with localized relief of less than 25 feet within the plains and deeper reliefs occurring within stream and river channels. The subsurface soils are similar to lake deposits, consisting of silt in calm areas and sands in turbulent areas. It is stated that low-lying residual glacial lake clay may still be present in the area.

The project site is located in the Red River Valley physiographic region as shown in Figure 1.

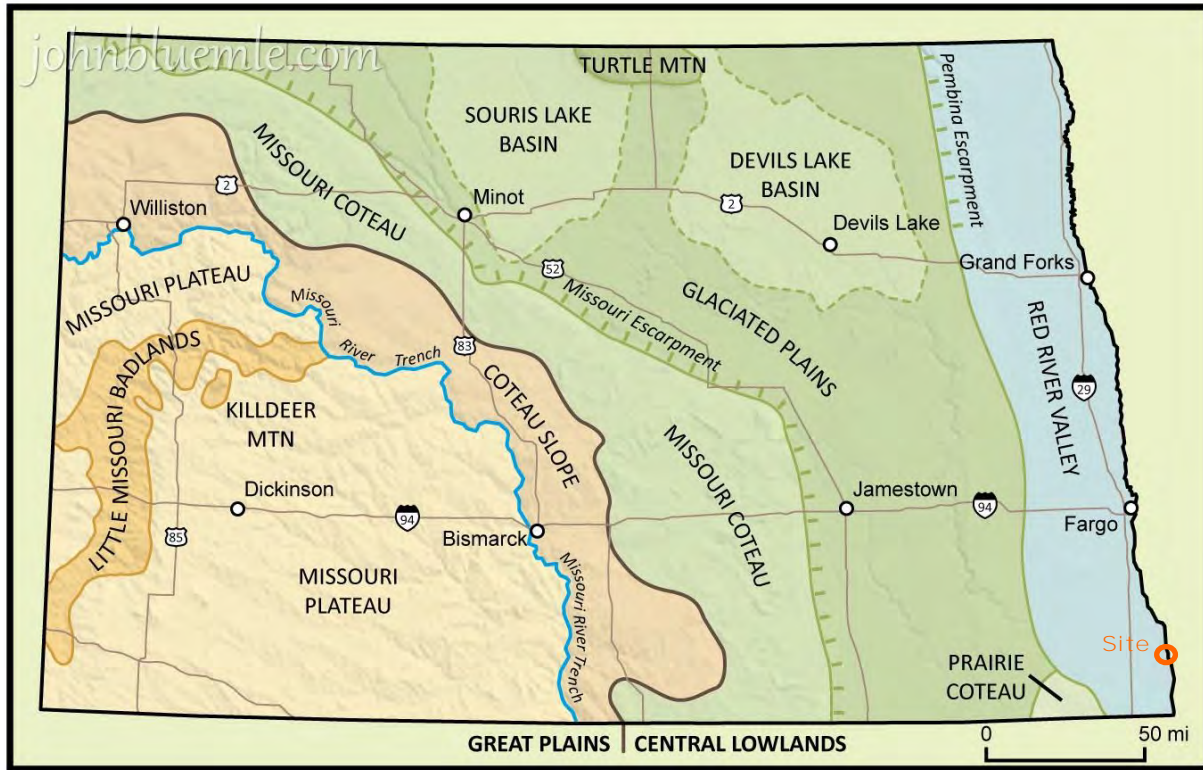


Figure 1. Physiographic Regions within North Dakota (Bluemle 2015)

The most recent glacial advancements into the area are Early Wisconsinan, believed to be 70,000 to 90,000 years ago, and Late Wisconsinan, 11,500 to 30,000 years ago. Geologists believe the early glacial advancements resulted in the formation of a glacial dam near the southern end of the Red River Valley physiographic region forming Lake Agassiz. The lake covered, in various stages, an area from northeast South Dakota, eastern North Dakota, western Minnesota, and southeast Manitoba and southwest Ontario, Canada. Lake Agassiz drained and refilled numerous times during subsequent glacial advances and recessions. It is believed that in early glacial episodes Lake Agassiz drained via the River Warren to the south and in the final drain about 9,000 years ago, drained into Lake Winnipeg via the Red River.

Geology References

Harris, Kenneth L. *Surficial Geologic Map*, USGS, 1995

Bluemle, John P. *The Face of North Dakota, Educational Series II, North Dakota Geological Survey*, Washburn Printing Center, 1977

Bluemle, John P. *North Dakota Geology, The work of John Bluemle PhD.*, May 26, 2015, <http://johnbluemle.com>

Subsurface Profile

Conditions encountered at the boring locations are indicated on the individual boring logs in the attached [Exploration and Laboratory Results](#). Stratification boundaries on the boring logs and the depths in the following table represent the approximate location of changes in material types; in situ, the transition between materials may be gradual. As noted in the [General Comments](#) section, variations are likely between and beyond the borings performed for this project. The following table provides a summary of the subsurface conditions encountered in the borings requested for this project.

Stratum	Depth to Bottom of Stratum (feet)	Material Description	Consistency / Relative Density
Surface	1.5	Topsoil	N/A
1	6.5 to 12	Lean Clay, with sand and occasional sand and silt layers (desiccated)	Very Stiff to Stiff
2	38 (BH1)	Sandy Lean to Fat Clay and Fat Clay, trace gravel with occasional sand and silt seams	Medium Stiff to Stiff
3	49.5 (Bottom of Borings)	Sandy Lean Clay and Sandy Lean to Fat Clay, Fat Clay, trace gravel, with occasional sand and silt seams Clayey Sand, with clay layers Sand, with clay layers	Stiff to Hard / Medium Dense to Dense

1. The depths to bottom of stratum are approximate and are in reference to the grade existing at the boring locations at the time of our exploration.
2. The standard penetration test (N) value within Stratum 1 ranged from 13 to 14.
3. N-values within Stratum 2 were 4.
4. N-values within Stratum 3 ranged from 5 to 33.

A Central Mine Equipment brand automatic hammer was used to drive the split barrel sampling spoon into the base of the borehole for this project. The percentage of theoretical potential energy transferred to the drilling rod string and the split spoon using an automatic hammer is usually higher than a 'safety' hammer (i.e., a hammer raised and dropped using a 'cathead' and rope) that is still used on some rotary drill rigs. The energy measured for the hammer used for this project in 2022, is at least 80 percent of the theoretical potential energy. The N-values shown on the boring logs can be considered N80 values. Conversion to N60 values may be made by using the following equation: $N_{60} = (ER/60) * N$, where ER for Terracon's hammer equals 80, and N equals the N-value shown on the boring logs. Further corrections/modifications to the N-values, such as modifications to account for in-situ effective stress and/or borehole size, may be prudent for use in geotechnical calculations/correlations.

Groundwater Observations

The boreholes were observed during drilling/sampling for the presence and level of groundwater. Water levels observations made during drilling/sampling of the borings are included on the boring logs. During sampling, groundwater was observed in Boring BH1 at an approximate depth of 12.5 feet below the existing grade. It is important to note that a relatively long period is necessary for a groundwater level to develop and stabilize **in a borehole within clay soils due to the relatively low 'permeability' of fine-grained soils**. Long-term observations in piezometers or groundwater observation wells, sealed from the influence of surface water, would be required to provide a better evaluation of groundwater levels in materials of this type.

Groundwater level fluctuations can occur due to seasonal variations in the amount of rainfall, runoff, the level of the Bois de Sioux River, and other factors not evident at the time the boring was performed. Perched (trapped) water can also develop with more **'permeable' soils/materials within and/or above lower 'permeability' soils/materials**. Therefore, groundwater levels during construction or at other times during the life of the pipeline may be higher or lower than the level indicated on the boring log. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

Corrosivity

The table below lists the results of laboratory testing. The values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials that will be used for project construction.

Corrosivity Test Results Summary

Boring	Sample Depth (feet)	pH	Soluble Sulfides (mg/kg)	Soluble Sulfate (mg/kg)	Soluble Chloride (mg/kg)	Total Salts (mg/kg)	Red-Ox (mV)	Electrical Resistivity (Ω -cm)
BH1	4.0-5.5	8.45	Nil	3.23	Nil	1039.45	+591	1340
BH1	19.0-21.0	8.46	Nil	41.14	Nil	1974	+513	973
BH1	29.0-31.0	8.41	Nil	52.09	Nil	2566.2	+499.6	752
BH2	6.5-8.0	8.86	Nil	27.38	Nil	1460.76	+495.9	1100
BH2	23.5-25.5	8.64	Nil	160.47	Nil	2673.36	+502.9	727

General Comments

This report presents the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur beyond the boring, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others.

Site characteristics, as provided, are for design purposes and are not to estimate excavation/drilling cost. Any use of our report in that regard is done at the sole risk of the cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation/construction cost. Any parties charged with estimating excavation/construction costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our data may not be valid and additional exploration and testing should be given consideration.

Any information Terracon personnel conveyed prior to completion of this report was for informational purposes only and should not be used for decision-making purposes or final design.

Terracon has not been asked to interpret the data to make design and construction recommendations for the referenced project. Therefore, we cannot assume any responsibility or liability for interpretation of this subsurface data by others.



Attachments

Exploration and Testing Procedures

Field Exploration

Number of Borings	Approximate Boring Depth (feet)	Location
2	49.5	Pipeline Alignment

Boring Layout and Elevation: SCS Carbon Transport personnel determined the subsurface exploration layout, and the borings were staked in the field by others/surveyors. The latitude and longitude of the boring locations that is indicated on the boring logs was provided by the surveyors. The ground surface elevation at the boring locations was estimated using the ND LiDAR Dissemination MapService and reported to the nearest foot on the boring logs. If a more accurate elevation is desired, we recommend a surveyor provide the surface elevation at the boring locations.

Subsurface Exploration Procedures: We advanced the borings with an ATV-mounted rotary drill rig using continuous flight, hollow-stem augers and mud-rotary techniques. Sampling was performed at intervals of about 2.5 feet in the upper 10 feet of the borings and at intervals of 5 feet thereafter. Soil sampling was performed using the split-barrel procedure. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring log at the test depths.

We observed and recorded groundwater levels during drilling and sampling. For safety purposes, the boreholes were backfilled with auger cuttings, bentonite chips, and bentonite-cement grout after completion.

Terracon's exploration team prepared a field boring log as part of the drilling operations that included sampling depth intervals, penetration resistances, groundwater level observations, and other drilling and sampling information. This field log included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. The samples were containerized and transported to our soil laboratory.

Laboratory Testing

Terracon's geotechnical personnel reviewed the soil samples and field data and assigned laboratory tests. The laboratory testing program included the following tests for this site:

- Moisture Content
- Dry Unit Weight
- Unconfined Compression
- Atterberg Limits
- Washed sieve
- Combined Sieve and Hydrometer
- Corrosivity Suite:
 - pH
 - soluble sulfide
 - soluble sulfate
 - soluble chloride
 - electrical resistivity
 - total salts
 - red-ox

The laboratory testing program also included examination of soil samples by a geologist and an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in general accordance with the Unified Soil Classification System (USCS). The boring logs in this report include interpretations of the field logs by our geotechnical personnel and include modifications based on observations and tests of the samples in our laboratory.

Site Location and Exploration Plans

Contents:

Site Location Plan
Exploration Plan

Note: All attachments are one page unless noted above.

Site Location

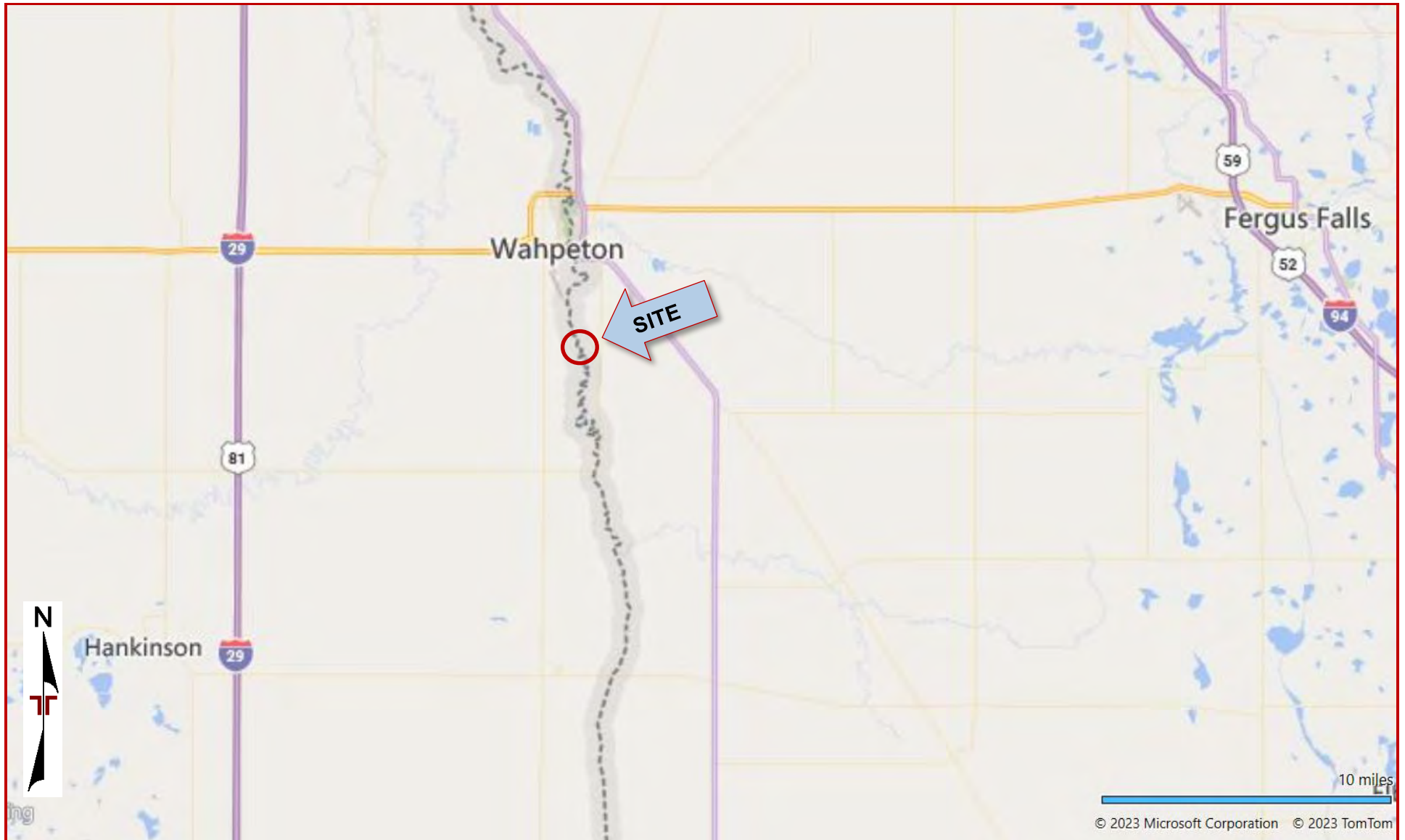


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan



DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration and Laboratory Results

Contents:

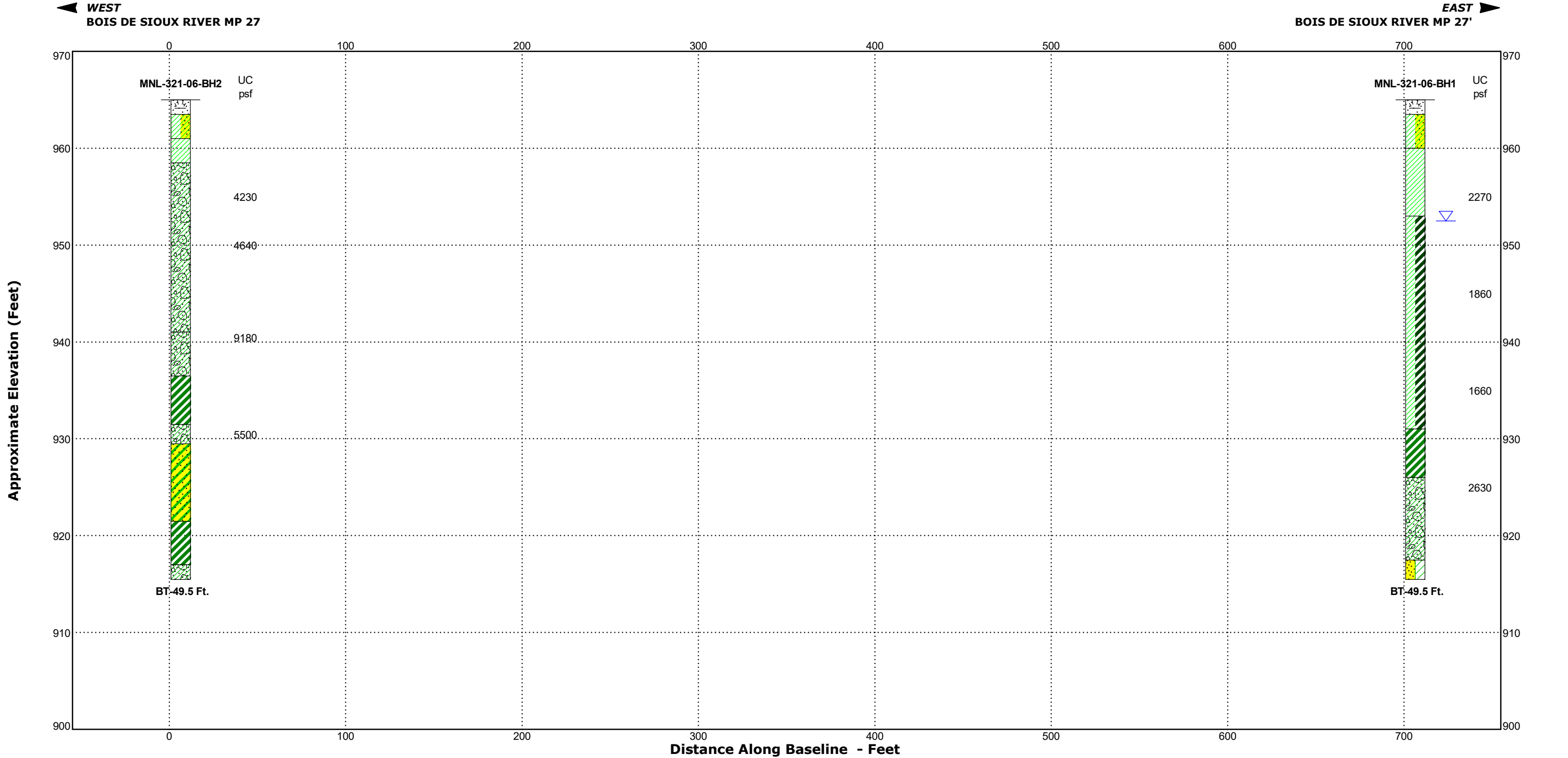
Subsurface Profile

Boring Log (MNL-321-06-BH1 and BH2) (4 pages)

Grain Size Distribution (2 pages)

Note: Attachments are one page unless noted above.

Subsurface Profile
BOIS DE SIOUX RIVER MP 27



Notes

Water Level Observations

Explanation

Material Legend

See [Exploration Plan](#) for orientation of soil profile.
See General Notes in [Supporting Information](#) for symbols and soil classifications.
Soils profile provided for illustration purposes only.
Soils between borings may differ
AR - Auger Refusal
BT - Boring Termination

▽ Water Level Reading at time of drilling.
Water Level Reading after drilling.

MNL-321-06-BH2

Moisture Content — %w

Sampling — (See General Notes)

AR BT

LL PL — Liquid and Plastic Limits

— Borehole Lithology

— Borehole Termination Type

Topsoil

Glacial Till

Lean Clay with Sand

Poorly-graded Sand with Clay

Clayey Sand


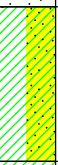
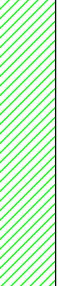

Lean Clay

Lean Clay/Fat Clay

Fat Clay

Facilities | Environmental | **Geotechnical** | Materials

Boring Log No. MNL-321-06-BH1

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 46.212162° Longitude: -96.587411° Station: MN; Bois de Sioux River; MP 27 Depth (Ft.) Elevation: 965 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	HP (psf)	Strength Test			Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits		Percent Fines	
									Test Type	Compressive Strength (psf)	Strain (%)			LL-PL-PI			
1		TOPSOIL	1.5														
		LEAN CLAY (CL) , with sand, dark gray and brown, desiccated, very stiff to stiff	963.5														
					X	6	6-7-7 N=14					21.7					
		LEAN CLAY (CL) , trace sand, with occasional sand and silt layers, brown and gray, stiff	960														
					X	8	3-3-3 N=6					20.4					
2		SANDY LEAN TO FAT CLAY (CL/CH) , trace gravel, with occasional sand and silt seams, gray, medium stiff	953														

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were determined using ND LiDAR Dissemination MapService.

Water Level Observations

12.5' observed while drilling

Drill Rig
603

Hammer Type
Automatic

Driller
SZ

Logged by
ES

Advancement Method
3 1/4" Hollow stem auger

Abandonment Method
Boring backfilled with soil cuttings, bentonite chips, and grout upon completion.

Boring Started
10-20-2022

Boring Completed
10-20-2022

Boring Log No. MNL-321-06-BH1

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 46.212162° Longitude: -96.587411° Station: MN; Bois de Sioux River; MP 27 Depth (Ft.) Elevation: 965 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	HP (psf)	Strength Test			Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits	Percent Fines
									Test Type	Compressive Strength (psf)	Strain (%)			LL-PL-PI	
2		SANDY LEAN TO FAT CLAY (CL/CH) , trace gravel, with occasional sand and silt seams, gray, medium stiff (<i>continued</i>) 34.0													

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).
See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were determined using ND LiDAR Dissemination MapService.

Water Level Observations

12.5' observed while drilling

Advancement Method

3 1/4" Hollow stem auger

Abandonment Method

Boring backfilled with soil cuttings, bentonite chips, and grout upon completion.

Drill Rig
603

Hammer Type
Automatic


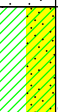
Driller
SZ

Logged by
ES

Boring Started
10-20-2022

Boring Completed
10-20-2022

Boring Log No. MNL-321-06-BH2

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 46.212219° Longitude: -96.589949° Station: ND; Bois de Sioux River; MP 27 Depth (Ft.) Elevation: 965 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	HP (psf)	Strength Test			Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits		Percent Fines
									Test Type	Compressive Strength (psf)	Strain (%)			LL-PL-PI		
1		TOPSOIL														
		1.5														

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were determined using ND LiDAR Dissemination MapService.

Water Level Observations

None observed while drilling

Drill Rig
603

Hammer Type
Automatic

Driller
SZ

Logged by
ES

Advancement Method

3 1/4" Hollow stem auger to 18.5 feet then mud rotary to boring termination.







Abandonment Method

Boring backfilled with soil cuttings, bentonite chips, and grout upon completion.

Boring Started
10-20-2022

Boring Completed
10-20-2022

Boring Log No. MNL-321-06-BH2

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 46.212219° Longitude: -96.589949° Station: ND; Bois de Sioux River; MP 27 Depth (Ft.) Elevation: 965 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	HP (psf)	Strength Test			Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits	
									Test Type	Compressive Strength (psf)	Strain (%)			LL-PL-PI	Percent Fines
3		FAT CLAY (CH) , trace sand, gray, stiff (<i>continued</i>)	33.5 931.5				3000 (HP)								
		SANDY LEAN CLAY (CL) , trace gravel, with occasional sand and silt seams, gray, very stiff	35.5 929.5		12				UC	5498	11.5	19.7	115		54
		CLAYEY SAND (SC) , wiith clay layers, fine to medium grained, gray, dense													
		FAT CLAY (CH) , trace sand, gray, stiff	43.5 921.5		17		13-19-14 N=33					16.4			
		FAT CLAY (CH) , trace sand, gray, stiff	48.0 917		18		2-2-3 N=5 2000 (HP)					36.0			
		SANDY LEAN CLAY (CL) , trace gravel, with occasional sand and silt layers, gray, very stiff	49.5 915.5		15		6-8-10 N=18 8000 (HP)					17.7			
		Boring Terminated at 49.5 Feet													

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were determined using ND LiDAR Dissemination MapService.

Water Level Observations

None observed while drilling

Drill Rig
603

Hammer Type
Automatic

Driller
SZ

Logged by
ES

Advancement Method

3 1/4" Hollow stem auger to 18.5 feet then mud rotary to boring termination.

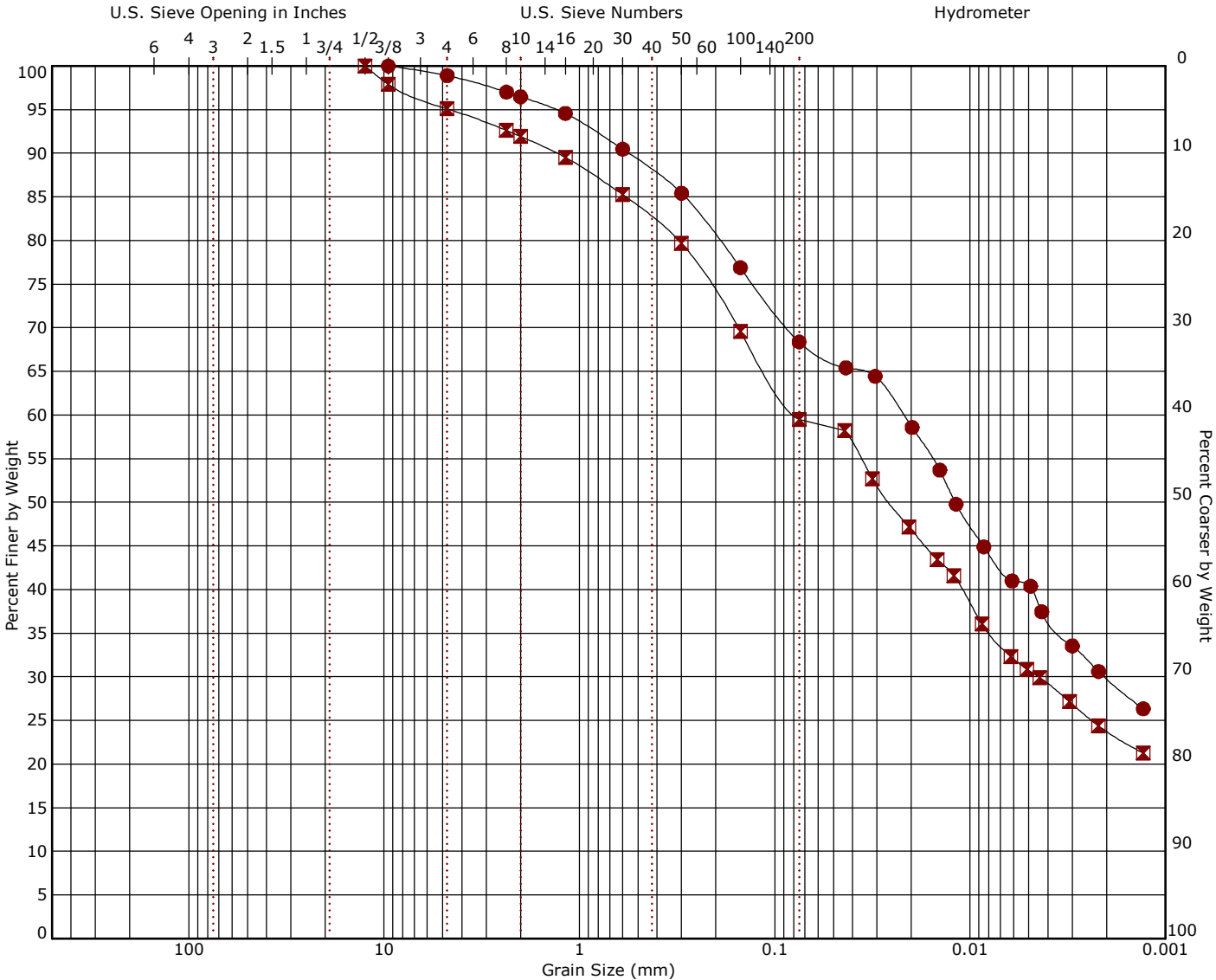
Abandonment Method

Boring backfilled with soil cuttings, bentonite chips, and grout upon completion.

Boring Started
10-20-2022

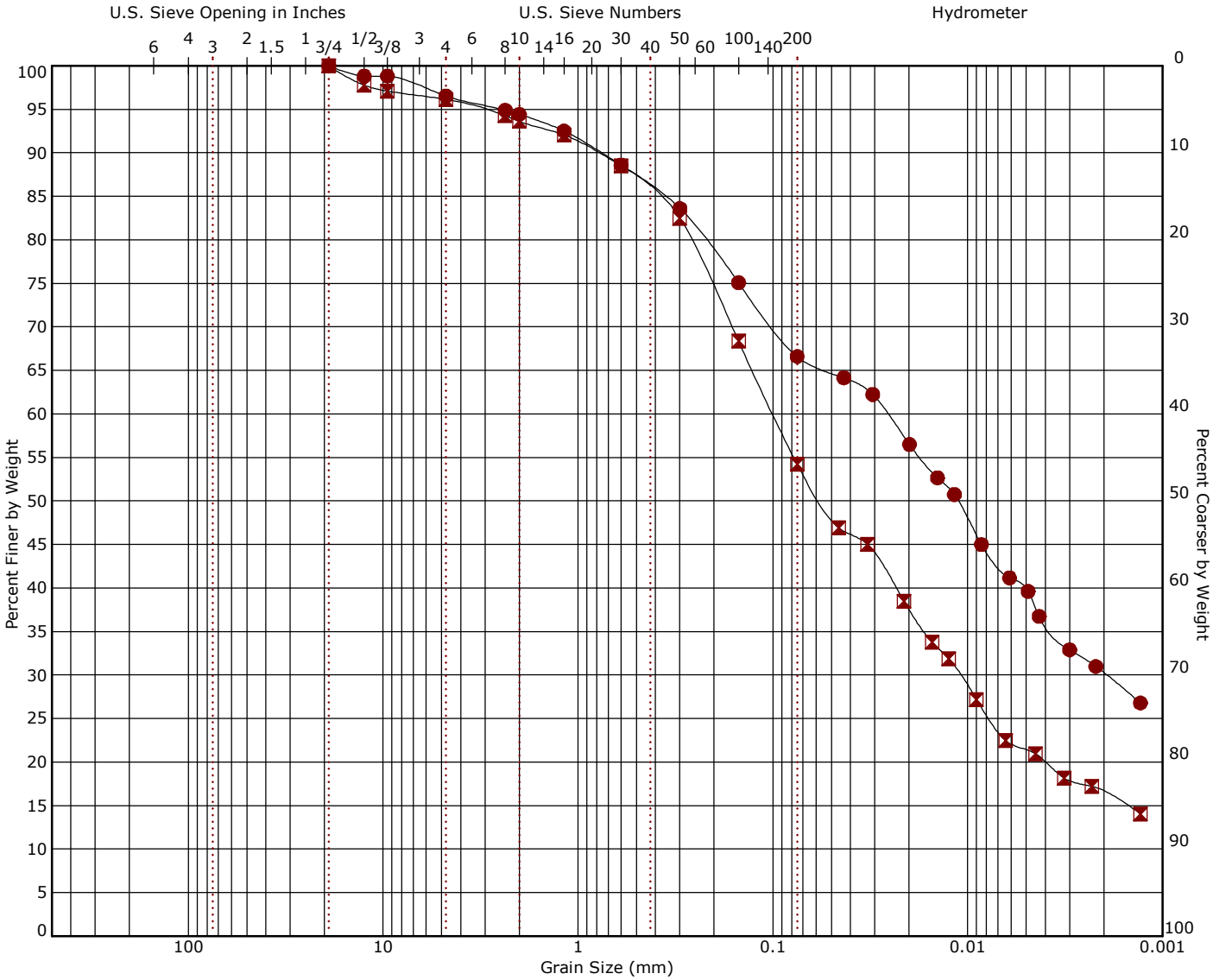
Boring Completed
10-20-2022

Grain Size Distribution
ASTM D422 / ASTM C136



Cobbles		Gravel		Sand			Silt or Clay						
		coarse	fine	coarse	medium	fine							
Boring ID	Depth (Ft)	Description						USCS	LL	PL	PI	Cc	Cu
MNL-321-06-BH1	19 - 21	SANDY LEAN TO FAT CLAY						CL/CH					
MNL-321-06-BH1	39 - 41	SANDY LEAN CLAY						CL					
Boring ID	Depth (Ft)	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay		
MNL-321-06-BH1	19 - 21	9.5	0.022	0.002		0.0	1.1	30.5		27.9	40.4		
MNL-321-06-BH1	39 - 41	12.5	0.078	0.004		0.0	4.9	35.6		28.8	30.7		

Grain Size Distribution
ASTM D422 / ASTM C136



Cobbles		Gravel		Sand			Silt or Clay						
		coarse	fine	coarse	medium	fine							
Boring ID	Depth (Ft)	Description						USCS	LL	PL	PI	Cc	Cu
MNL-321-06-BH2	9 - 11	SANDY LEAN CLAY						CL					
MNL-321-06-BH2	33.5 - 35.5	SANDY LEAN CLAY						CL					
Boring ID	Depth (Ft)	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay		
MNL-321-06-BH2	9 - 11	19	0.026	0.002		0.0	3.5	29.9		26.9	39.8		
MNL-321-06-BH2	33.5 - 35.5	19	0.099	0.011		0.0	3.9	41.9		32.8	21.4		

Supporting Information








Contents:

General Notes

Unified Soil Classification System

Note: Attachments are one page unless noted above.

General Notes

Sampling	Water Level	Field Tests
 Rock Core  Shelby Tube  Split Spoon	 Water Initially Encountered  Water Level After a Specified Period of Time  Water Level After a Specified Period of Time  Cave In Encountered <p>Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.</p>	N Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer UC Unconfined Compressive Strength (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		Consistency of Fine-Grained Soils (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Relative Density	Standard Penetration or N-Value (Blows/Ft.)	Consistency	Unconfined Compressive Strength Qu (tsf)	Standard Penetration or N-Value (Blows/Ft.)
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification	
				Group Symbol	Group Name ^B
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3$ ^E	GW	Well-graded gravel ^F
			$Cu < 4$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ ^E	GP	Poorly graded gravel ^F
		Gravels with Fines: More than 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F, G, H}
			Fines classify as CL or CH	GC	Clayey gravel ^{F, G, H}
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines ^D	$Cu \geq 6$ and $1 \leq Cc \leq 3$ ^E	SW	Well-graded sand ^I
			$Cu < 6$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ ^E	SP	Poorly graded sand ^I
		Sands with Fines: More than 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G, H, I}
			Fines classify as CL or CH	SC	Clayey sand ^{G, H, I}
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	$PI > 7$ and plots above "A" line ^J	CL	Lean clay ^{K, L, M}
			$PI < 4$ or plots below "A" line ^J	ML	Silt ^{K, L, M}
		Organic:	$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$	OL	Organic clay ^{K, L, M, N}
					Organic silt ^{K, L, M, O}
	Silts and Clays: Liquid limit 50 or more	Inorganic:	PI plots on or above "A" line	CH	Fat clay ^{K, L, M}
			PI plots below "A" line	MH	Elastic silt ^{K, L, M}
		Organic:	$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$	OH	Organic clay ^{K, L, M, P}
					Organic silt ^{K, L, M, Q}
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

^A Based on the material passing the 3-inch (75-mm) sieve.

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

$$E \quad Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^F If soil contains $\geq 15\%$ sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^H If fines are organic, add "with organic fines" to group name.

^I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^L If soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

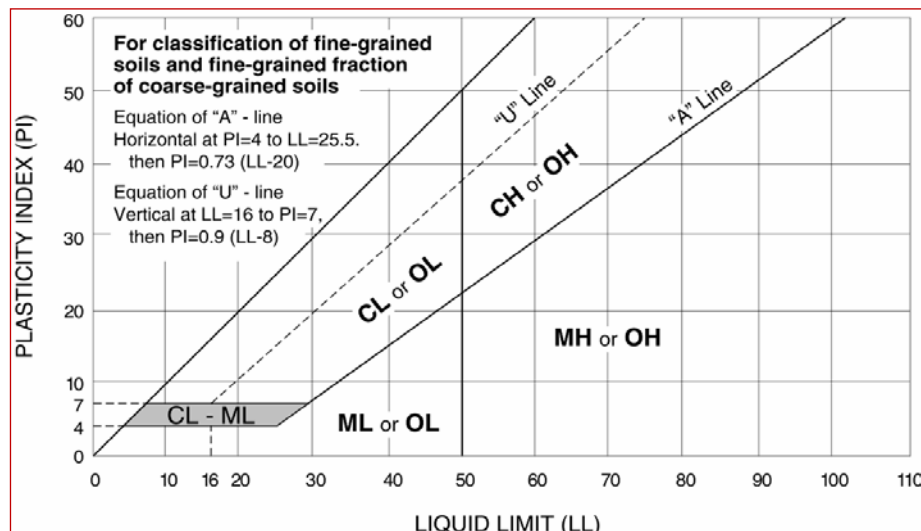
^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.



REVISION 2 - Report of Geotechnical Investigation

Midwest Carbon Express HDD 34 – Otter Tail River HDD Crossing Wilkin County, Minnesota

Tetra Tech Project No. 117-8273015
September 19, 2022

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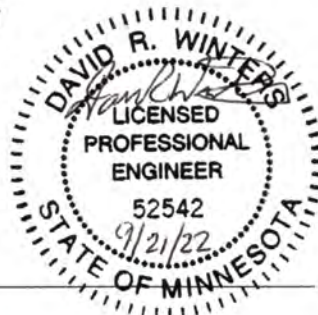
Rev	Date	Author	Reviewer	Revision Description
1	8/31/2022	Aric Hotaling	David Winters	Updated based on HDD Profile dated 8/26/2022.
2	9/19/2022	Aric Hotaling	David Winters	Edits to pipe and boring dimensions.

Prepared by:



Aric Hotaling, P.E.
Geotechnical Engineer

Reviewed by:



David Winters, P.E.
Senior Principal Engineer

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APPENDIX

◆ Appendix A: Miscellaneous Figures and Details

- Important Information About Your Geotechnical Engineering Report (Published by ASFE/GBA)
- Boring Log Descriptive Terminology Key to Soil Symbols and Terms
- Drawing No. 3015-1 – Location of Exploratory Borings and Seismic Lines
- HDD Plan and Profile Details

◆ Appendix B: Logs of Exploratory Borings

- Figures 1B through 4B

◆ Appendix C: Laboratory Test Data

- American Engineering Testing Laboratory Test Report

◆ Appendix D: Geophysical Seismic Survey Data

- Tables D-1 through D-4

◆ Appendix E: Inadvertent Returns Analyses

- Figures 1E through 3E

1.0 EXECUTIVE SUMMARY

Summit Carbon Solutions (SCS) plans to develop a new interstate CO₂ capture, transportation, and sequestration project (Midwest Carbon Express, MCE). The Project will capture CO₂ from multiple sources throughout Iowa, Minnesota, Nebraska, South Dakota, and North Dakota and deliver the CO₂ to three injection sites in North Dakota for permanent geological sequestration.

The Midwest Carbon Express HDD 34 location is an Otter Tail River crossing in Wilkin County, Minnesota. Proposed construction consists of installation of a 3,575 foot long, 4-inch-diameter pipe to cross the Otter Tail River. The crossing location is approximately 8.5 miles southeast of Wahpeton, North Dakota.

The soil profile encountered at the proposed pipeline crossing location generally comprised of alluvial soils consisting primarily of lean clay with varying amounts of sand and silt. Discontinuous sand layers 3 to 10 feet thick were encountered at various depths.

It is anticipated that minor site grading will be required consisting of minor cuts and fills of less than 2 feet to level the site and provide a stable, uniform bearing platform for HDD drilling equipment. Excavation of the overburden soil can be accomplished with most heavy-duty earth excavating equipment.

Drilling equipment and other support equipment and materials may be supported on prepared construction pads consisting of heavy-duty timber or fabricated mats as is typical industry practice for this type of construction.

A subsurface assessment to analyze the risk of hydraulic fracturing and inadvertent returns during the HDD process was conducted at the proposed Otter Tail River HDD crossing location. The analyses were conducted based on topographic and HDD profiles provided by Tetra Tech's engineering team coupled with subsurface characteristics determined from the field investigation and published values. The analyses were conducted using the Bingham Plastic Model for minimum required drilling fluid pressures, and the Delft approach and methods detailed by the US Army Corps of Engineers for determining maximum allowable pressures. The results indicate the risk of hydrofracture has a Factor of Safety above 2.0 along the majority of the bore paths and an elevated risk of hydrofracture near the entry and exit point of the bores.

This executive summary has been prepared solely to provide a general overview and should not be relied upon for any purpose except for that for which it was prepared. The full geotechnical report must be referenced for information about findings, recommendations, and other concerns.

2.0 PURPOSE AND SCOPE OF STUDY

Tetra Tech conducted a field exploration program consisting of four exploratory borings to obtain information on subsurface soil conditions for the proposed Otter Tail River HDD crossing. The geotechnical study was performed in accordance with Tetra Tech's scope of work dated March 26, 2022.

Results of the field investigation and laboratory tests were analyzed to characterize site material properties. This report summarizes the field and presents conclusions and recommendations for design and construction of the proposed crossing and associated site grading based on the proposed construction and subsurface conditions encountered. The report also includes design parameters and a discussion of geotechnical engineering considerations related to construction.

3.0 PROPOSED CONSTRUCTION

The project will include installation of a new HDD crossing approximately 8.5 miles southeast of Wahpeton, North Dakota. The proposed 4-inch diameter pipeline HDD crossing is approximately 3,575 feet long spanning the Otter Tail River. As the pipeline crosses the proposed alignment, HDD depths are anticipated to be on the order of 46 feet below the bottom of the Otter Tail River channel.

Equipment loads were not available at the time of report preparation, but are anticipated to be light, consisting of a small HDD drill rig and associated equipment. Site grading plans were not provided at the time of report preparation, but grading is anticipated to consist of minor cuts or fills less than 2 feet to level the site and provide a stable, uniform platform for HDD drilling equipment.

If the above proposed construction, loadings, and site grading will be significantly different from that described, Tetra Tech should be notified to re-evaluate the geotechnical recommendations and perform additional analysis as required.

4.0 FIELD EXPLORATION

The field exploration was conducted April 19 to 22, 2022 consisting of four boreholes and four geophysical seismic refraction surveys as depicted on Drawing No. 3015-1 (Locations of Exploratory Borings and Seismic Surveys) in Appendix A. Locations of the exploration borings were provided and staked in the field by project surveyor. Prior to mobilization, Minnesota One Call was contacted to request the location and clearance of public underground utilities before performing drilling.

Tetra Tech's drilling subcontractor (Interstate Drilling Services) advanced the borings with a track-mounted Diedrich drill rig equipped with 6-inch outside diameter, continuous flight, hollow stem augers, and mud rotary roller bit. Tetra Tech's field geologist provided technical oversight during the field investigation, logged the borings, and handled samples. The borings were reclaimed by backfilling with grout.

Samples of the subsurface materials were obtained with 2-inch outside diameter split-spoon samplers. Split-spoon samplers were driven into the various strata using a 140-pound hammer falling 30 inches. The number of blows required to advance the sampler each of three successive 6-inch increments was recorded. When using the split-spoon sampler, the total number of blows required to advance the sampler the second and third 6-inch increments is the penetration resistance (N value), as described by ASTM International (ASTM) Method D1586. Penetration resistance values generally indicate the relative density or consistency of the subsurface soils. Bulk samples of soil were obtained from the hollow-stem auger cuttings at select locations.

Boring logs were prepared noting the borehole location and elevation, equipment and drill methods used, subsurface profile and descriptions per ASTM D2487, and groundwater conditions. Depths at which the samples were obtained along with the penetration resistance values are shown on the logs of exploratory borings, presented in Appendix B (Figures 1B through 4B).

5.0 LABORATORY TESTING

Samples obtained during the field exploration were taken to Tetra Tech's laboratory where they were observed and visually classified in accordance with ASTM Method D2487, which is based on the Unified Soil Classification System. Representative samples were selected for testing and shipped to American Engineering Testing's laboratory to determine the physical properties of the soils in general accordance with ASTM or other approved procedures. The following list describes laboratory testing performed for this investigation, and their purpose:

Tests Conducted:	To Determine:
Natural Moisture Content	Moisture content representative of field conditions at the time samples were taken.
Grain-size Distribution	Size and distribution of soil particles (i.e., clay, silt, sand, and gravel).
Atterberg Limits	The effect of varying water content on the consistency of fine-grained soils.
Natural Dry Density	Dry unit weight of samples, representative of in-place conditions.
Direct Shear	Consolidated-Drained soil strength properties.
Resistivity and pH	The combination of these characteristics determines the potential of soil to corrode metal.
Water Soluble Sulfate Content	Potential of soils to deteriorate normal strength concrete.

Laboratory test results are presented in the American Engineering Testing lab results report in Appendix C. This data, along with the field information, were used to prepare the logs of exploratory borings on Figures 1B through 4B in Appendix B.

6.0 SITE CONDITIONS

The project alignment generally crosses agricultural fields located to the northeast and southwest of the Otter Tail River. Topography at the HDD 34 crossing site is generally relatively flat with a shallow main channel formed by the Otter Tail River. The maximum elevation difference across the ground surface along the proposed HDD 34 alignment is approximately 7 feet.

7.0 SUBSURFACE CONDITIONS

The soil profile encountered at the proposed pipeline crossing location generally comprised of alluvial soils consisting primarily of lean clay with varying amounts of sand and silt. Discontinuous sand layers 3 to 10 feet thick were encountered at various depths. The boring logs should be referenced for complete descriptions of the soil types and their estimated depths. A characterization of the subsurface profile includes grouping soils with similar physical and engineering properties into a number of distinct layers. The representative subsurface layers at the proposed crossing locations are presented below, starting at the ground surface.

7.1 ALLUVIAL SOILS

Borings BH-34-1 and BH-34-5 were located northeast of the Otter Tail River and borings BH-34-2 and BH-34-3 were located southwest of the Otter Tail River. Underlying a thin layer of topsoil, natural lean clay with varying amounts of sand and silt was encountered in the borings. The natural clay extended to the maximum boring depths explored (71.5 feet). The clay visually classified as lean clay, sandy lean clay, silty clay, and silty clay with sand according to ASTM D2488. Discontinuous layers of poorly graded sand to clayey sand 3 to 10 feet thick were encountered in the borings at varying depths. Penetration resistance values in the clay ranged from 0 to greater than 50 blows per foot indicating a very soft to hard soil stratum. Penetration resistance values generally increased with depth and with increased sand and gravel content.

Tests of representative samples obtained from the borings classified as poorly graded sand, well graded sand with silt, clayey sand, sandy lean clay, and sandy silt according to the ASTM Classification System. Liquid and plastic limit tests performed indicated that the clay portions of the samples had liquid limits ranging from 19 to 42 and plasticity indices ranging from 9 to 23 while silt portions of the sample clay portions of the samples had liquid limits ranging from 16 to 17 and plasticity indices ranging from non-plastic to 2.

Direct shear testing on representative samples indicates the soils have a friction angle of 20.4 to 32.4 degrees and are cohesionless. Unconfined compressive strength testing indicates the soils have an unconfined compressive strength of 1,051 to 5,529 pounds per square foot.

7.2 GROUNDWATER

Due to mud rotary drilling techniques and use of water as drill fluid, groundwater levels could not be observed in the borings at the time of the field investigation. The borings were backfilled immediately after drilling and water levels were not allowed to stabilize. Based on the Minnesota Well Index, wells within the project area generally encounter water at or near the ground surface. Typical fluctuations in groundwater elevations are attributed to the seasonal amounts of rainfall during a particular year and the Otter Tail River Water Level Elevation. Numerous factors contribute to groundwater fluctuations, and evaluation of such factors is beyond the scope of this report.

7.3 CORROSIVITY TESTING

Corrosivity testing consisting of pH, electrical resistivity, and water-soluble sulfate content was performed on several samples and the results are compiled below.

Boring No.	Sample Depth (ft)	Soil Type	pH	Resistivity	Sulfate Content (%)	Sulfate Exposure
BH-34-1	5	Sand	7	1,200	0.09	Low
BH-34-2	60	Sand	7	1,130	0.07	Low
BH-34-5	5	Sand	6	1,410	0.07	Low

Sulfate content is used to determine the potential for the on-site soils to deteriorate normal strength concrete and the measured results are considered low. The combination of pH and resistivity indicate the potential of corrosion of buried metal. Based on soil resistivity and pH data, the potential of corrosion of buried metal is high. A qualified corrosion engineer should review this data and recommend corrosivity protection and steel corrosion allowances as necessary.

8.0 DYNAMIC SOIL PROPERTIES

As part of the project, geophysical surveys were conducted at each end of the proposed crossings in order to further understand the subsurface geology and obtain shear modulus values for use in inadvertent returns analysis.

Tetra Tech conducted a geophysical seismic survey at the project site on June 7, 2022. Seismic data was collected to determine the shear wave (s-wave) and compression wave (p-wave) velocities of the subsurface (~116 feet) materials at the site. The seismic survey was completed as part of a geotechnical assessment at the site. The overall objective of the seismic survey was to help define the subsurface profile

and estimate dynamic soil properties. The seismic survey line locations are indicated on Drawing No. 3015-1 in Appendix A.

The interpreted p-wave and s-wave velocities and dynamic modulus calculations are presented in summary in Appendix D. Poisson's ratio and the shear modulus at various depths were also calculated and are presented in the summary tables. The values calculated for Poisson's ratio and the shear modulus were used to calculate Young's deformation modulus and the bulk modulus of the subsurface materials at each of the survey intervals. Estimated density values were used in the calculations.

The interpreted seismic cross sections indicate that the seismic s-wave velocities across the site range from approximately 410 feet per second (ft/s) to 1,781 ft/s. The interpreted seismic refraction cross sections indicate that the seismic p-wave velocities across this portion of the site range from approximately 1,526 ft/s to 9,645 ft/s. The slower velocities are representative of near surface unconsolidated material; higher velocities represent denser more consolidated material at depth. The maximum depth of investigation of the s-wave and p-wave seismic data was approximately 116 feet below ground surface. Included in the Appendix are approximate back-calculated dynamic modulus parameters obtained from the seismic data.

The geophysical survey was successful in providing data to assist in interpreting and mapping the geotechnical characteristics of the subsurface below the pipeline crossing locations along the alignment. Seismic methods, like any remote sensing technique, require the interpretation of indirect methods of measurement. As such, there is an inherent margin of error, which is unavoidable. The methods of data acquisition and interpretation are as complete as is reasonably possible and are a reasonable representation of the subsurface conditions. However, due to the subjective nature of any type of interpretation, results cannot be guaranteed to be accurate in all areas. The findings identified by this survey generally agree with the boring data when compared to the geotechnical borings collected at the site.

9.0 ENGINEERING ANALYSIS AND RECOMMENDATIONS

9.1 SITE GRADING

It is anticipated that minor site grading will be required consisting of cuts and fills of less than 2 feet to level the crossing entry/exit sites and provide a stable, uniform bearing platform for HDD drilling equipment. Excavation of the overburden soil can be accomplished with conventional heavy-duty earth excavation equipment. If site grading significantly differs from what is described herein, the recommendations of this report must be reviewed and revised as necessary to reflect the final grading plan.

Drilling equipment and other support equipment and materials may be supported on prepared construction pads consisting of heavy-duty timber or fabricated mats as is typical industry practice for this type of construction.

Depending on the season and precipitation patterns, the natural moisture content in the excavated material may be higher or lower than the optimum moisture content. Moisture conditioning will be required to adjust the natural moisture content of the soils to within 2 percent of optimum moisture to achieve proper compaction. Unless the soils are processed to adjust the moisture content, it will be difficult to achieve compaction when placed as fill.

In addition, depending on the time of construction, natural moisture conditions and precipitation will influence the mobility of construction equipment. The use of low ground pressure, track-mounted equipment should be anticipated by the contractor since tracks will exert lower ground pressures than pneumatic tires. In loose subgrade soils such as these, pneumatic-tired equipment may rut the subgrade and reduce its shear strength. Construction mats may also be an acceptable alternative to provide a stable working platform for construction equipment and high traffic areas during wetter periods.

Freezing temperatures have the potential to impact construction. Prolonged periods of cold weather in the months of November through March may be difficult for construction since it can be difficult to drill with fluid methods in subfreezing temperatures. Fill should not be placed during freezing temperatures, especially during winter months unless construction practices are altered to adjust to these conditions. Under no circumstances should foundations be constructed on frozen materials.

Site grading plans must include drainage features to rapidly drain surface run-off away from the site. All grades must provide effective drainage away from the construction area during and after construction. Drainage run-off should be controlled with Best Management Practices (BMPs) such as silt fences, straw bales and wattles, earthen berms, or similar approved features. Such collection and discharge must be in compliance with the Project's site-specific storm water pollution prevention plan (SWPPP).

Design and construction criteria presented below should be observed for site preparation purposes and when preparing project documents for construction. Construction details should be considered when preparing project documents.

1. All fill and backfill should be approved by the geotechnical engineer, moisture-conditioned to within 2 percent of optimum moisture content and placed in uniform lifts of suitable thickness for the compaction equipment. It should then be compacted to at least 95 percent of the maximum dry density as determined by ASTM D698.
2. Imported granular material used as backfill should meet the following grading requirements and be placed and compacted in accordance with Item 3 above.

Sieve and Screen Size	Percent Passing
3-Inch	90 – 100
No. 4	25 – 50
No. 40	10 – 20
No. 200	0 – 15

3. The on-site natural soils are suitable for use as general over-lot fill provided any organic or deleterious material is removed and it is placed under controlled moisture and density conditions.
4. The contractor is responsible for providing safe working conditions in connection with underground excavations. Temporary construction excavations which workers will enter will be governed by OSHA guidelines 29 CFR 1926, Subpart P. For planning purposes, subsoils encountered in the exploratory borings classify as Type C.

9.2 INADVERTENT RETURNS

Subsurface assessments to analyze the risk of hydraulic fracturing and inadvertent returns during the HDD process were conducted for the proposed Otter Tail River crossing. The proposed HDD 34 bore is anticipated to be drilled by HDD equipment with an entry point starting approximately 1,800 feet southwest of the Otter Tail River and a pilot hole drilled to a minimum depth of 46 ft below the river channel, exiting approximately 1,660 feet beyond the northeastern bank of the Otter Tail River, where the bore is stopped. The stopping point is then excavated, the bore path is reamed out and the pipe is pulled through for tie in with the next section of pipe. This bore geometry was used in the model for inadvertent return analyses of the river bore crossing.

Analyses were conducted based on topographic and HDD profiles provided by Tetra Tech coupled with subsurface characteristics determined from the field investigation and laboratory testing. The analyses were conducted using the Bingham Plastic Model for minimum required drilling fluid pressures, and the Delft (cavity expansion) approach for maximum allowable pressures using procedures detailed in the US Army Corps of Engineers Conduits, Pipes, and Culverts Associated with Dams and Levee Systems, (US Army Corps of Engineers, 2020). Graphical depiction of calculated minimum and maximum drilling fluid pressures relative to location and depth are provided in Appendix E.

9.2.1 Hydrofracture

Environmental concerns related to inadvertent drilling fluid returns are an increasingly significant issue for HDD design and operations. Although drilling fluid is comprised primarily of water and 1 to 3 percent bentonite and other additives, the fine bentonite and additive particles can smother invertebrates, aquatic and wetland plants, and fish and their eggs if discharged into a waterway or wetland area. By conducting assessments to analyze the potential risk of inadvertent fluid returns and using competent design and construction practices, risk can be minimized.

Inadvertent fluid returns are often referred to as hydrofractures or “frac-outs”. However, not all of these instances are actually caused by hydrofracture. Sources of inadvertent fluid returns can include existing fissures in the soil, preferential seepage paths along piers, piles or other structures, joints and fractures in rock masses, and open-graded, loose gravel or rocks above the bore. Hydraulic fracturing is a specific occurrence in soils when the pressure of the drilling fluid exceeds the strength and confining stress of the surrounding soils, and the excess pressure fractures the soil around the bore allowing drilling fluids to escape the annulus.

Drilling fluid in the bore exerts pressure on the surrounding soil, causing it to deform. As the drilling fluid pressure in the annulus increases, the zone of soil that is affected and plastically deforms increases until it reaches a limiting radius. Once that radius is reached, a fracture forms and drilling fluid is lost to the surrounding formation, propagating the fracture. Drilling fluid pressure decays rapidly with distance from the bore, but it generally takes less pressure to propagate a fracture than it does to initiate one, so the best method to prevent hydrofracture is to avoid initiating a fracture. Even if a fracture is initiated, not all hydrofractures are observed at the ground surface. The path of least resistance through the soil may not lead the fracture to the surface or the fracture might never reach the surface due to the rapid pressure decay.

Maximum allowable calculated pressure at any point is the pressure required to create a plastic (failed) zone equal to the depth of soil above the pipeline at that point. Graphically speaking, the factor of safety against the plastic zone reaching the ground surface is 1.0 for any location along the maximum allowable pressure curve.

Minimum drilling fluid pressure required to return the soil cuttings back through the HDD bore to the surface is a critical factor in evaluating hydrofracture risk. Minimum pressure depends on the length, depth and diameter of the bore, the weight of the drilling fluid and the flow rate. Minimum required pressure is a combination of the drilling fluid head pressure that must be overcome and the frictional resistance to flow from the bore wall.

Drilling fluid pressures are often highest during the pilot bore, because of the smaller annulus and one-way flow path. During reaming, drilling fluid can flow out through the entry or exit, and the annulus is larger, therefore pressures are usually lower. Pressures during pullback, however, can be high because the larger diameter of the product pipe reduces the annular flow path.

Drilling fluid pressures can vary greatly with the contractor's methods and changes in ground conditions. Although calculations may indicate there is little risk of hydrofracture in various locations along the bore, an

inexperienced operator or unforeseen soil conditions can greatly affect that risk. Selection of an experienced, qualified contractor is an important step in preventing hydrofracture.

Relief wells can be installed at locations where excessive drilling fluid pressures may exceed the soil's capability to resist hydrofracture. Locations should be selected that are accessible for containment and cleanup equipment, making it easier to maintain a clean worksite, while avoiding damage to sensitive features.

Regardless of the preventative measures used or the relative risk of hydrofracture, a contingency plan should be provided by the Contractor. This plan should include a procedure for containing and cleaning up any inadvertent fluid returns and describe materials that the Contractor should have on hand such as sand bags, hay bales, wattles, or turbidity curtains to contain the fluid, a vac-truck or trailer, shovels, brooms, or barrels to contain the fluid and submersible pumps to remove the liquid.

9.2.2 Analysis

The inadvertent returns analyses consisted of a two-part approach; determining the approximate maximum allowable fluid pressure that can be withstood without initiating plastic yielding (hydrofracture) and determining the minimum required drilling fluid pressure to return cuttings to the surface. The difference between the calculated maximum allowable and minimum required drilling fluid pressures indicates the relative risk of hydrofracture at any point along the bore.

The minimum required drilling fluid pressures were determined with the Bingham Plastic Model, which provides a relatively conservative approach. In order to satisfy the Bingham equation for minimum pressures, bore properties such as length, depth, and diameter, and drilling fluid properties such as viscosity, yield point, and flow rate, are needed. Drilling fluids and their properties can vary substantially depending on the specific contractor, actual drilling conditions, and other factors. As such, drilling fluid properties used in the analyses were estimated based on information provided to Tetra Tech. In the literature, a recommended value for drilling fluid (e.g. mud) is less than 9.5 lb/gallon. If the below properties will be significantly different from that assumed, Tetra Tech should be notified to perform additional analysis and update recommendations as required. The table below summarizes the drilling fluid properties assumed for the analyses.

Summary of Assumed HDD Drilling Fluid Properties

Variable	Pilot Hole	Pullback
Drilling Fluid Weight	10.5 lb/gal	10.5 lb/gal
Drilling Fluid Viscosity	35 Cp	35 Cp
Drilling Fluid Yield Point	15 lb/100ft ²	15 lb/100ft ²
Flow Rate at Drill Bit	120 gal/min	120 gal/min

Diameters of the pilot hole and reamer for pullback of the product pipe were assumed for the analyses. A pilot hole diameter of 6 inches and a reaming bit diameter of 8.5 inches for pullback were assumed for the analyses. A nominal pilot hole drill pipe diameter of 2 inches and pullback hole drill pipe diameter of 3 inches was assumed for calculations of the effective annulus for transport of drilling fluid and cuttings.

The maximum allowable drilling fluid pressures were determined from the Delft approach, commonly referred to as the Cavity Expansion Model. The model assumes the radius of the plastic zone around the bore can grow infinitely. Since this assumption is unrealistic to actual soil conditions, multiple recommendations have been suggested in the literature to limit the plastic radius according to soil type and depth.

As previously discussed, although hydrofractures can initiate during drilling, such hydrofractures may not reach the ground surface as they propagate along the path of least resistance. Since propagation of hydrofractures along these errant pathways rely on complex geologic conditions and a multitude of other factors are not readily known or determined, the risk analyses only evaluated the possibility of hydrofractures reaching ground level by means of plastic deformation.

The Cavity Expansion Model relies on soil conditions such as internal angle of friction, cohesion, shear modulus, groundwater, and effective stress, as well as the depth and radius of the bore. From these parameters, which vary depending on the position of the bore, a theoretical maximum allowable drilling fluid pressure is determined. To the extent practical, the analyses were performed using data from the field and available published values. It should be noted that the calculations assume soil properties are homogeneous within respective layers.

9.2.3 Results

Graphical results of the analyses are presented on Figures 1E through 3E in Appendix E. The plots depict minimum required drilling fluid pressure (P_{min}) and the maximum allowable drilling fluid pressure (P_{max}) (Figure 1E and 2E) and Factor of Safety (Figure 3E) as a function of the bore path and ground elevation. The results indicate the factor of safety against hydrofracture is above 2.0 across the majority of the bore path.

The analyses and accompanying plots for the crossing site show an elevated risk of hydrofracture near the entry and exit point of the bores. This risk is typical for HDD bores, and should be mitigated through common measures, including specifying that the Contractor have tools and equipment on-site for rapid containment and clean-up of any inadvertent fluid returns. SCS should also develop a detailed surface spill and hydrofracture contingency plan for the project that describes the planned response in the event of an inadvertent drilling fluid return.

The analyses show a risk of hydrofracture with a factor of safety less than 2.0 in the section between the entry point and Station 0+75 in the section between Station 33+00 and the exit point. These lower factors of safety are attributed to the soft clayey material below the water table that provides low confining resistance for hydrofracture due to relatively low shear strength. To mitigate potential hydrofracture risk, methods including relief wells or conductor casings can be utilized.

Prior to initiating drilling, the minimum fluid pressure should be determined to allow the cuttings to be returned to the surface. The minimum pressure is dependent on the length of the boring, boring depth, boring diameter, flow rate, and weight of the drilling fluid. Since actual drilling fluid conditions (e.g. viscosity, yield point, and flow rates) are unknown, drilling fluid conditions were assumed for the minimum required fluid pressures provided with this analysis. Once actual drilling fluid parameters are known, the minimum fluid pressures can be recalculated and the chart updated and reevaluated for critical points (e.g. river channel) where the factor of safety is near 1.0, indicating the risk of hydrofracturing is higher.

10.0 CONTINUING SERVICES

Two additional elements of geotechnical engineering service are important to the successful completion of this project.

1. **Consultation with Tetra Tech during the design phase.** This is essential to ensure that the intent of our recommendations is incorporated in design decisions related to the project and that changes in the design concept consider geotechnical aspects.

2. **Observation and monitoring during construction.** Tetra Tech should be retained to observe the earthwork phases of the project, including the site grading and excavations, to determine that the subsurface conditions are compatible with those described in our analysis. In addition, if environmental contaminants or other concerns are discovered in the subsurface, our personnel are available for consultation.

11.0 LIMITATIONS

This study has been conducted in accordance with generally accepted geotechnical engineering practices in the region where the work was conducted. The conclusions and recommendations submitted in this report are based upon project information provided to Tetra Tech and data obtained from the exploratory borings drilled and the geophysical surveys at the locations indicated. The nature and extent of subsurface variations across the site may not become evident until construction. Tetra Tech should be on site during construction, to verify that actual subsurface conditions are consistent with those described herein.

This report has been prepared exclusively for Tetra Tech Rooney and Summit Carbon Solutions. This report and the data included herein shall not be used by any third party without the express written consent of both the client and Tetra Tech. Tetra Tech is not responsible for technical interpretations by others. As the project evolves, Tetra Tech should provide continued consultation and field services during construction to review and monitor the implementation of the recommendations and verify that the recommendations have been appropriately interpreted. Significant design changes may require additional analysis or modifications of the recommendations presented herein. Tetra Tech recommends on-site observation of excavations and foundation bearing strata and testing of fill by a representative of the geotechnical engineer.

12.0 REFERENCES

- Bennett, D., & Wallin, K. (2008). Step by Step Evaluation of Hydrofracture Risks for Horizontal Directional Drilling Projects. *ASCE Pipelines Conference Proceeding Paper*, (p. 321).
- Miller, M., & Robison, J. (2018). *Formational Fluid Loss and Inadvertent Returns Risk in Sedimentary Rock HDD Construction*. Palm Springs: North American Society for Trenchless Technology (NASTT).
- US Army Corps of Engineers. (2020). *Conduits, Pipes, and Culverts Associated with Dams and Levee Systems*.

APPENDIX A

Important Information about Your Geotechnical Engineering
Report (Published by ASFE/GBA)

Tetra Tech Boring Log Descriptive Terminology Key
to Soil and Rock Symbols and Terms

Classification of Soils for Engineering Purposes

Location of Exploratory Borings and Seismic Surveys
Drawing No. 3015-1

HDD Plan and Profile Details

IMPORTANT INFORMATION

ABOUT YOUR

GEOTECHNICAL ENGINEERING REPORT

More construction problems are caused by site subsurface conditions than any other factor. As troublesome as subsurface problems can be, their frequency and extent have been lessened considerably in recent years, due in large measure to programs and publications of ASFE/The Association of Engineering Firms Practicing in the Geosciences.

The following suggestions and observations are offered to help you reduce the Geotechnical-related delays, cost-overruns and other costly headaches that can occur during a construction project.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

A Geotechnical engineering report is based on a subsurface exploration plan designed to incorporate a unique set of project-specific factors. These typically include: the general nature of the structure involved, its size and configuration; the location of the structure on the site and its orientation; physical concomitants such as access roads, parking lots, and underground utilities, and the level of additional risk which the client assumed by virtue of limitations imposed upon the exploratory program. To help avoid costly problems, consult the geotechnical engineer to determine how any factors which change subsequent to the date of the report may affect its recommendations.

Unless your consulting Geotechnical engineer indicates otherwise, *your Geotechnical engineer report should not be used:*

- When the nature of the proposed structure is changed, for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one;
- when the size or configuration of the proposed structure is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership, or
- for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems which may develop if they are not consulted after factors considered in their reports' development have changed.

MOST GEOTECHNICAL "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site exploration identifies actual subsurface conditions only at those points where samples are taken, when they are taken.

Data derived through sampling and subsequent laboratory testing are extrapolated by Geotechnical engineers who then render an opinion about overall subsurface conditions, their likely reaction to proposed conditions, their likely reaction to proposed construction activity, and appropriate foundation design. Even under optimal circumstances actual conditions may differ from those inferred to exist, because no Geotechnical engineer, no matter how qualified, and not subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. *Nothing can be done to prevent the unanticipated, but steps can be taken to help minimize their impact.* For this reason, *most experienced owners retain their Geotechnical consultants through the construction stage*, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

SUBSURFACE CONDITIONS CAN CHANGE

Subsurface conditions may be modified by constantly-changing natural forces. Because a Geotechnical engineering report is based on conditions which existed at the time of subsurface exploration, *construction decisions should not be based on a Geotechnical engineering report whose adequacy may have been affected by time.* Speak with the Geotechnical consultant to learn if additional tests are advisable before construction starts.

Construction operations at or adjacent to the site and natural events such as flood, earthquakes or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Geotechnical engineers' reports are prepared to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Unless indicated otherwise, this report was prepared expressly for the client involved and expressly for purposes indicated by the client. Use by any other persons for any purpose, or by the client for a different purpose, may result in problems. *No individual other than the client should apply this report for its intended purpose without first conferring with the*

geotechnical engineer. No person should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Costly problems can occur when other design professionals develop their plants based on misinterpretations of a geotechnical engineering report. To help avoid these problems, the geotechnical engineer should be retained to work with other appropriate design professionals to explain relevant geotechnical findings and to review the adequacy of their plans and specifications relative to geotechnical issues.

BORING LOGS SHOULD NOT BE SEPARATED FROM THE ENGINEERING REPORT

Final boring logs are developed by geotechnical engineers based upon their interpretation of field logs (assembled by site personnel) and laboratory evaluation of field samples. Only final boring logs customarily are included in geotechnical engineering reports. *These logs should not under any circumstances be redrawn* for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimize the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes and unanticipated costs are the all-too-frequent result.

To minimize the likelihood of boring log misinterpretation, *give contractors ready access to the complete geotechnical engineering report* prepared or authorized for their use. Those

who do not provide such access may proceed under the *mistaken* impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes which aggravate them to disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY

Because geotechnical engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against geotechnical consultants. To help prevent this problem, geotechnical engineers have developed model clauses for use in written transmittals. These are *not* exculpatory clauses designed to foist geotechnical engineers' liabilities onto someone else. Rather, they are definitive clauses which identify where geotechnical engineers' responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your geotechnical engineering report, and you are encouraged to read them closely. your geotechnical engineer will be pleased to give full and frank answers to your questions.

OTHER STEPS YOU CAN TAKE TO REDUCE RISK

Your consulting geotechnical engineer will be pleased to discuss other techniques which can be employed to mitigate risk. In addition, ASFE as developed a variety of materials which may be beneficial. Contact ASFE for a complimentary copy of its publications directory.

Published by

The logo for the Association of Engineering Firms Practicing in the Geosciences (ASFE). It features the letters "ASFE" in a large, bold, blue, sans-serif font. The letters are slightly shadowed, giving them a three-dimensional appearance as if they are floating above or attached to a light brown, rounded rectangular background.

THE ASSOCIATION
OF ENGINEERING FIRMS
PRACTICING IN THE
GEOSCIENCES

8811 Colesville Road/Suite G106/Silver Spring, Maryland 20910/(301)565-2733

LOGS OF EXPLORATIONS

EXPLANATION OF ABBREVIATIONS AND DESCRIPTIVE TERMS

- SSS (SPT) - Standard penetration resistance test – results recorded as the number of blows of a 140-pound hammer falling 30 inches required to drive a 2-inch O.D. split sample spoon the second and third 6-inch increments of an 18-inch distance.
- LSS - Modified penetration test – results recorded as the number of blows of a 140-pound hammer falling 30 inches required to drive a 2.5-inch O.D. split spoon the second and third 6-inch increments of an 18-inch distance.
- SRS - Split barrel ring sampler 2-inches I.D. for taking undisturbed samples.
- LRS - Split barrel ring sampler 2.5 inches I.D. for taking undisturbed samples.
- STS - Shelby tube sampler for taking undisturbed samples (2” to 3-5/16” I.D.).
- Sack (SK) or Bag - Sample of disturbed soil placed in canvas sack or plastic bag.
- GWL - Groundwater level on the date shown on the logs.
- RQD - Rock quality designation (RQD) for the bedrock samples are determined for each core run by summing the length of all sound, hard pieces of core over four inches in length, and dividing this number by the total length of the core run. This value, along with the core recovery percentage, is recorded on the drill logs.

GRAIN SIZES

	U.S. Standard Series Sieve					Clear Square Sieve Openings	
	200	40	10	4	¾”	3”	12”
Silts & Clays Distinguished on Basis of Plasticity	SAND				GRAVEL		Cobbles Boulders
	Fine	Medium	Coarse	Fine	Coarse		

CONSISTENCY		RELATIVE DENSITY	
Clays & Silts	SPT* Blows/foot	Sands & Gravels	SPT* Blows/foot
Very Soft	0 – 2	Very Loose	0 – 4
Soft	3 – 4	Loose	5 – 10
Firm	5 – 8	Medium Dense	11 – 30
Stiff	9 – 15	Dense	31 – 50
Very Stiff	15 – 30	Very dense	Over 50
Hard	Over 30		

*Standard Penetration Test; PL = Plastic Limit; LL = Liquid Limit

Tetra Tech Boring Log Descriptive Terminology

Key to Soil Symbols and Terms

12/06/12



TETRA TECH

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL
			GRAPH	LETTER	DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	Well-graded gravels, gravel sand mixtures, little or no fines.
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines.
				GM	Silty gravels, gravel-sand-silt mixtures.
	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	Well-graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SP	Poorly graded sands, gravelly sands, little or no fines.
				SM	Silty sands, sand-silt mixtures.
MORE THAN 50% OF COARSE FRACTION PASSED ON NO. 4 SIEVE				SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
				OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
				CH	Inorganic clays of high plasticity, fat clays.
				OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS				PT	Peat and other highly organic soils.

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Notes

See Soil Boring Information Special Provision.

SPT (Standard Penetration Test-ASTM D1586):

The number of blows of a 140 lb (63.6 kg) hammer falling 2.5 ft (750 mm) used to drive a 2 in (50 mm) O.D. Split Spoon sampler for a total of 1.5 ft (0.45 m) of penetration.

Written as follows:

first 0.5 ft (0.15 m) - second 0.5 ft (0.15 m) - third 0.5 ft (0.15 m)
(ex: 1-3-9)

Note: if the number of blows exceeds 50 before 0.5 ft (0.15 m) of penetration is achieved, the actual penetration rounded to the nearest 0.1 ft (0.03 m) follows the number of blows in parentheses (ex: 12-24-50 (0.09 m), 34-50 (0.4 ft), or 100 (0.3 ft)). WR denotes a zero blow count with the weight of the rods only.

WH denotes a zero blow count with the weight of the rods plus the weight of the hammer.

MC=Moisture Content, LL=Liquid limit, PL=Plastic Limit

-200%=percent soil passing 200 sieve, DD=Dry Density

Soil Classifications are Based on the Unified Soil Classification System, ASTM D2487 and D2488.

Also included are the AASHTO group classifications (M145). Descriptions are based on visual observation, except where they have been modified to reflect results of laboratory tests as deemed appropriate.

Example soil description: Sandy FAT CLAY (CH), soft, wet, brown. (A-7)

Order of Descriptors

- Group Name
- Consistency or Relative Density
- Moisture Condition
- Color
- Particle size descriptor(s) (coarse grained soils only)
- Angularity of coarse grained soils
- Other relevant notes

Criteria For Descriptors

Consistency of Fine Grained Soils

Consistency	N-Value (uncorrected)
Very Soft	< 2
Soft	2 - 4
Medium Stiff	5 - 8
Stiff	9 - 15
Very Stiff	16 - 30
Hard	> 30

Apparent Density of Coarse Grained Soils

Relative Density	N-Value (uncorrected)
Very Loose	< 4
Loose	4 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

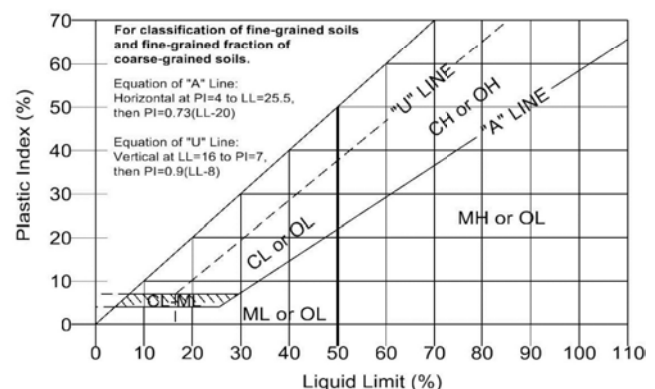
Moisture Condition

Dry	-Absence of moisture, dusty, dry to the touch.
Moist	-Damp, but no visible water.
Wet	-Visible free water.

Definition of Particle Size Ranges

Soil Component	Size Range
Boulder	> 12 in (300 mm)
Cobble	3 in (75 mm) - 12 in (300 mm)
Gravel	No. 4 Sieve (4.75 mm) to 3 in (75 mm)
Sand	No. 200 (0.075 mm) to No. 4 Sieves (4.75 mm)
Silt	< No. 200 Sieve (0.075 mm)*
Clay	< No. 200 Sieve (0.075 mm)*

*Atterberg limits and chart below to differentiate between silt and clay.



Angularity of Coarse-Grained Particles

Angular	-Particles have sharp edges and relative plane sides with unpolished surfaces.
Subangular	-Particles are similar to angular description, but have rounded edges.
Subrounded	-Particles have nearly plane sides, but have no edges.
Rounded	-Particles have smoothly curved sides and well-rounded corners and edges.

Tetra Tech Boring Log Descriptive Terminology

Key to Rock Symbols and Terms

12/06/12



TETRA TECH

Rock Type	Symbol	Rock Type	Symbol	Rock Type	Symbol
Argillite		Dolomite		Quartzite	
Basalt		Gneiss		Rhyolite	
Bedrock (other)		Granitic		Sandstone	
Breccia		Limestone		Schist	
Claystone		Siltstone		Shale	
		Conglomerate			

Order of Descriptors

- Rock Type
- Color
- Grain size (if applicable)
- Stratification/Foliation (as applicable)
- Field Hardness
- Other relevant notes

Criteria For Descriptors

Grain Size

Description	Characteristic
Coarse Grained	-Individual grains can be easily distinguished by eye
Fine Grained	-Individual grains can be distinguished with difficulty

Stratum Thickness

Thickly Bedded	3-10 ft (1-3 m)
Medium Bedded	1-3 ft (300 mm - 1 m)
Thinly Bedded	2-12 in (50-300 mm)
Very Thinly Bedded	< 2 in (50 mm)

Rock Field Hardness

Very Soft	-Can be carved with knife. Can be excavated readily with point of rock hammer. Can be scratched readily by fingernail.
Soft	-Can be grooved or gouged readily by knife or point of rock hammer. Can be excavated in fragments from chips to several inches in size by moderate blows of the point of a rock hammer.
Medium	-Can be grooved or gouged 0.05 in (2 mm) deep by firm pressure of knife or rock hammer point. Can be excavated in small chips to pieces about 1 in (25 mm) maximum size by hard blows of the point of a rock hammer.
Moderately hard	-Can be scratched with knife or pick. Gouges or grooves to 0.25 in (6 mm) can be excavated by hard blow of rock hammer. Hand specimen can be detached by moderate blows.
Hard	-Can be scratched with knife or pick only with difficulty. Hard hammer blows required to detach hand specimen.
Very Hard	-Cannot be scratched with knife or sharp rock hammer point. Breaking of hand specimens requires several hard blows of a rock hammer.

Notes:

UCS = Unconfined Compressive Strength obtained from laboratory testing at the given depth.

See Soil Boring Information Special Provision.

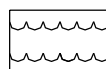
Miscellaneous Soil/Rock Symbols and Terms



Concrete



Asphalt



Water



Boulders and Cobbles



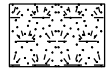
Coal



Fill



Millings



Topsoil

-Soil and Rock descriptions are based on visual observation, except where they have been modified to reflect results of laboratory tests as deemed appropriate.

Explanation of Text Fields In Boring Logs:

Material Description: Lithologic Description of soil or rock encountered.

Remarks: Comments on drilling, including method, bit type, and problems encountered.

Unless stated on logs as being surveyed by district survey, all locations are considered approximate.

General Notes

- Descriptions on these boring logs apply only at the specific boring, and at the time the borings were made. These logs are not warranted to be representative of subsurface conditions at other locations or times.
- Water level observations apply only at the specific boring, and at the time the borings were made. Due to the variability of groundwater measurements given the type of drilling used, and the stratification of the soil in the boring, these logs are not warranted to be representative of groundwater conditions at other locations or times.
- Other terms may be used as descriptors, as defined by the profession.

Operation Types:



Auger



Casing Advancer



Core Barrel



Drive Casing

Sample Types:



Split Spoon



Shelby



Bulk Sample



Grab Sample



Cone Penetrometer



Vane Shear



Special Samplers



Testpit

Example Rock Log

SANDSTONE, gray, fine grained, thickly bedded, hard field hardness.



CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

ASTM Designation: D 2487 – 83
(Based on Unified Soil Classification System)

MAJOR DIVISIONS				GROUP SYMBOL	GROUP NAME
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines	Cu ≥ 4 and 1 ≤ Cc ≤ 3 ^E	GW	Well graded gravel ^F
			Cu < 4 and/or 1 > Cc > 3 ^E	GP	Poorly graded gravel ^F
		Gravels with Fines More than 12% fines	Fines classify as ML or MH	GM	Silty gravel ^{F GH}
			Fines classify as CL or CH	GC	Clayey gravel ^{F GH}
	Sands 50% or more of coarse faction passes No. 4 sieve	Clean Sands Less than 5% fines	Cu ≥ 6 and 1 ≤ Cc ≤ 3 ^E	SW	Well-graded sand ^I
			Cu < 6 and/or 1 > Cc > 3 ^E	SP	Poorly graded sand ^I
		Sands with Fines More than 12% fines	Fines classify as ML or MH	SM	Silty Sand ^{GHI}
			Fines classify as CL or CH	SC	Clayey sand ^{GHI}
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above “A” line	CL	Lean clay ^{KLM}
			PI < 4 or plots below “A” line	ML	Silt ^{KLM}
		Organic	<u>Liquid limit – oven dried</u> Liquid limit – not dried < 0.75	OL	Organic clay ^{KLMN} Organic silt ^{KLMO}
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above “A” line	CH	Fat clay ^{KLM}
			PI plots below “A” line	MH	Elastic silt ^{KLM}
		Organic	<u>Liquid limit – oven dried</u> Liquid limit – not dried < 0.75	OH	Organic clay ^{KLMO} Organic silt ^{KLMO}
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

^A Based on the material passing the 3-in. (75-mm) sieve.

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Gravels with 5 to 12% require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

^D Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

^E $C_u = D_{60}/D_{10}$ $C_c = (D_{30})^2 / (D_{10} \times D_{90})$

^F If soil contains $\geq 15\%$ sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^H If fines are organic, add "with organic fines" to group name.

^I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^J If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.

^L If solid contains $\geq 30\%$ plus No. 200, predominantly sand, add "sandy" to group name.

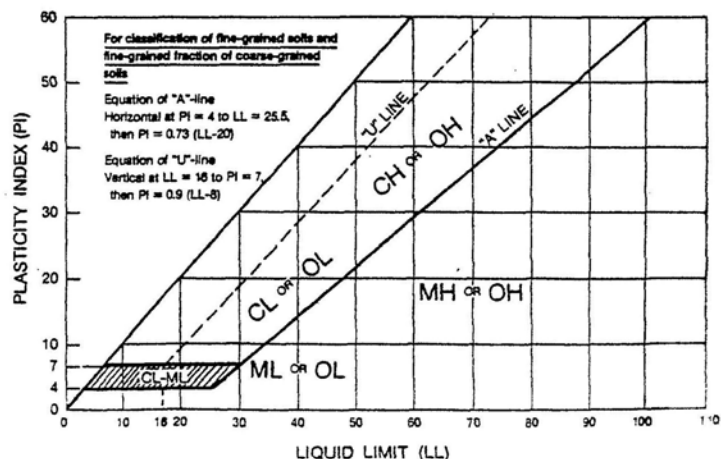
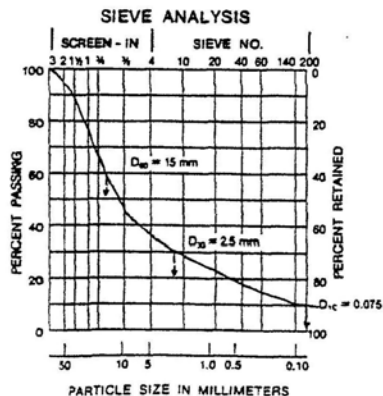
^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N PI ≥ 4 and plots on or above "A" line.

^O PI < 4 or plots below "A" line.

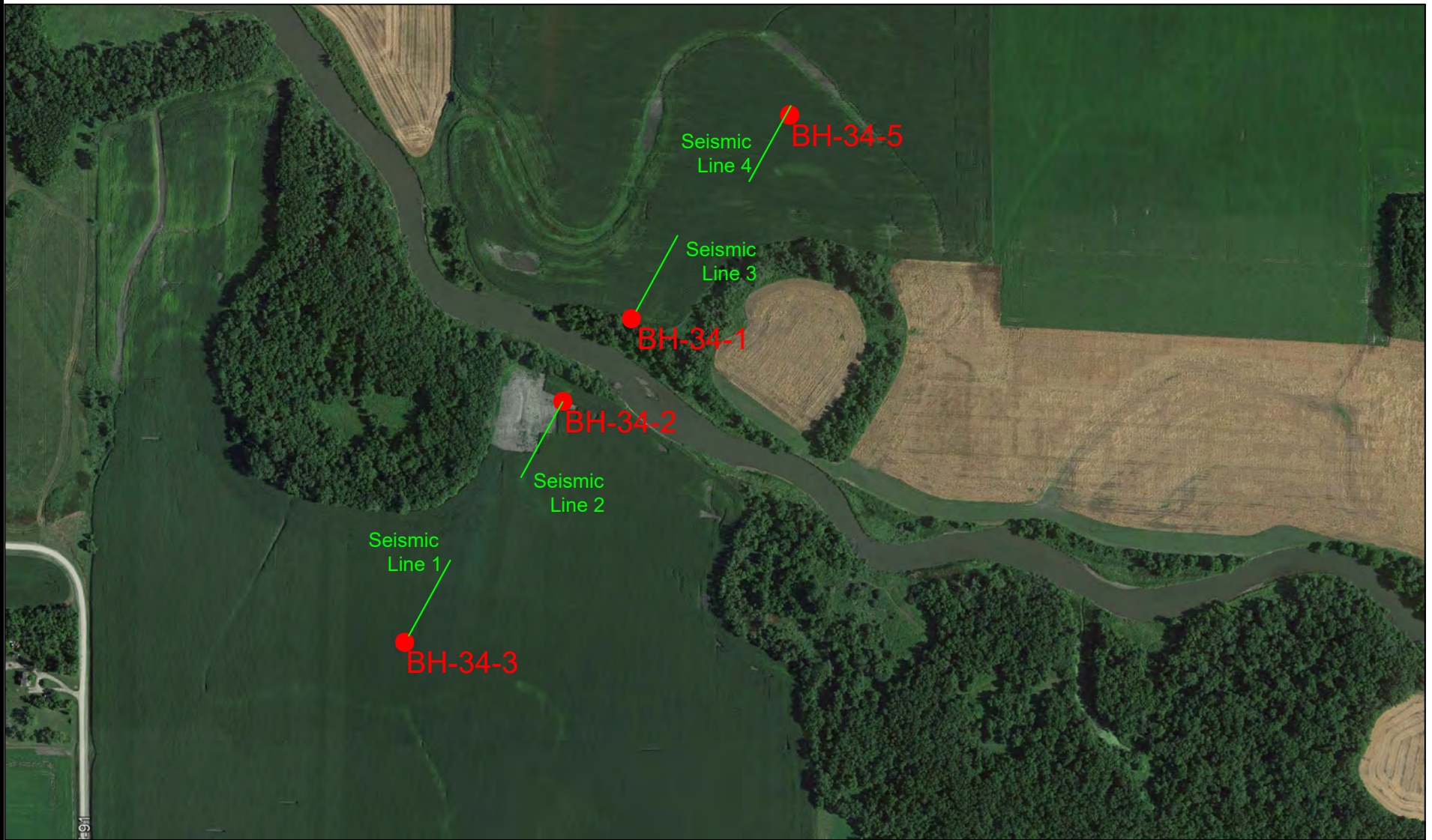
^P PI plots on or above "A" line.

^Q PI plots below "A" line.



$$C_u = \frac{D_{60}}{D_{10}} = \frac{15}{0.075} = 200 \quad C_c = \frac{(D_{30})^2}{D_{12} \times D_{36}} + \frac{(2.5) - (0.075)}{0.075 \times 15} = 5.6$$

7/14/2022 4:32:15 PM - C:\USERS\ARIC\HOTALING\DOCUMENTS\REPORTS\MCE\HDD 34 - MN SITE MAP\HDD 33.DWG - HOTALING - ARIC



TETRA TECH

www.tetrattech.com
2525 Palmer St. Suite 2
Missoula, MT 59808
Phone: (406) 543-3045

Client: Tetra Tech Rooney

Midwest Carbon Express HDD 34 - Otter Tail River Crossing
Wilkin County, Minnesota
LOCATION OF EXPLORATORY BORINGS AND SEISMIC SURVEYS

Project No.: 117-8273015

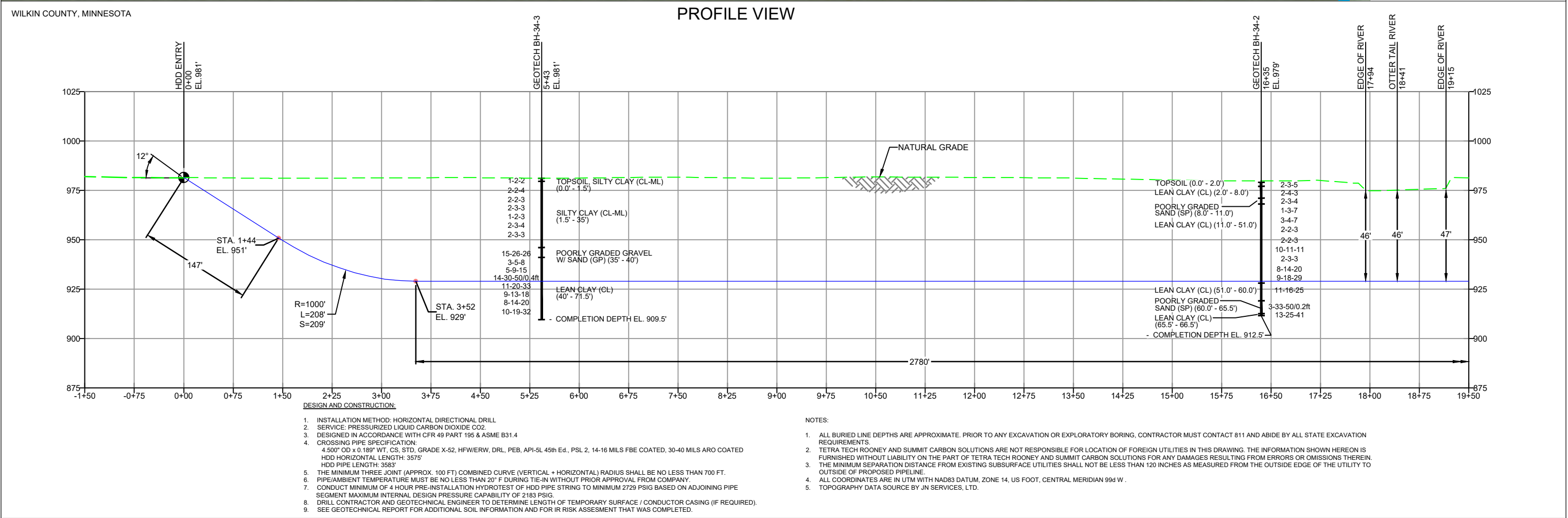
Date: July 2022



Drawn By: A. Hotaling

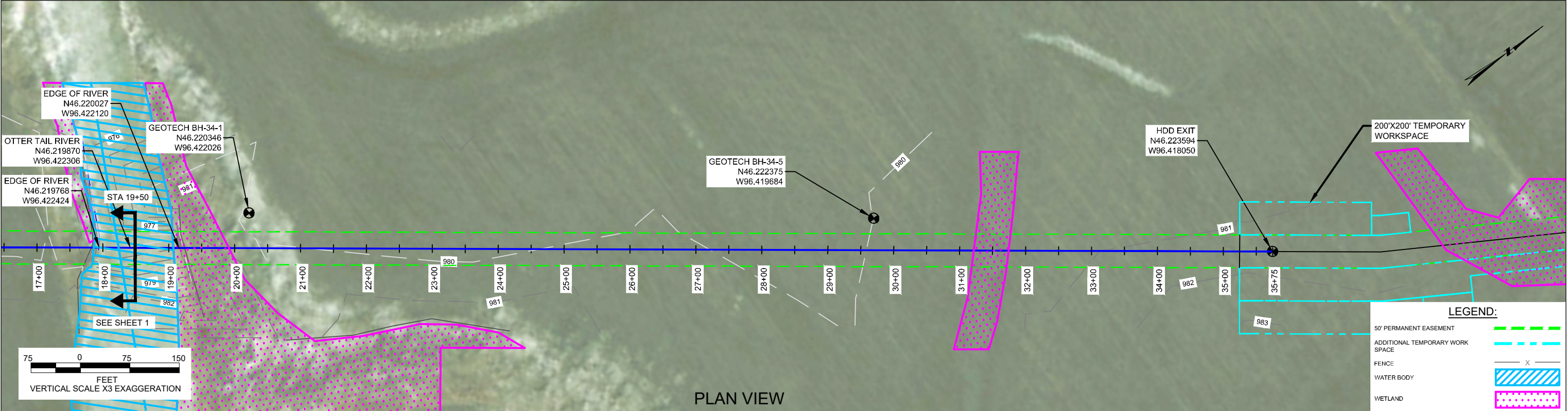
Drawing Number

3015-1



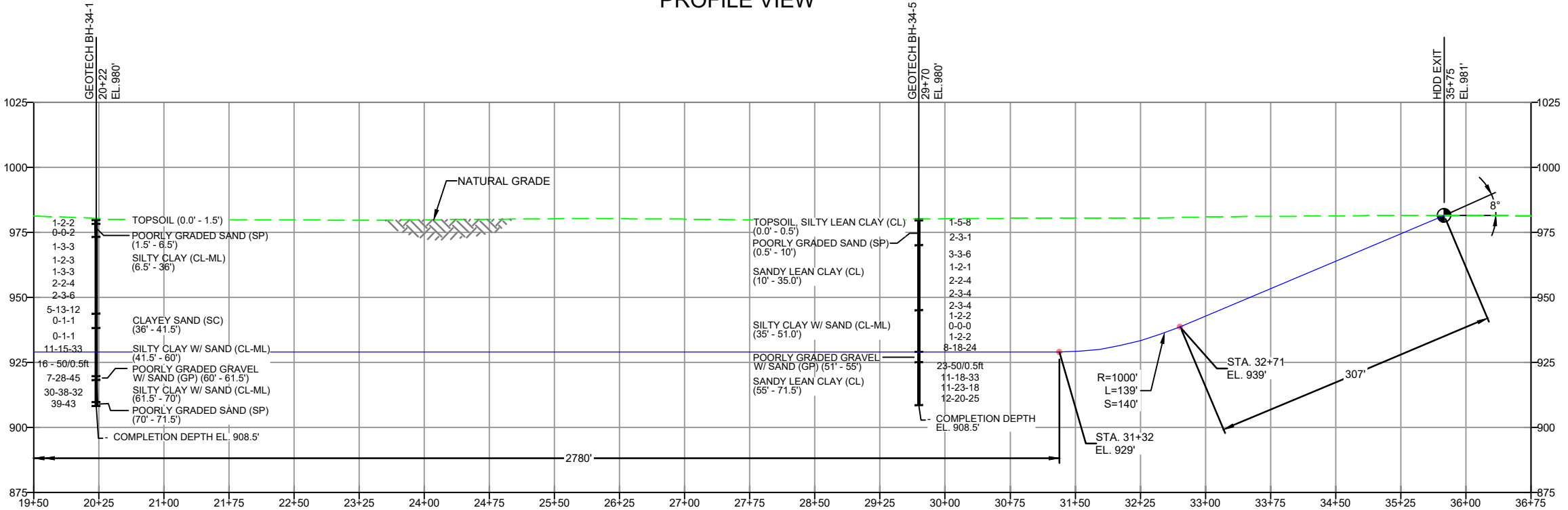


NOTES		REVISIONS								<div><div>SUMMIT CARBON SOLUTIONS</div></div> <div><div>TETRA TECH ROONEY</div><div>(303) 792-5911</div></div>		SUMMIT CARBON SOLUTIONS	
1. ALL COORDINATES SHOWN ARE IN LATITUDE AND LONGITUDE. ALL MSL ELEVATIONS ARE NAD83 2. STATIONING IS BASED ON HORIZONTAL DISTANCES.									HORIZONTAL DIRECTIONAL DRILL OTTER TAIL RIVER SHEET 1 OF 2				
		E	CLIENT COMMENTS	MRS	09/09/2022	AMC	09/09/2022	ZBB				09/09/2022	
		D	DESIGN CHANGE	MRS	08/26/2022	AMC	08/26/2022	ZBB			08/26/2022		
		C	FINAL DELIVERABLE	MRS	08/02/2022	AMC	08/02/2022	ZBB			08/02/2022		
		B	ADDED GEOTECHNICAL BORING DATA TO PROFILE	MRS	07/07/2022	AMC	07/07/2022	ZBB	07/07/2022				
A	ISSUED FOR REVIEW	MRS	05/02/2022	AMC	05/02/2022	ZBB	05/02/2022						
NO.	DESCRIPTION	BY	DATE	CHK	DATE	APP	DATE			SCALE: 1"=150'	DWG. NO: HDD-34 CROSSING		



WILKIN COUNTY, MINNESOTA

PROFILE VIEW



DESIGN AND CONSTRUCTION:

1. INSTALLATION METHOD: HORIZONTAL DIRECTIONAL DRILL
2. SERVICE: PRESSURIZED LIQUID CARBON DIOXIDE CO₂
3. DESIGNED IN ACCORDANCE WITH CFR 49 PART 195 & ASME B31.4
4. CROSSING PIPE SPECIFICATION:
4.500" OD x 0.189" WT, CS, STD, GRADE X-52, HFW/ERW, DRL, PEB, API-5L 45th Ed., PSL 2, 14-16 MILS FBE COATED, 30-40 MILS ARO COATED
HDD HORIZONTAL LENGTH: 3575'
HDD PIPE LENGTH: 3583'
5. THE MINIMUM THREE JOINT (APPROX. 100 FT) COMBINED CURVE (VERTICAL + HORIZONTAL) RADIUS SHALL BE NO LESS THAN 700 FT.
6. PIPE/AMBIENT TEMPERATURE MUST BE NO LESS THAN 20° F DURING TIE-IN WITHOUT PRIOR APPROVAL FROM COMPANY.
7. CONDUCT MINIMUM OF 4 HOUR PRE-INSTALLATION HYDROTEST OF HDD PIPE STRING TO MINIMUM 2729 PSIG BASED ON ADJOINING PIPE SEGMENT MAXIMUM INTERNAL DESIGN PRESSURE CAPABILITY OF 2163 PSIG.
8. DRILL CONTRACTOR AND GEOTECHNICAL ENGINEER TO DETERMINE LENGTH OF TEMPORARY SURFACE / CONDUCTOR CASING (IF REQUIRED).
9. SEE GEOTECHNICAL REPORT FOR ADDITIONAL SOIL INFORMATION AND FOR IR RISK ASSESSMENT THAT WAS COMPLETED.

NOTES:

1. ALL BURIED LINE DEPTHS ARE APPROXIMATE. PRIOR TO ANY EXCAVATION OR EXPLORATORY BORING, CONTRACTOR MUST CONTACT 811 AND ABIDE BY ALL STATE EXCAVATION REQUIREMENTS.
2. TETRA TECH ROONEY AND SUMMIT CARBON SOLUTIONS ARE NOT RESPONSIBLE FOR LOCATION OF FOREIGN UTILITIES IN THIS DRAWING. THE INFORMATION SHOWN HEREON IS FURNISHED WITHOUT LIABILITY ON THE PART OF TETRA TECH ROONEY AND SUMMIT CARBON SOLUTIONS FOR ANY DAMAGES RESULTING FROM ERRORS OR OMISSIONS THEREIN.
3. THE MINIMUM SEPARATION DISTANCE FROM EXISTING SUBSURFACE UTILITIES SHALL NOT BE LESS THAN 120 INCHES AS MEASURED FROM THE OUTSIDE EDGE OF THE UTILITY TO OUTSIDE OF PROPOSED PIPELINE.
4. ALL COORDINATES ARE IN UTM WITH NAD83 DATUM, ZONE 14, US FOOT, CENTRAL MERIDIAN 99d W.
5. TOPOGRAPHY DATA SOURCE BY JN SERVICES, LTD.

NOTES

1. ALL COORDINATES SHOWN ARE IN LATITUDE AND LONGITUDE. ALL MSL ELEVATIONS ARE NAD83
2. STATIONING IS BASED ON HORIZONTAL DISTANCES.

REVISIONS

NO.	DESCRIPTION	BY	DATE	CHK	DATE	APP	DATE
E	CLIENT COMMENTS	MRS	09/09/2022	AMC	09/09/2022	ZBB	09/09/2022
D	DESIGN CHANGE	MRS	08/26/2022	AMC	08/26/2022	ZBB	08/26/2022
C	FINAL DELIVERABLE	MRS	08/02/2022	AMC	08/02/2022	ZBB	08/02/2022
B	ADDED GEOTECHNICAL BORING DATA TO PROFILE	MRS	07/07/2022	AMC	07/07/2022	ZBB	07/07/2022
A	ISSUED FOR REVIEW	MRS	05/02/2022	AMC	05/02/2022	ZBB	05/02/2022



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TETRA TECH ROONEY
(303) 792-5911

SUMMIT CARBON SOLUTIONS

HORIZONTAL DIRECTIONAL DRILL
OTTER TAIL RIVER
SHEET 2 OF 2

SCALE: 1"=150'

DWG. NO: HDD-34 CROSSING



NOTES:

1. ALL BURIED LINE DEPTHS ARE APPROXIMATE. PRIOR TO ANY EXCAVATION OR EXPLORATORY BORING, CONTRACTOR MUST CONTACT 811 AND ABIDE BY ALL STATE EXCAVATION REQUIREMENTS.
2. TETRA TECH ROONEY AND SUMMIT CARBON SOLUTIONS ARE NOT RESPONSIBLE FOR LOCATION OF FOREIGN UTILITIES IN THIS DRAWING. THE INFORMATION SHOWN HEREON IS FURNISHED WITHOUT LIABILITY ON THE PART OF TETRA TECH ROONEY AND SUMMIT CARBON SOLUTIONS FOR ANY DAMAGES RESULTING FROM ERRORS OR OMISSIONS THEREIN.
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4. ALL COORDINATES ARE IN UTM WITH NAD83 DATUM, ZONE 14, US FOOT, CENTRAL MERIDIAN 99d W.
5. TOPOGRAPHY DATA SOURCE BY JN SERVICES, LTD.

NOTES	
1. ALL COORDINATES SHOWN ARE IN LATITUDE AND LONGITUDE. ALL MSL ELEVATIONS ARE NAD83	
2. STATIONING IS BASED ON HORIZONTAL DISTANCES.	

REVISIONS						
NO.	DESCRIPTION	BY	DATE	CHK	DATE	APP
C	CLIENT COMMENTS	MRS	09/09/2022	AMC	09/09/2022	ZBB
B	DESIGN CHANGE	MRS	08/26/2022	AMC	08/26/2022	ZBB
A	ISSUED FOR REVIEW	MRS	08/08/2022	AMC	08/08/2022	ZBB



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SUMMIT CARBON SOLUTIONS

HORIZONTAL DIRECTIONAL DRILL
OTTER TAIL RIVER
HDD PULL BACK PLAN SKETCH

SCALE: 1"=500' DWG. NO: HDD-34 CROSSING

APPENDIX B

Logs of Exploratory Borings (Figures 1B through 4B)

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Figure No. 1B LOG OF BORING



Sheet 1 of 3

Boring BH-34-1

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70	Boring Location N: 46.220346
Project Number: 117-8273015		Hammer: Auto	Coordinates E: -96.422026
Date Started: 4/20/22		Boring Diameter: 8"	System: Decimal Degrees
Date Finished: 4/21/22		Datum: NAD83	Top of Boring Elevation: 980.0 ft
Driller: IDS		Drilling Fluid: None	Abandonment Method: Bentonite
Logger: P. Lemire		Location: North Side of Ottetail River	

TT LOG OF BORING - MDT REVISED 2009+ GDT - 8/5/22 10:14 - N:\GEO\TECH\REPORTS\REPORT 2022\MIDWEST CARBON EXPRESS HDDS\HDD 34 MNI\LAB LOG\OTTERTAIL BORING LOGS.GPJ

Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
5			70		1-2-2		TOPSOIL, Silty Lean CLAY (CL-ML), soft, moist, dark brown.	1.5	978.5	27					
5			75		0-0-2		Poorly-Graded SAND (SP), very loose, wet, brown.	6.5	973.5	16	26	12	37		pH= 7 Resistivity= 1,200 ohm-cm Sulfate Content= 0.09 %
10			100		1-3-3		Sandy Lean CLAY (CL), medium stiff, moist, brown, coarse grained, angular, Sand and very small gravel.	23							
15			80		1-2-3			29							
20			10		1-3-3			22	35	17					Friction Angle= 20.4 degrees Cohesion= 0 ksf
25			70		2-2-4										
30															

Water Level Observations		<div><div></div><div>During Drilling: Not Recorded</div></div>	Remarks:
<div><div></div><div>After Drilling: Not Recorded</div></div>	<div><div></div><div>After Drilling: Not Recorded</div></div>		

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Figure No. 1B LOG OF BORING



Sheet 2 of 3

Boring BH-34-1

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70 Hammer: Auto	Boring Location N: 46.220346 Coordinates E: -96.422026
Project Number: 117-8273015		Boring Diameter: 8"	System: Decimal Degrees Datum: NAD83 Top of Boring Elevation: 980.0 ft
Date Started: 4/20/22	Date Finished: 4/21/22	Drilling Fluid: None	Abandonment Method: Bentonite
Driller: IDS Logger: P. Lemire		Location: North Side of Ottetail River	

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Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
30.0 950.0			10		2 - 3 - 6		Silty CLAY (CL-ML), stiff, moist, brown.	30.0 950.0		25					
31.5 948.5							Silty CLAY (CL-ML), medium dense, moist, brown, Some sand and small gravel.	31.5 948.5							
35 945.0			100		5 - 13 - 12			36.0 944.0							
40 940.0			15		0 - 1 - 1		Clayey SAND (SC), very loose, moist to wet, brown, angular, Small gravel.	41.5 938.5		22					
45 935.0			100		0 - 1 - 1		Sandy Lean CLAY (CL), very dense, moist to slightly moist, brown.								
50 930.0			100		11 - 15 - 33					14	33	17	42		Friction Angle= 32.4 degrees Cohesion= 0 ksf
55 925.0			50		16 - 50/0.5ft										
60 920.0															

Water Level Observations		<div><div></div>During Drilling: Not Recorded</div>	Remarks:
<div><div></div>After Drilling: Not Recorded</div>	<div><div></div>After Drilling: Not Recorded</div>		

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Figure No. 1B LOG OF BORING



Sheet 3 of 3

Boring BH-34-1

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70 Hammer: Auto	Boring Location N: 46.220346 Coordinates E: -96.422026	
Project Number: 117-8273015		Boring Diameter: 8"	System: Decimal Degrees Datum: NAD83	Top of Boring Elevation: 980.0 ft
Date Started: 4/20/22	Date Finished: 4/21/22	Drilling Fluid: None	Abandonment Method: Bentonite	
Driller: IDS Logger: P. Lemire		Location: North Side of Ottertail River		

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Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
60.0			100		7 - 28 - 45		Silty SAND with gravel (SM), hard, wet, brown, fine to coarse grained, angular.	60.0	920.0	12	NV	NP	23		
61.5							Silty CLAY with sand (CL-ML), hard, moist to slightly moist, brown.	61.5	918.5						
65															
65			40		30 - 38 - 32										
70															
70															
70.0			27		39 - 43		Poorly-Graded SAND (SP), very dense, moist, brown, fine to medium grained, angular, Some small gravel.	70.0	910.0	9					
71.5								71.5	908.5						
Boring Depth: 71.5 ft, Elevation: 908.5 ft															

Water Level Observations		<div><div></div><div>During Drilling: Not Recorded</div></div>	Remarks:
<div><div></div><div>After Drilling: Not Recorded</div></div>	<div><div></div><div>After Drilling: Not Recorded</div></div>		

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Figure No. 2B LOG OF BORING



Sheet 1 of 3

Boring BH-34-2

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70	Boring Location N: 46.219514
Project Number: 117-8273015		Hammer: Auto	Coordinates E: -96.42297
Date Started: 4/19/22		Boring Diameter: 8"	System: Decimal Degrees
Date Finished: 4/19/22		Datum: NAD83	Top of Boring Elevation: 980.0 ft
Driller: IDS		Drilling Fluid: None	Abandonment Method: Bentonite
Logger: P. Lemire		Location: South Side of Ottetail River	

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Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
2.0			75		2-3-5		TOPSOIL, Lean CLAY (CL), medium stiff, moist, dark brown.	2.0	978.0						
5.0			75		2-4-3		Lean CLAY (CL), medium stiff, moist, brown.	8.0	972.0	18					
10.0			75		2-3-4		Poorly-Graded SAND (SP), loose, wet, brown, coarse grained.	11.0	969.0						
15.0			100		1-3-7		Lean CLAY (CL), medium stiff to stiff, moist, brown.	18.0	962.0	21					
20.0			100		3-4-7		Sandy SILT (ML), medium stiff, moist, brown.	23.0	957.0	25	NV	NP	52		
25.0			0		2-2-3		Lean CLAY (CL), medium stiff to very stiff, moist, brown.								
30.0															

Water Level Observations		<div><div></div>During Drilling: Not Recorded</div>	Remarks:
<div><div></div>After Drilling: Not Recorded</div>	<div><div></div>After Drilling: Not Recorded</div>		

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Figure No. 2B LOG OF BORING




Sheet 2 of 3

Boring BH-34-2

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70 Hammer: Auto	Boring Location N: 46.219514 Coordinates E: -96.42297
Project Number: 117-8273015		Boring Diameter: 8"	System: Decimal Degrees Datum: NAD83 Top of Boring Elevation: 980.0 ft
Date Started: 4/19/22	Date Finished: 4/19/22	Drilling Fluid: None	Abandonment Method: Bentonite
Driller: IDS Logger: P. Lemire		Location: South Side of Ottetail River	

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Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
35			100		2-2-3			19							
945.0			80		10-11-11			23							
40			0		2-3-3										
940.0															
45			70		8-14-20			24	42	19	3				
935.0															
50			100		9-18-29			51.0	929.0						
930.0							Lean CLAY (CL), dense, moist, brown, Some small gravels in clay.								
55			90		11-16-25			23							
925.0															
60															
920.0															

Water Level Observations		 During Drilling: Not Recorded	Remarks:
After Drilling: Not Recorded	After Drilling: Not Recorded		

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Figure No. 2B LOG OF BORING



Sheet 3 of 3

Boring BH-34-2

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70	Boring Location N: 46.219514
Project Number: 117-8273015		Hammer: Auto	Coordinates E: -96.42297
Date Started: 4/19/22		Boring Diameter: 8"	System: Decimal Degrees
Date Finished: 4/19/22		Datum: NAD83	Top of Boring Elevation: 980.0 ft
Driller: IDS		Drilling Fluid: None	Abandonment Method: Bentonite
Logger: P. Lemire		Location: South Side of Ottetail River	

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Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
65 915.0			100		3 - 33 - 50/0.2ft		Well-Graded SAND with silt (SP-SM), very dense, wet, brown, medium to coarse grained.	60.0 920.0		16	16	15	8		pH= 7 Resistivity= 1,130 ohm-cm Sulfate Content= 0.07 %
			75		13 - 25 - 41		Clayey SAND (SC), hard, moist, brown, Some gravel.	65.5 914.5 66.5		20	22	11	17		
Boring Depth: 66.5 ft, Elevation: 913.5 ft								913.5							

Water Level Observations		<div>During Drilling: Not Recorded</div>	Remarks:
<div>After Drilling: Not Recorded</div>	<div>After Drilling: Not Recorded</div>		

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Figure No. 3B LOG OF BORING




Sheet 1 of 3

Boring BH-34-3

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70 Hammer: Auto	Boring Location N: 46.217 Coordinates E: -96.425346
Project Number: 117-8273015		Boring Diameter: 8"	System: Decimal Degrees Datum: NAD83 Top of Boring Elevation: 981.0 ft
Date Started: 4/19/22	Date Finished: 4/20/22	Drilling Fluid: None	Abandonment Method: Bentonite
Driller: IDS Logger: P. Lemire		Location: South Side of Ottetail River	

TT LOG OF BORING - MDT REVISED 2009+ GDT - 8/5/22 10:14 - N:\GEO\TECH\REPORTS\REPORT 2022\MIDWEST CARBON EXPRESS HDDS\HDD 34 MNI\LAB LOG\OTTERTAIL BORING LOGS.GPJ

Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
5			50		1-2-2		TOPSOIL, Silty CLAY (CL-ML), soft, moist, brown.	1.5	979.5	32					
976.0			90		2-3-4		Sandy Lean CLAY (CL), medium stiff, moist, brown.								
10			100		2-2-3					36					
971.0			10		2-3-3										
15			100		1-2-3					25					
966.0			100		2-3-4										
20			100							23	34	18	45		Friction Angle= 24.6 degrees Cohesion= 0 ksf
961.0															
25															
956.0															
30															
951.0															

Water Level Observations		 During Drilling: Not Recorded	Remarks:
After Drilling: Not Recorded	After Drilling: Not Recorded		

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Missoula, MT 59808
Phone: (406) 543-3045
Fax: (406) 543-3088

Figure No. 3B LOG OF BORING



Sheet 2 of 3

Boring BH-34-3

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70	Boring Location N: 46.217
Project Number: 117-8273015		Hammer: Auto	Coordinates E: -96.425346
Date Started: 4/19/22		Boring Diameter: 8"	System: Decimal Degrees
Date Finished: 4/20/22		Datum: NAD83	Top of Boring Elevation: 981.0 ft
Driller: IDS		Drilling Fluid: None	Abandonment Method: Bentonite
Logger: P. Lemire		Location: South Side of Ottetail River	

TT LOG OF BORING - MDT - REVISED 2009+ GDT - 8/5/22 10:14 - N:\GEO\TECH\REPORTS\REPORT 2022\MIDWEST CARBON EXPRESS HDDS\HDD 34 MINLAB LOG\OTTERTAIL BORING LOGS.GPJ

Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
35			0		2 - 3 - 3										
35.0			35		15 - 26 - 26		Poorly-Graded GRAVEL with sand (GP), very dense, wet, brown, medium to coarse grained, angular.	35.0	946.0						
40			100		3 - 5 - 8		Sandy Lean CLAY (CL), stiff to hard, moist, brown, fine grained, angular, Small angular gravel and fine grained sand.	40.0	941.0	20					
45			100		5 - 9 - 15					14					Thin 1" sand lense Coarse gravel
50			68		14 - 30 - 50/0.4ft					18	27	18	59		
55			0		11 - 20 - 33										
60															
921.0															

Water Level Observations		<div><div></div>During Drilling: Not Recorded</div>	Remarks:
<div><div></div>After Drilling: Not Recorded</div>	<div><div></div>After Drilling: Not Recorded</div>		

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Figure No. 3B
LOG OF BORING



Sheet 3 of 3

Boring BH-34-3

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70 Hammer: Auto	Boring Location N: 46.217 Coordinates E: -96.425346
Project Number: 117-8273015		Boring Diameter: 8"	System: Decimal Degrees Datum: NAD83 Top of Boring Elevation: 981.0 ft
Date Started: 4/19/22	Date Finished: 4/20/22	Drilling Fluid: None	Abandonment Method: Bentonite
Driller: IDS Logger: P. Lemire		Location: South Side of Ottetail River	

TT LOG OF BORING - MDT REVISED 2009+ GDT - 8/5/22 10:14 - N:\GEO\TECH\REPORTS\REPORT 2022\MIDWEST CARBON EXPRESS HDDS\HDD 34 MINILAB LOG\OTTERTAIL BORING LOGS.GPJ

Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
65 916.0			0		9 - 13 - 18										
70 911.0			10		8 - 14 - 20					14					
			100		10 - 19 - 32			71.5	909.5						
Boring Depth: 71.5 ft, Elevation: 909.5 ft															

Water Level Observations		<div><div></div>During Drilling: Not Recorded</div>	Remarks:
<div><div></div>After Drilling: Not Recorded</div>	<div><div></div>After Drilling: Not Recorded</div>		

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Figure No. 4B LOG OF BORING



Sheet 1 of 3

Boring BH-34-5

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70	Boring Location N: 46.222375 E: -96.419684
Project Number: 117-8273015		Hammer: Auto	Coordinates
Date Started: 4/21/22		Boring Diameter: 8"	System: Decimal Degrees Datum: NAD83
Date Finished: 4/20/22		Drilling Fluid: None	Abandonment Method: Bentonite
Driller: IDS Logger: P. Lemire		Location: North Side of Ottertail River	

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Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
0.5			80		1-5-8		TOPSOIL, Silty Lean CLAY (CL), moist, black to brown.	0.5	979.5						
5							Silty SAND (SM), very loose to medium dense, moist, brown, fine to coarse grained.								
975.0			100		2-3-1					16	17	15	29		pH= 6 Resistivity= 1,410 ohm-cm Sulfate Content= 0.07 %
10															
970.0			85		3-3-6		Sandy Lean CLAY (CL), stiff to medium stiff, moist, brown, Small gravel.	10.0	970.0						
15															
965.0			5		1-2-1										
20															
960.0			0		2-2-4										
25															
955.0			100		2-3-4					24					
30															
950.0															

Water Level Observations		<div>▽ During Drilling: Not Recorded</div>	Remarks:
<div>▽ After Drilling: Not Recorded</div>	<div>▼ After Drilling: Not Recorded</div>		

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Figure No. 4B LOG OF BORING



Sheet 2 of 3

Boring BH-34-5

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70	Boring Location N: 46.222375
Project Number: 117-8273015		Hammer: Auto	Coordinates E: -96.419684
Date Started: 4/21/22		Boring Diameter: 8"	System: Decimal Degrees
Date Finished: 4/20/22		Datum: NAD83	Top of Boring Elevation: 980.0 ft
Driller: IDS		Drilling Fluid: None	Abandonment Method: Bentonite
Logger: P. Lemire		Location: North Side of Ottertail River	

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Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
35			0		2 - 3 - 4										
35.0			100		1 - 2 - 2		Silty CLAY with sand (CL-ML), soft to very soft, moist, brown, Small gravel.	35.0	945.0	27					
40			0		0 - 0 - 0										
40.0			0		0 - 0 - 0										
45			0		1 - 2 - 2										
45.0			0		1 - 2 - 2										
50			70		8 - 18 - 24		Poorly-Graded GRAVEL with sand (GP), dense, wet, brown, medium to coarse grained.	51.0	929.0						UCS= 5.529 ksf
50.0			70		8 - 18 - 24										
55			70		23 - 50/0.5ft		Silty, Clayey SAND (CL), hard, wet, brown, Small rocks.	55.0	925.0	15	19	15	39		UCS= 1.051 ksf
55.0			70		23 - 50/0.5ft										
60															
60.0															

Water Level Observations		<div><div></div><div>During Drilling: Not Recorded</div></div>	Remarks:
<div><div></div><div>After Drilling: Not Recorded</div></div>	<div><div></div><div>After Drilling: Not Recorded</div></div>		

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Figure No. 4B LOG OF BORING



Sheet 3 of 3

Boring BH-34-5

Project: Midwest Carbon Express HDD 32 - Minnesota		Rig: Diedrich D-70 Hammer: Auto	Boring Location N: 46.222375 Coordinates E: -96.419684
Project Number: 117-8273015		Boring Diameter: 8"	System: Decimal Degrees Datum: NAD83 Top of Boring Elevation: 980.0 ft
Date Started: 4/21/22	Date Finished: 4/20/22	Drilling Fluid: None	Abandonment Method: Bentonite
Driller: IDS Logger: P. Lemire		Location: North Side of Ottertail River	

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Depth (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft)	MC (%)	LL	PL	-200 (%)	DD	Remarks and Other Tests
Elev. (ft)								Elev. (ft)						
65			70		11 - 18 - 33									
915.0			0		11 - 23 - 18									
70			30		12 - 20 - 25									
910.0														

Boring Depth: 71.5 ft, Elevation: 908.5 ft

71.5
908.5

Water Level Observations		<div><div></div></div> During Drilling: Not Recorded	Remarks:
<div><div></div></div> After Drilling: Not Recorded	<div><div></div></div> After Drilling: Not Recorded		

APPENDIX C

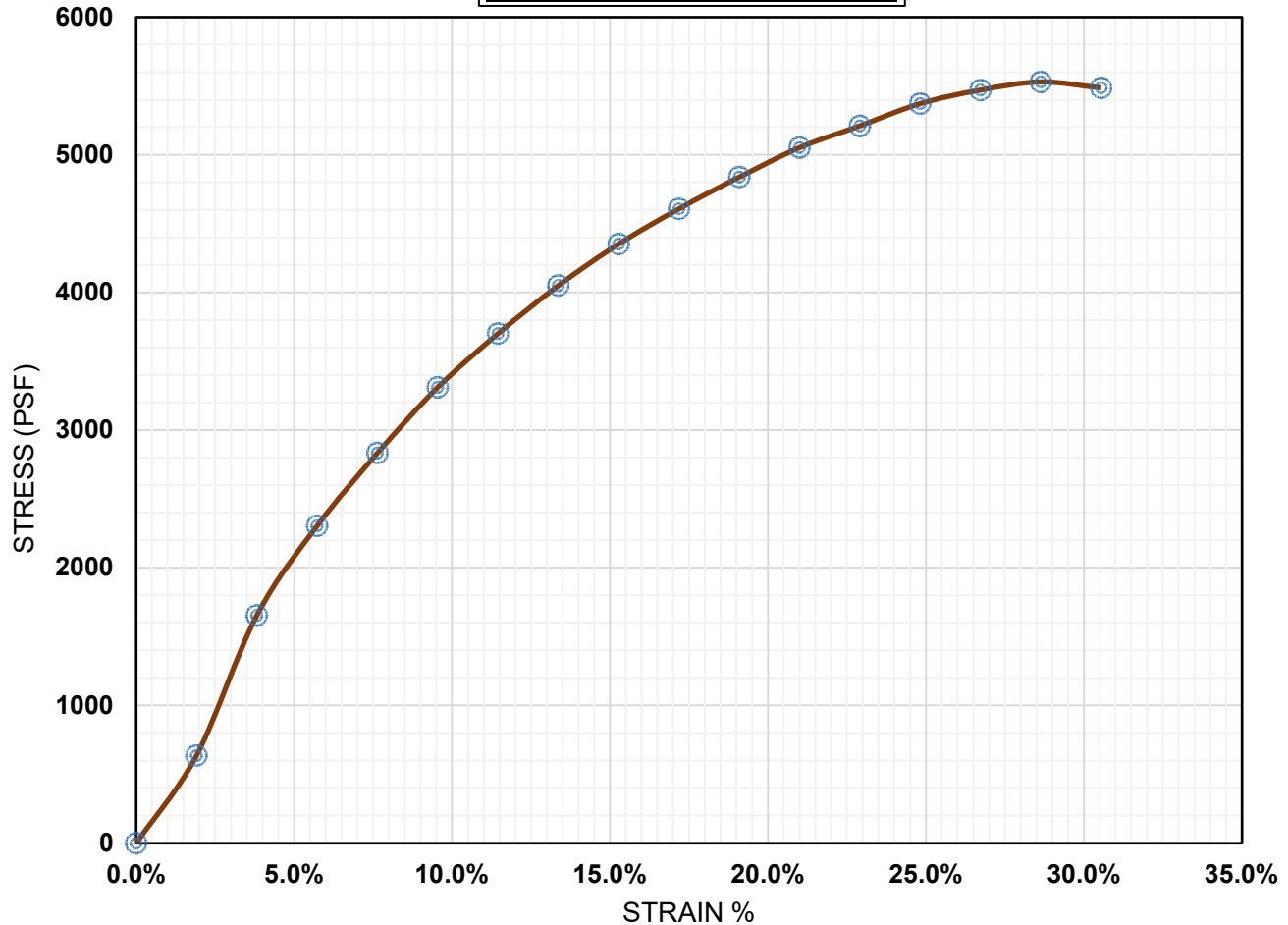
American Engineering Testing Laboratory Test Report

TT Contract Drilling/Lab testing - HDD 34 Ottertail MN
P-0014212

American Engineering Testing - Sheridan Wyoming								Tested by: Sarah Ostrander			
								Reviewed By: Brian Freed			
Moisture and Density Sheet Geotech											
Boring	Sample	Depth	Tare #	Tare Weight (g)	Wet Weight (g)	Dry weight (g)	Height (in)	Diameter (in)	M%	Dry Density (pcf)	Wet Density (pcf)
34-1		0-1.5		13.94	32.1	28.24			26.99%	---	---
34-1		5-10 B		131.4	584.7	521.3			16.26%	---	---
34-1		10-11.5		17.04	45.65	40.36	0.51	1.46	22.68%	104.0	127.7
34-1		20-21.5		16.64	36.67	32.22			28.56%	---	---
34-1		25-26.5		185.7	523.7	462.3			22.20%	---	---
34-1		30-31.5		14.09	36.14	31.75			24.86%	---	---
34-1		40-41.5		19.7	50.68	44.96			22.64%	---	---
34-1		50-51.5		182.6	736.1	666.5			14.38%	---	---
34-1		60-61.5		19.93	79.9	73.59			11.76%	---	---
34-1		70-71.5		13.99	52.6	49.21			9.63%	---	---
34-2		5-6.5		14.35	50.34	44.69			18.62%	---	---
34-2		15-16.5		14.34	51.92	45.28	0.79	1.38	21.46%	99.8	121.2
34-2		20-21.5		134.7	616.8	521.6			24.61%	---	---
34-2		25-26.5		No Sample					---	---	---
34-2		30-31.5		299.9	644.9	591			18.52%	---	---
34-2		35-36.5		19.82	45.02	40.33			22.87%	---	---
34-2		45-46.5		231.4	425.5	388.3			23.71%	---	---
34-2		55-56.5		20.01	68.1	59.25			22.55%	---	---
34-2		60-61.5		188.2	328.2	309.4			15.51%	---	---
34-2		65-66.6		19.68	49.56	44.68			19.52%	---	---
34-3		0-1.5		13.92	40.38	33.97	0.68	1.32	31.97%	82.1	108.3
34-3		10-11.5		19.87	70.0	56.9			35.55%	---	---
34-3		20-21.5		16.86	55.15	47.5			24.97%	---	---
34-3		25-26.5		147.3	653.5	559.4			22.83%	---	---
34-3		30-31.5		No Sample					---	---	---
34-3		40-41.5		14.34	54.54	47.85	0.82	1.35	19.96%	108.8	130.5
34-3		45-46.5		272.2	716.1	661			14.17%		
34-3		50-51.5		8.065	58.52	50.69			18.37%	---	---
34-3		60-61.5		No Sample					---	---	---
34-3		70-71.5		19.67	55.42	50.96	0.76	1.36	14.25%	108.0	123.4
34-5		5-6.5		19.97	63.72	57.58			16.33%	---	---
34-5		15-16.5		No Sample							
34-5		25-26.5		158.9	626.9	537.7			23.55%	---	---
34-5		35-36.5		296	633.8	561.7			27.14%	---	---
34-5		45-46.5		No Sample					---	---	---
34-5		55-56.5		0	360.26	313.94			14.75%	---	---
34-5		65-66.5		No Sample					---	---	---

Note: The samples recieved were Split Spoon samples in Zip-Lock Bags, as a result the density values may not be representative of the in place soils.

Stress vs. Strain



Test Results

Boring	Depth	L/D Ratio	Stress At Failure (psf)	Strain At Failure	Strain Rate (in/min)	Strain Rate (%/min)
34-5	50'	2.11	5529	28.64%	0.0757	1.91%
Date Sampled	Sample Type	Dry Density (pcf)	Wet Density (pcf)	% Moisture	N Value	
5/1/2022	California Tube	135.9	117.6	15.6%	NA	

Sample Description Lean Clay with gravel (CL)

Notes/Remarks: A large amount of gravel was observed within the sample, ranging up to approximately 1/2" in size. The sample did not fail within the first 15% strain, even at a high strain rate.

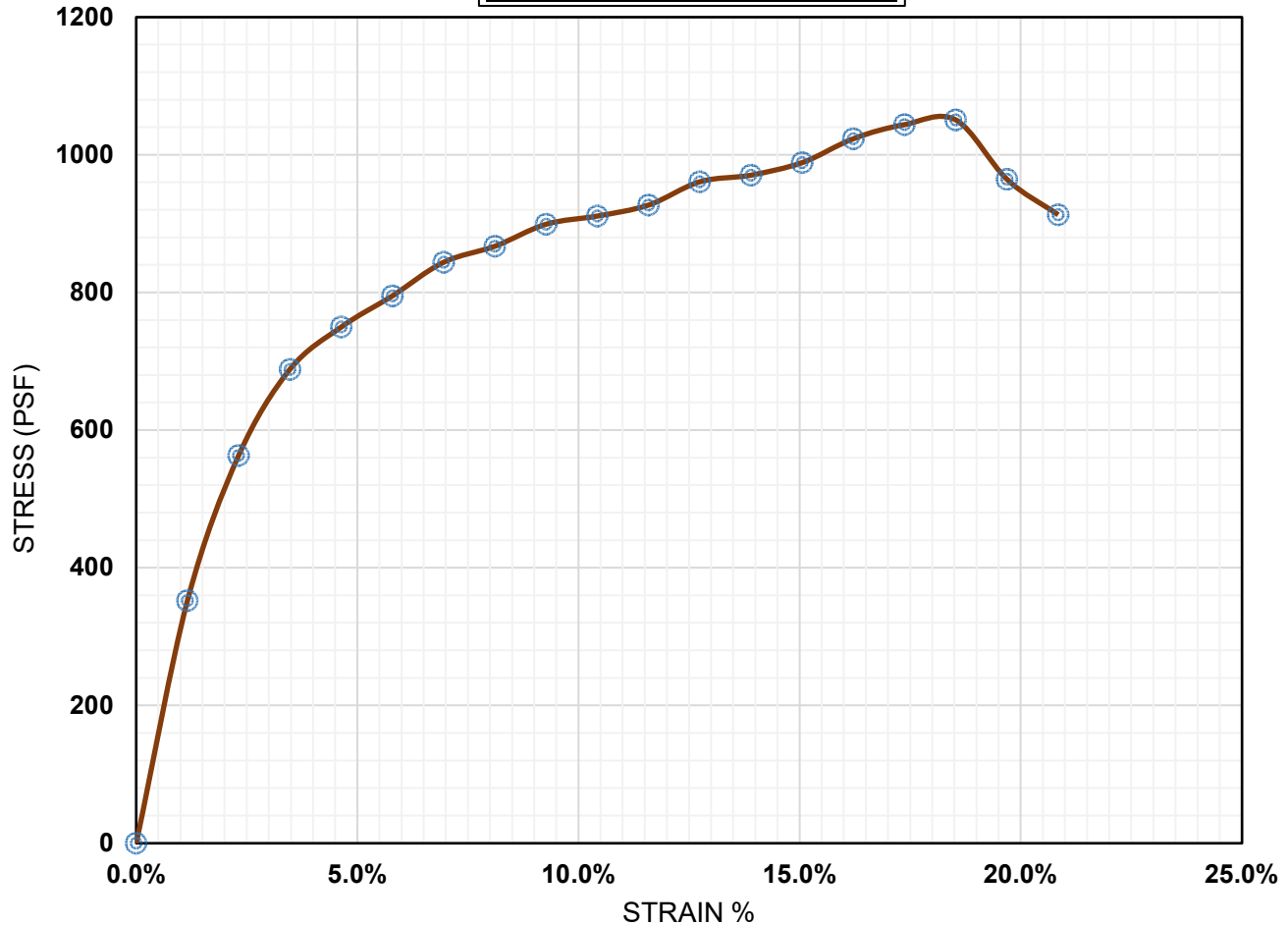
Project Information

Project:	HDD 34 - Ottertail MN	Job Number:	P-0014212
Location:	HDD 34 - Ottertail MN	Date Tested:	7/15/2022



UNCONFINED COMPRESSION TEST RESULTS (ASTM D2166)

Stress vs. Strain



Test Results

Boring	Depth	L/D Ratio	Stress At Failure (psf)	Strain At Failure	Strain Rate (in/min)	Strain Rate (%/min)
34-5	55'	1.96	1051	18.53%	0.0425	1.16%
Date Sampled	Sample Type	Dry Density (pcf)	Wet Density (pcf)	% Moisture	N Value	
5/1/2022	California Tube	136.2	118.7	14.8%	NA	

Sample Description Lean Clay with gravel (CL)

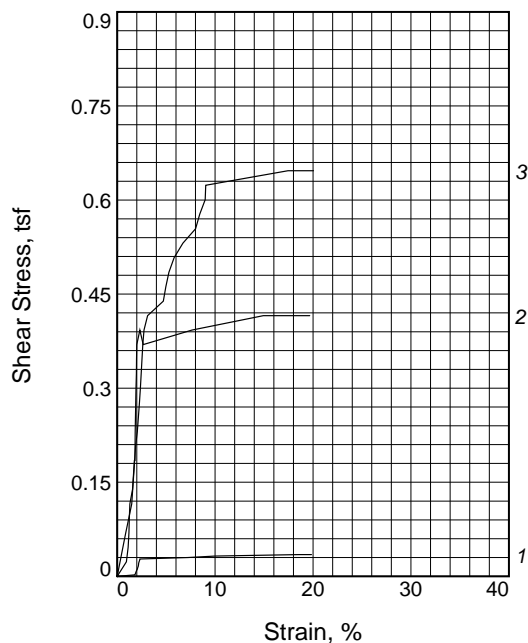
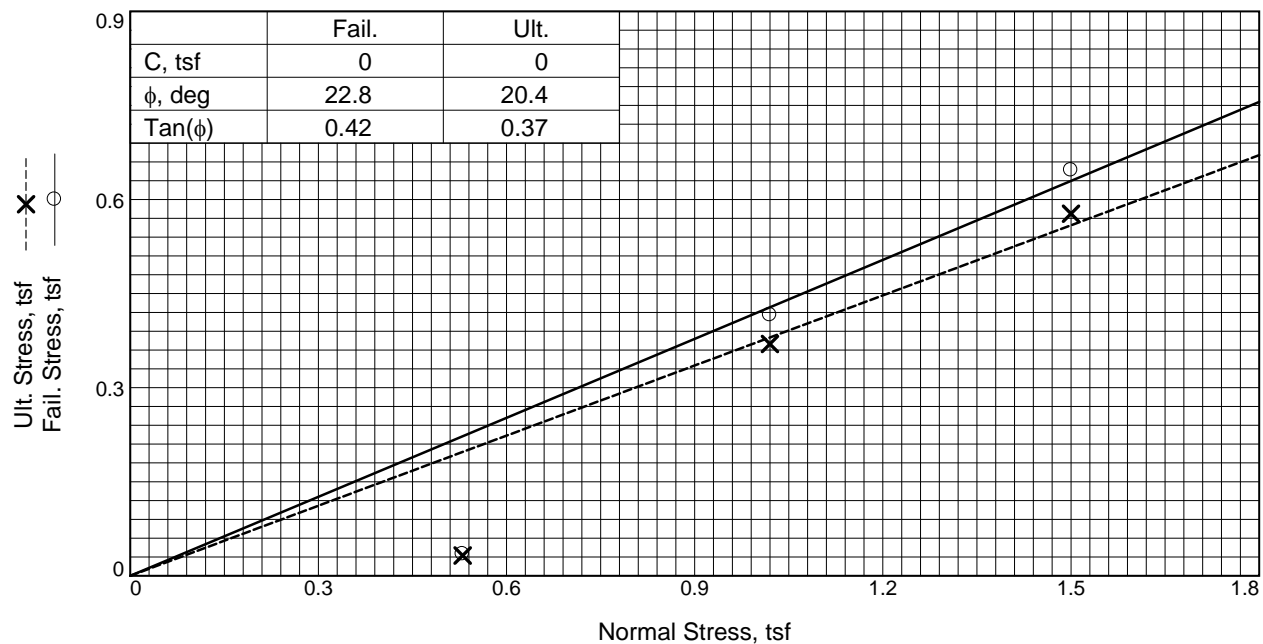
Notes/Remarks: A large amount of gravel was observed within the sample, ranging up to approximately 1/2" in size. The longest L/D Ratio possible with the amount of sample was used.

Project Information

Project:	HDD 34 - Ottertail MN	Job Number:	P-0014212
Location:	HDD 34 - Ottertail MN	Date Tested:	7/15/2022



UNCONFINED COMPRESSION TEST RESULTS (ASTM D2166)



Sample No.		1	2	3
Initial	Water Content, %	22.6	22.6	22.6
	Dry Density, pcf	101.0	96.5	96.0
	Saturation, %	94.1	84.0	82.9
	Void Ratio	0.6376	0.7145	0.7237
	Diameter, in.	1.88	1.88	1.88
	Height, in.	1.08	1.08	1.08
At Test	Water Content, %	21.1	23.6	23.6
	Dry Density, pcf	101.6	101.2	103.5
	Saturation, %	89.0	98.5	104.6
	Void Ratio	0.6285	0.6350	0.5982
	Diameter, in.	1.88	1.88	1.88
	Height, in.	1.08	1.03	1.00
Normal Stress, tsf		0.530	1.020	1.500
Fail. Stress, tsf		0.035	0.416	0.647
Strain, %		18.5	14.9	17.4
Ult. Stress, tsf		0.032	0.370	0.577
Strain, %		10.0	2.7	8.4
Strain rate, in./min.		0.001	0.001	0.001

Sample Type: California Sampler

Description: Clayey Sand

LL= 35

PL= 17

PI= 18

Assumed Specific Gravity= 2.65

Remarks:

Figure _____

Client: Tetra Tech

Project: HDD 34 Ottertail MN (Midwest Carbon)

Location: BH-34-1

Depth: 25-26.5

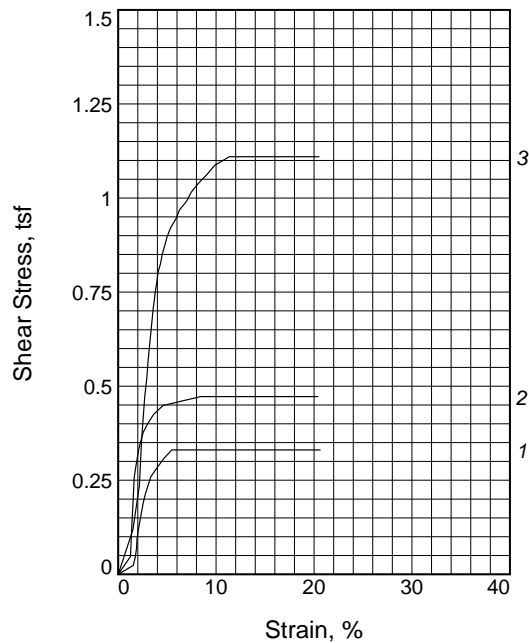
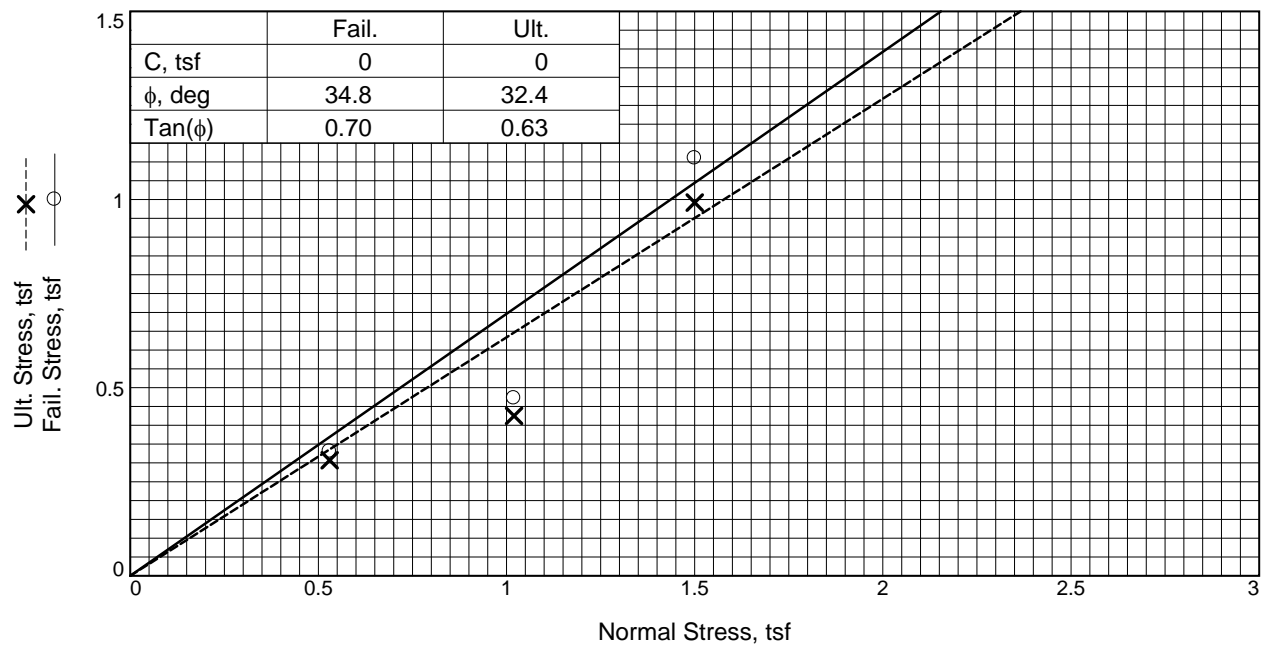
Proj. No.: P-0014212

Date Sampled:

DIRECT SHEAR TEST REPORT
American Engineering Testing, Inc.
Gillette, WY

Tested By: WTL

Checked By: BF



Sample No.		1	2	3
Initial	Water Content, %	15.0	15.0	15.0
	Dry Density, pcf	115.5	105.7	113.6
	Saturation, %	91.8	70.2	86.9
	Void Ratio	0.4317	0.5647	0.4565
	Diameter, in.	1.86	1.86	1.86
	Height, in.	1.12	1.12	1.12
At Test	Water Content, %	19.7	18.2	18.8
	Dry Density, pcf	118.3	112.2	117.2
	Saturation, %	131.1	101.5	121.0
	Void Ratio	0.3982	0.4742	0.4120
	Diameter, in.	1.86	1.86	1.86
	Height, in.	1.09	1.05	1.08
Normal Stress, tsf		0.530	1.020	1.500
Fail. Stress, tsf		0.331	0.472	1.110
Strain, %		5.5	8.4	11.3
Ult. Stress, tsf		0.307	0.425	0.992
Strain, %		4.6	3.6	7.0
Strain rate, in./min.		0.001	0.001	0.001

Sample Type: California Sampler

Description: Clayey Sand

LL= 32

PL= 16

PI= 16

Assumed Specific Gravity= 2.65

Remarks:

Figure _____

Client: Tetra Tech

Project: HDD 34 Ottertail MN (Midwest Carbon)

Location: BH-34-1

Depth: 50.5-51

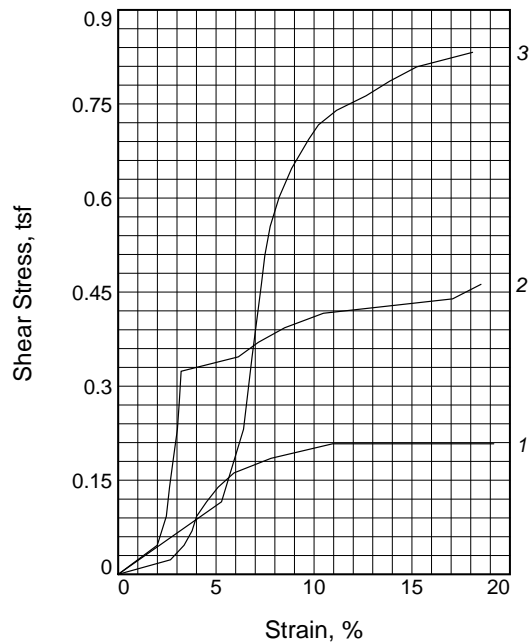
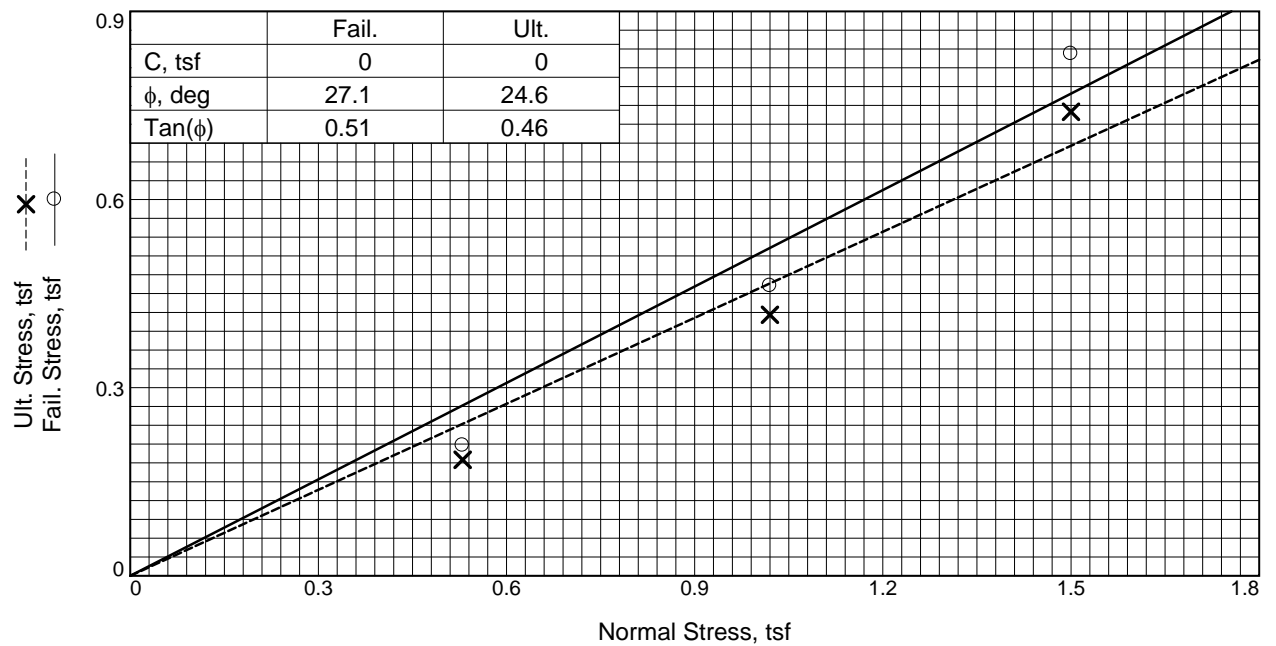
Proj. No.: P-0014212

Date Sampled:

DIRECT SHEAR TEST REPORT
American Engineering Testing, Inc.
Gillette, WY

Tested By: WTL

Checked By: BF



Sample No.		1	2	3
Initial	Water Content, %	24.9	24.9	24.9
	Dry Density, pcf	90.9	90.7	91.0
	Saturation, %	80.6	80.2	80.8
	Void Ratio	0.8195	0.8236	0.8175
	Diameter, in.	1.88	1.88	1.88
	Height, in.	1.08	1.08	1.08
At Test	Water Content, %	26.0	25.7	23.6
	Dry Density, pcf	93.7	99.9	100.2
	Saturation, %	90.0	104.0	96.0
	Void Ratio	0.7662	0.6562	0.6515
	Diameter, in.	1.88	1.88	1.88
	Height, in.	1.05	0.98	0.99
Normal Stress, tsf		0.530	1.020	1.500
Fail. Stress, tsf		0.208	0.462	0.832
Strain, %		10.9	18.5	18.1
Ult. Stress, tsf		0.185	0.416	0.740
Strain, %		7.8	10.5	11.2
Strain rate, in./min.		0.001	0.001	0.001

Sample Type: California Sampler

Description: Clayey Sand

LL= 35

PL= 18

PI= 17

Assumed Specific Gravity= 2.65

Remarks:

Figure _____

Client: Tetra Tech

Project: HDD 34 Ottertail MN (Midwest Carbon)

Location: BH-3-3

Depth: 25.5-26

Proj. No.: P-0014212

Date Sampled:

DIRECT SHEAR TEST REPORT
American Engineering Testing, Inc.
Gillette, WY

Tested By: WTL

Checked By: BF



American Engineering Testing, Inc.
 Sheridan
 72 E Ridge Rd Unit D
 Sheridan, WY 82801
 (607) 675-1862
 www.teamAET.com

Report No: MAT:AET-066754-S1

Material Test Report

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
 change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S1
Field Sample ID BH-34-1 5.1-10.1
Date Sampled
Source
Material Clayey Sand (SC)
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest)
Location BH-34-1 bulk sample
 5.1-10.1
Date Submitted

Sample Description:

Clayey Sand (SC)

Atterberg Limit:

Liquid Limit: 26
Plastic Limit: 12
Plasticity Index: 14
Linear Shrinkage (%): N/A

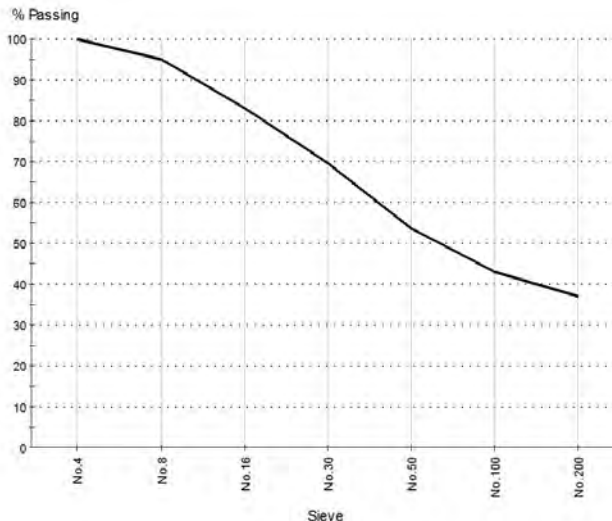
Grading: ASTM C 136, ASTM C 117

Date Tested: 6/9/2022

Tested By: Sara Ostrander

Sieve Size	% Passing	Limits
No.4	100.0	
No.8	94.9	
No.16	83.1	
No.30	69.8	
No.50	53.8	
No.100	43.0	
No.200	37.0	

Particle Size Distribution



COBBLES	GRAVEL		SAND			FINES (37.0%)	
(0.0%)	Coarse (0.0%)	Fine (0.0%)	Coarse (7.9%)	Medium (30.2%)	Fine (24.8%)	Silt	Clay

D85: 1.3193 **D60:** 0.3924 **D50:** 0.2351
D30: N/A **D15:** N/A **D10:** N/A



American Engineering Testing, Inc.
Sheridan
72 E Ridge Rd Unit D
Sheridan, WY 82801
(607) 675-1862
www.teamAET.com

Report No: MAT:AET-066754-S1

Material Test Report

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S1
Field Sample ID BH-34-1 5.1-10.1
Date Sampled
Source
Material Clayey Sand (SC)
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-1 bulk sample
5.1-10.1
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	26	
Plastic Limit (%)	AASHTO T 90	12	
Plasticity Index	AASHTO T 90	14	
Date Tested		6/9/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	1.55	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	
Maximum Dry Unit Weight (lb/ft³)	ASTM D 698	125.3	
Corrected Maximum Dry Unit Weight (lb/ft³)		125.3	
Optimum Water Content (%)		7.4	
Corrected Optimum Water Content (%)		7.4	
Method		A	
Retained Sieve No 4 (4.75mm) (%)		0	
Specific Gravity (Oversize)		2.65	
Specific Gravity (Fines)		2.65	
Date Tested		6/9/2022	

Comments

PH-7
Resistivity - 1200 ohm-cm
Sulfates - 870 mg SO42/L



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 Sheridan, WY 82801
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 www.teamAET.com

Report No: MAT:AET-066754-S9

Material Test Report

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
 change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S9
Field Sample ID BH-34-1 60-61.5
Date Sampled
Source
Material Silty Sand with Gravel
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH 34-1, SS Sample
 60-61.5
Date Submitted

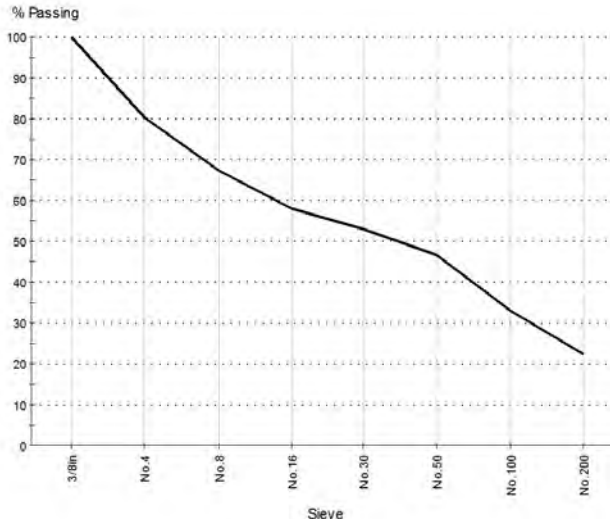
Sample Description:

Silty Sand with Gravel

Atterberg Limit:

Liquid Limit: 15
Plastic Limit: N/A
Plasticity Index: NP
Linear Shrinkage (%): N/A

Particle Size Distribution



Grading: ASTM C 136, ASTM C 117

Date Tested: 6/9/2022

Tested By: Sara Ostrander

Sieve Size	% Passing	Limits
3/8in	100.0	
No. 4	80.4	
No. 8	67.5	
No. 16	57.9	
No. 30	53.1	
No. 50	46.6	
No. 100	32.9	
No. 200	22.5	

COBBLES	GRAVEL		SAND			FINES (22.5%)	
(0.0%)	Coarse (0.0%)	Fine (19.6%)	Coarse (15.2%)	Medium (15.3%)	Fine (27.4%)	Silt	Clay

D85: 5.5891 **D60:** 1.3732 **D50:** 0.4311
D30: 0.1236 **D15:** N/A **D10:** N/A



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Sheridan
72 E Ridge Rd Unit D
Sheridan, WY 82801
(607) 675-1862
www.teamAET.com

Report No: MAT:AET-066754-S9

Material Test Report

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S9
Field Sample ID BH-34-1 60-61.5
Date Sampled
Source
Material Silty Sand with Gravel
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH 34-1, SS Sample
60-61.5
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	15	
Plastic Limit (%)	AASHTO T 90	N/A	
Plasticity Index	AASHTO T 90	NP	
Date Tested		6/9/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	2.62	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	

Comments

NP = Non Plastic



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Material Test Report

Report No: MAT:AET-066754-S10

Client: TETRA TECH, INC Project: TT HDD 34 Lab Testing Sheridan WY Job No: P-0014212	CC: Draft Report - Subject to change pending final review Date of Issue: 7/29/2022
--	--

Sample Details Sample ID AET-066754-S10 Field Sample ID B-34-2 60-61.5 Date Sampled Source Material Well Graded Sand with silt Specification Gradation + Hydrometer In Sampling Method Place Material Ottertail General Location (midwest Location BH-34-2 60-61.5 Date Submitted	Sample Description: Well Graded Sand with silt Atterberg Limit: Liquid Limit: 16 Plastic Limit: 15 Plasticity Index: 1 Linear Shrinkage (%): N/A
---	--

Particle Size Distribution <table border="1"> <thead> <tr> <th>Sieve</th> <th>% Passing</th> </tr> </thead> <tbody> <tr><td>5/8in</td><td>100.0</td></tr> <tr><td>1/2in</td><td>97.3</td></tr> <tr><td>3/8in</td><td>93.4</td></tr> <tr><td>No. 4</td><td>90.8</td></tr> <tr><td>No. 8</td><td>80.2</td></tr> <tr><td>No. 16</td><td>60.5</td></tr> <tr><td>No. 30</td><td>36.2</td></tr> <tr><td>No. 50</td><td>17.3</td></tr> <tr><td>No. 100</td><td>10.8</td></tr> <tr><td>No. 200</td><td>8.2</td></tr> </tbody> </table>	Sieve	% Passing	5/8in	100.0	1/2in	97.3	3/8in	93.4	No. 4	90.8	No. 8	80.2	No. 16	60.5	No. 30	36.2	No. 50	17.3	No. 100	10.8	No. 200	8.2	Grading: ASTM C 136, ASTM C 117 Date Tested: 6/9/2022 Tested By: Sara Ostrander <table border="1"> <thead> <tr> <th>Sieve Size</th> <th>% Passing</th> <th>Limits</th> </tr> </thead> <tbody> <tr><td>5/8in</td><td>100.0</td><td></td></tr> <tr><td>1/2in</td><td>97.3</td><td></td></tr> <tr><td>3/8in</td><td>93.4</td><td></td></tr> <tr><td>No. 4</td><td>90.8</td><td></td></tr> <tr><td>No. 8</td><td>80.2</td><td></td></tr> <tr><td>No. 16</td><td>60.5</td><td></td></tr> <tr><td>No. 30</td><td>36.2</td><td></td></tr> <tr><td>No. 50</td><td>17.3</td><td></td></tr> <tr><td>No. 100</td><td>10.8</td><td></td></tr> <tr><td>No. 200</td><td>8.2</td><td></td></tr> </tbody> </table>	Sieve Size	% Passing	Limits	5/8in	100.0		1/2in	97.3		3/8in	93.4		No. 4	90.8		No. 8	80.2		No. 16	60.5		No. 30	36.2		No. 50	17.3		No. 100	10.8		No. 200	8.2	
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No. 100	10.8																																																							
No. 200	8.2																																																							

COBBLES	GRAVEL		SAND			FINES (8.2%)	
(0.0%)	Coarse (0.0%)	Fine (9.2%)	Coarse (15.3%)	Medium (48.7%)	Fine (18.6%)	Silt	Clay

D85: 3.2395 **D60:** 1.1637 **D50:** 0.8810
D30: 0.4780 **D15:** 0.2347 **D10:** 0.1212
Cu: 9.60 **Cc:** 1.62



American Engineering Testing, Inc.
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72 E Ridge Rd Unit D
Sheridan, WY 82801
(607) 675-1862
www.teamAET.com

Material Test Report

Report No: MAT:AET-066754-S10

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S10
Field Sample ID B-34-2 60-61.5
Date Sampled
Source
Material Well Graded Sand with silt
Specification Gradation + Hydrometer In
Sampling Method Place Material Ottertail
General Location (midwest
Location BH-34-2
60-61.5
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	16	
Plastic Limit (%)	AASHTO T 90	15	
Plasticity Index	AASHTO T 90	1	
Date Tested		6/9/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	3.12	
Curvature Coefficient		1.62	
Uniformity Coefficient		9.60	

Comments

PH-7
Resistivity - 1130 ohm-cm
Sulfates - 730 mg SO42/L



American Engineering Testing, Inc.
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 72 E Ridge Rd Unit D
 Sheridan, WY 82801
 (607) 675-1862
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Material Test Report

Report No: MAT:AET-066754-S11

Client: TETRA TECH, INC Project: TT HDD 34 Lab Testing Sheridan WY Job No: P-0014212	CC: Draft Report - Subject to change pending final review Date of Issue: 7/29/2022
--	--

Sample Details	Sample Description:
Sample ID AET-066754-S11 Field Sample ID BH-34-3 50.5-51 Date Sampled Source Material Sandy Lean Clay Specification Gradation + Hydrometer Sampling Method In Place Material General Location Ottertail (midwest Location BH-34-3 MC Sample 50.5-51.5 Date Submitted	Sandy Lean Clay Atterberg Limit: Liquid Limit: 27 Plastic Limit: 18 Plasticity Index: 9 Linear Shrinkage (%): N/A

Particle Size Distribution	Grading: ASTM C 136, ASTM C 117																																	
	Date Tested: 6/9/2022 Tested By: Sara Ostrander <table border="1"> <thead> <tr> <th>Sieve Size</th> <th>% Passing</th> <th>Limits</th> </tr> </thead> <tbody> <tr><td>1 1/2 in</td><td>100.0</td><td></td></tr> <tr><td>1 in</td><td>90.5</td><td></td></tr> <tr><td>3/8 in</td><td>88.9</td><td></td></tr> <tr><td>No. 4</td><td>88.1</td><td></td></tr> <tr><td>No. 8</td><td>86.0</td><td></td></tr> <tr><td>No. 16</td><td>83.7</td><td></td></tr> <tr><td>No. 30</td><td>80.7</td><td></td></tr> <tr><td>No. 50</td><td>77.5</td><td></td></tr> <tr><td>No. 100</td><td>67.5</td><td></td></tr> <tr><td>No. 200</td><td>59.4</td><td></td></tr> </tbody> </table>	Sieve Size	% Passing	Limits	1 1/2 in	100.0		1 in	90.5		3/8 in	88.9		No. 4	88.1		No. 8	86.0		No. 16	83.7		No. 30	80.7		No. 50	77.5		No. 100	67.5		No. 200	59.4	
Sieve Size	% Passing	Limits																																
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No. 8	86.0																																	
No. 16	83.7																																	
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No. 50	77.5																																	
No. 100	67.5																																	
No. 200	59.4																																	
<table border="1"> <thead> <tr> <th>COBBLES</th> <th colspan="2">GRAVEL</th> <th colspan="3">SAND</th> <th colspan="2">FINES (59.4%)</th> </tr> <tr> <th>(0.0%)</th> <th>Coarse (10.0%)</th> <th>Fine (2.0%)</th> <th>Coarse (2.7%)</th> <th>Medium (6.3%)</th> <th>Fine (19.7%)</th> <th>Silt</th> <th>Clay</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	COBBLES	GRAVEL		SAND			FINES (59.4%)		(0.0%)	Coarse (10.0%)	Fine (2.0%)	Coarse (2.7%)	Medium (6.3%)	Fine (19.7%)	Silt	Clay									D85: 1.7459 D60: 0.0790 D50: N/A D30: N/A D15: N/A D10: N/A									
COBBLES	GRAVEL		SAND			FINES (59.4%)																												
(0.0%)	Coarse (10.0%)	Fine (2.0%)	Coarse (2.7%)	Medium (6.3%)	Fine (19.7%)	Silt	Clay																											



American Engineering Testing, Inc.
Sheridan
72 E Ridge Rd Unit D
Sheridan, WY 82801
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www.teamAET.com

Material Test Report

Report No: MAT:AET-066754-S11

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S11
Field Sample ID BH-34-3 50.5-51
Date Sampled
Source
Material Sandy Lean Clay
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-3 MC Sample
50.5-51.5
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	27	
Plastic Limit (%)	AASHTO T 90	18	
Plasticity Index	AASHTO T 90	9	
Date Tested		6/9/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	N/A	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	

Comments

N/A



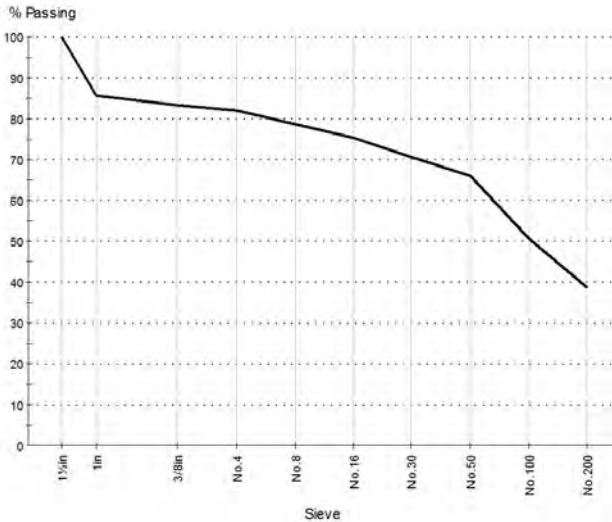
American Engineering Testing, Inc.
 Sheridan
 72 E Ridge Rd Unit D
 Sheridan, WY 82801
 (607) 675-1862
 www.teamAET.com

Material Test Report

Report No: MAT:AET-066754-S12

Client: TETRA TECH, INC Project: TT HDD 34 Lab Testing Sheridan WY Job No: P-0014212	CC: Draft Report - Subject to change pending final review Date of Issue: 7/29/2022
--	--

Sample Details Sample ID AET-066754-S12 Field Sample ID BH-34-5 55-56.5 Date Sampled Source Material Silty, Clayey Sand Specification Gradation + Hydrometer Sampling Method In Place Material General Location Ottertail (midwest Location BH-34-5 55-56.5 Date Submitted	Sample Description: Silty, Clayey Sand Atterberg Limit: Liquid Limit: 19 Plastic Limit: 15 Plasticity Index: 4 Linear Shrinkage (%): N/A
--	--

Particle Size Distribution 	Grading: ASTM C 136, ASTM C 117 Date Tested: 6/9/2022 Tested By: Sara Ostrander <table border="1"> <thead> <tr> <th>Sieve Size</th> <th>% Passing</th> <th>Limits</th> </tr> </thead> <tbody> <tr><td>1 1/2 in</td><td>100.0</td><td></td></tr> <tr><td>1 in</td><td>85.6</td><td></td></tr> <tr><td>3/8 in</td><td>83.2</td><td></td></tr> <tr><td>No. 4</td><td>81.9</td><td></td></tr> <tr><td>No. 8</td><td>78.7</td><td></td></tr> <tr><td>No. 16</td><td>75.3</td><td></td></tr> <tr><td>No. 30</td><td>70.8</td><td></td></tr> <tr><td>No. 50</td><td>65.9</td><td></td></tr> <tr><td>No. 100</td><td>50.8</td><td></td></tr> <tr><td>No. 200</td><td>38.6</td><td></td></tr> </tbody> </table>	Sieve Size	% Passing	Limits	1 1/2 in	100.0		1 in	85.6		3/8 in	83.2		No. 4	81.9		No. 8	78.7		No. 16	75.3		No. 30	70.8		No. 50	65.9		No. 100	50.8		No. 200	38.6	
Sieve Size	% Passing	Limits																																
1 1/2 in	100.0																																	
1 in	85.6																																	
3/8 in	83.2																																	
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No. 8	78.7																																	
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No. 100	50.8																																	
No. 200	38.6																																	
<table border="1"> <thead> <tr> <th>COBBLES</th> <th colspan="2">GRAVEL</th> <th colspan="3">SAND</th> <th colspan="2">FINES (38.6%)</th> </tr> </thead> <tbody> <tr> <td>(0.0%)</td> <td>Coarse (15.1%)</td> <td>Fine (3.0%)</td> <td>Coarse (4.0%)</td> <td>Medium (9.6%)</td> <td>Fine (29.8%)</td> <td>Silt</td> <td>Clay</td> </tr> </tbody> </table>	COBBLES	GRAVEL		SAND			FINES (38.6%)		(0.0%)	Coarse (15.1%)	Fine (3.0%)	Coarse (4.0%)	Medium (9.6%)	Fine (29.8%)	Silt	Clay	D85: 19.6284 D60: 0.2288 D50: 0.1433 D30: N/A D15: N/A D10: N/A																	
COBBLES	GRAVEL		SAND			FINES (38.6%)																												
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American Engineering Testing, Inc.
Sheridan
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Material Test Report

Report No: MAT:AET-066754-S12

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S12
Field Sample ID BH-34-5 55-56.5
Date Sampled
Source
Material Silty, Clayey Sand
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-5
55-56.5
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	19	
Plastic Limit (%)	AASHTO T 90	15	
Plasticity Index	AASHTO T 90	4	
Date Tested		6/9/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	N/A	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	

Comments

N/A



American Engineering Testing, Inc.
Sheridan
72 E Ridge Rd Unit D
Sheridan, WY 82801
(607) 675-1862
www.teamAET.com

Material Test Report

Report No: MAT:AET-066754-S13

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S13
Field Sample ID BH-34-5 5.1-10.1
Date Sampled
Source
Material Silty Sand (SM)
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest)
Location BH-34-5 Bulk Sample
5.1-10.1
Date Submitted

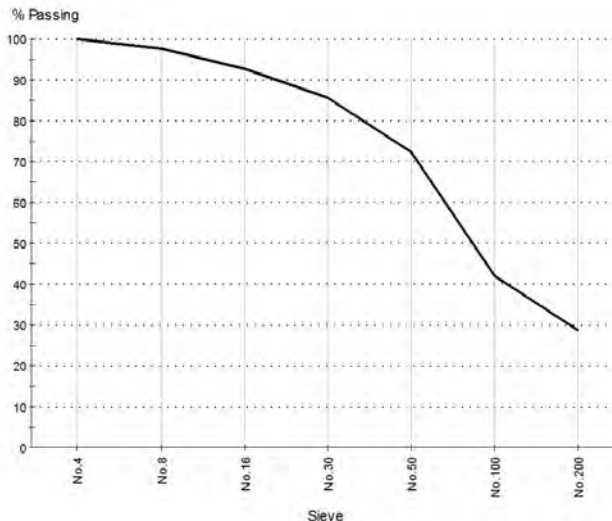
Sample Description:

Silty Sand (SM)

Atterberg Limit:

Liquid Limit: 17
Plastic Limit: 15
Plasticity Index: 2
Linear Shrinkage (%): N/A

Particle Size Distribution



Grading: ASTM C 136, ASTM C 117

Date Tested: 6/9/2022

Tested By: Sara Ostrander

Sieve Size	% Passing	Limits
No.4	99.9	
No.8	97.8	
No.16	92.8	
No.30	85.7	
No.50	72.3	
No.100	42.0	
No.200	28.8	

COBBLES	GRAVEL		SAND			FINES (28.8%)	
(0.0%)	Coarse (0.0%)	Fine (0.1%)	Coarse (3.3%)	Medium (17.5%)	Fine (50.2%)	Silt	Clay

D85: 0.5787 D60: 0.2264 D50: 0.1801
D30: 0.0799 D15: N/A D10: N/A



American Engineering Testing, Inc.
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72 E Ridge Rd Unit D
Sheridan, WY 82801
(607) 675-1862
www.teamAET.com

Material Test Report

Report No: MAT:AET-066754-S13

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S13
Field Sample ID BH-34-5 5.1-10.1
Date Sampled
Source
Material Silty Sand (SM)
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-5 Bulk Sample
5.1-10.1
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	17	
Plastic Limit (%)	AASHTO T 90	15	
Plasticity Index	AASHTO T 90	2	
Date Tested		6/9/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	N/A	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	
Maximum Dry Unit Weight (lb/ft ³)	ASTM D 698	124.5	
Corrected Maximum Dry Unit Weight (lb/ft ³)		124.5	
Optimum Water Content (%)		10.3	
Corrected Optimum Water Content (%)		10.3	
Method		A	
Specific Gravity (Oversize)		2.65	
Specific Gravity (Fines)		2.65	
Date Tested		7/20/2022	

Comments

PH-6
Resistivity - 1410 ohm-cm
Sulfates - 660 mg SO42/L



American Engineering Testing, Inc.
 Sheridan
 72 E Ridge Rd Unit D
 Sheridan, WY 82801
 (607) 675-1862
 www.teamAET.com

Material Test Report

Report No: MAT:AET-066754-S15

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
 change pending final review

Date of Issue:

7/29/2022

Sample Details

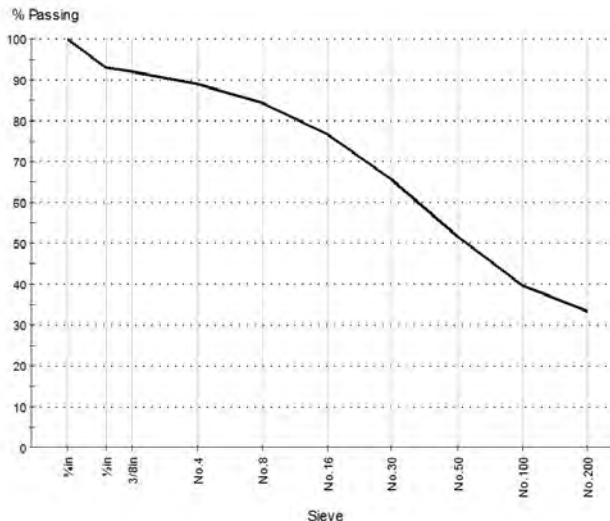
Sample ID AET-066754-S15
 Field Sample ID BH-34-1, 25-26.5
 Date Sampled
 Source
 Material
 Specification Gradation + Hydrometer
 Sampling Method In Place Material
 General Location Ottertail (midwest
 Location BH-34-1
 25-26.5
 Date Submitted

Sample Description:

Atterberg Limit:

Liquid Limit: 35
 Plastic Limit: 17
 Plasticity Index: 18
 Linear Shrinkage (%): N/A

Particle Size Distribution



Grading: ASTM C 136, ASTM C 117

Date Tested: 7/20/2022

Tested By: Sara Ostrander

Sieve Size	% Passing	Limits
3/4 in	100.0	
1/2 in	93.1	
3/8 in	92.1	
No. 4	88.9	
No. 8	84.5	
No. 16	76.7	
No. 30	65.6	
No. 50	51.6	
No. 100	39.8	
No. 200	33.3	

COBBLES	GRAVEL		SAND			FINES (33.3%)	
(0.0%)	Coarse (0.0%)	Fine (11.1%)	Coarse (6.2%)	Medium (24.0%)	Fine (25.4%)	Silt	Clay

D85: 2.5552 D60: 0.4547 D50: 0.2731
 D30: N/A D15: N/A D10: N/A



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Material Test Report

Report No: MAT:AET-066754-S15

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S15
Field Sample ID BH-34-1, 25-26.5
Date Sampled
Source
Material
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-1
25-26.5
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	35	
Plastic Limit (%)	AASHTO T 90	17	
Plasticity Index	AASHTO T 90	18	
Date Tested		7/20/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	2.00	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	

Comments



American Engineering Testing, Inc.
 Sheridan
 72 E Ridge Rd Unit D
 Sheridan, WY 82801
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Material Test Report

Report No: MAT:AET-066754-S16

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
 change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S16
 Field Sample ID BH-34-1, 50-51.5
 Date Sampled
 Source
 Material
 Specification Gradation + Hydrometer
 Sampling Method In Place Material
 General Location Ottertail (midwest
 Location BH-34-1
 50-51.5
 Date Submitted

Sample Description:

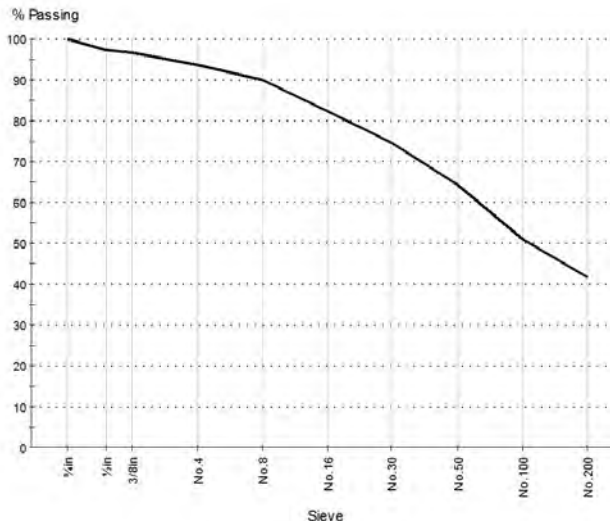
Atterberg Limit:

Liquid Limit: 33
 Plastic Limit: 17
 Plasticity Index: 16
 Linear Shrinkage (%): N/A

Grading: ASTM C 136, ASTM C 117

Date Tested: 7/20/2022
 Tested By: Sara Ostrander

Particle Size Distribution



Sieve Size	% Passing	Limits
3/4in	100.0	
1/2in	97.2	
3/8in	96.7	
No.4	93.8	
No.8	90.0	
No.16	82.5	
No.30	74.7	
No.50	64.5	
No.100	50.9	
No.200	41.6	

COBBLES	GRAVEL		SAND			FINES (41.6%)	
(0.0%)	Coarse (0.0%)	Fine (6.2%)	Coarse (5.5%)	Medium (18.6%)	Fine (28.1%)	Silt	Clay

D85: 1.4867 D60: 0.2385 D50: 0.1403
 D30: N/A D15: N/A D10: N/A



American Engineering Testing, Inc.
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Material Test Report

Report No: MAT:AET-066754-S16

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S16
Field Sample ID BH-34-1, 50-51.5
Date Sampled
Source
Material
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-1
50-51.5
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	33	
Plastic Limit (%)	AASHTO T 90	17	
Plasticity Index	AASHTO T 90	16	
Date Tested		7/20/2022	

Comments

N/A



American Engineering Testing, Inc.
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Material Test Report

Report No: MAT:AET-066754-S17

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
 change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S17
 Field Sample ID BH-34-2, 20-21.5
 Date Sampled
 Source
 Material
 Specification Gradation + Hydrometer
 Sampling Method In Place Material
 General Location Ottertail (midwest
 Location BH-34-2
 20-21.5
 Date Submitted

Sample Description:

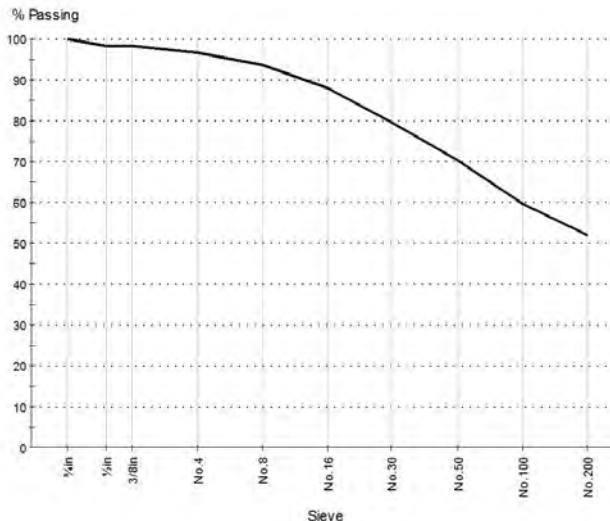
Atterberg Limit:

Liquid Limit: N/A
 Plastic Limit: 18
 Plasticity Index: NP
 Linear Shrinkage (%): N/A

Grading: ASTM C 136, ASTM C 117

Date Tested: 7/20/2022
 Tested By: Sara Ostrander

Particle Size Distribution



Sieve Size	% Passing	Limits
3/4in	100.0	
1/2in	98.3	
3/8in	98.3	
No.4	96.6	
No.8	93.7	
No.16	87.9	
No.30	79.7	
No.50	70.2	
No.100	59.7	
No.200	52.1	

COBBLES	GRAVEL		SAND			FINES (52.1%)	
(0.0%)	Coarse (0.0%)	Fine (3.4%)	Coarse (4.3%)	Medium (17.3%)	Fine (22.8%)	Silt	Clay

D85: 0.9290 D60: 0.1530 D50: N/A
 D30: N/A D15: N/A D10: N/A



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Material Test Report

Report No: MAT:AET-066754-S17

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S17
Field Sample ID BH-34-2, 20-21.5
Date Sampled
Source
Material
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-2
20-21.5
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	N/A	
Plastic Limit (%)	AASHTO T 90	18	
Plasticity Index	AASHTO T 90	NP	
Date Tested		7/20/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	1.13	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	

Comments

NP = Non Plastic



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Material Test Report

Report No: MAT:AET-066754-S18

Client: TETRA TECH, INC Project: TT HDD 34 Lab Testing Sheridan WY Job No: P-0014212	CC: Draft Report - Subject to change pending final review Date of Issue: 7/29/2022
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Sample Details		Sample Description:
Sample ID Field Sample ID Date Sampled Source Material Specification Sampling Method General Location Location Date Submitted	AET-066754-S18 BH-34-2, 45-46.5 Gradation + Hydrometer In Place Material Ottertail (midwest BH-34-2 45-46.5	Atterberg Limit: Liquid Limit: 42 Plastic Limit: 19 Plasticity Index: 23 Linear Shrinkage (%): N/A

Particle Size Distribution						Grading: ASTM C 136, ASTM C 117																																																							
						Date Tested: 7/20/2022 Tested By: Sara Ostrander																																																							
<table border="1"> <thead> <tr> <th>Sieve Size</th> <th>% Passing</th> <th>Limits</th> </tr> </thead> <tbody> <tr><td>3/8in</td><td>100.0</td><td></td></tr> <tr><td>No.4</td><td>98.2</td><td></td></tr> <tr><td>No.8</td><td>95.7</td><td></td></tr> <tr><td>No.16</td><td>92.7</td><td></td></tr> <tr><td>No.30</td><td>89.4</td><td></td></tr> <tr><td>No.50</td><td>84.9</td><td></td></tr> <tr><td>No.100</td><td>44.6</td><td></td></tr> <tr><td>No.200</td><td>2.7</td><td></td></tr> </tbody> </table>						Sieve Size	% Passing	Limits	3/8in	100.0		No.4	98.2		No.8	95.7		No.16	92.7		No.30	89.4		No.50	84.9		No.100	44.6		No.200	2.7		<table border="1"> <thead> <tr> <th colspan="2">COBBLES</th> <th colspan="2">GRAVEL</th> <th colspan="3">SAND</th> <th colspan="2">FINES (2.7%)</th> </tr> <tr> <th>(0.0%)</th> <th></th> <th>Coarse (0.0%)</th> <th>Fine (1.8%)</th> <th>Coarse (3.2%)</th> <th>Medium (7.8%)</th> <th>Fine (84.5%)</th> <th>Silt</th> <th>Clay</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		COBBLES		GRAVEL		SAND			FINES (2.7%)		(0.0%)		Coarse (0.0%)	Fine (1.8%)	Coarse (3.2%)	Medium (7.8%)	Fine (84.5%)	Silt	Clay									
Sieve Size	% Passing	Limits																																																											
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<table border="1"> <tbody> <tr> <td>D85: 0.3047</td> <td>D60: 0.1955</td> <td>D50: 0.1646</td> </tr> <tr> <td>D30: 0.1178</td> <td>D15: 0.0919</td> <td>D10: 0.0846</td> </tr> <tr> <td>Cu: 2.31</td> <td>Cc: 0.84</td> <td></td> </tr> </tbody> </table>						D85: 0.3047	D60: 0.1955	D50: 0.1646	D30: 0.1178	D15: 0.0919	D10: 0.0846	Cu: 2.31	Cc: 0.84																																																
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American Engineering Testing, Inc.
Sheridan
72 E Ridge Rd Unit D
Sheridan, WY 82801
(607) 675-1862
www.teamAET.com

Material Test Report

Report No: MAT:AET-066754-S18

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S18
Field Sample ID BH-34-2, 45-46.5
Date Sampled
Source
Material
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-2
45-46.5
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	42	
Plastic Limit (%)	AASHTO T 90	19	
Plasticity Index	AASHTO T 90	23	
Date Tested		7/20/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	0.94	
Curvature Coefficient		0.84	
Uniformity Coefficient		2.31	

Comments

N/A



American Engineering Testing, Inc.
 Sheridan
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 Sheridan, WY 82801
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Material Test Report

Report No: MAT:AET-066754-S20

Client: TETRA TECH, INC **CC:**

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
 change pending final review

Date of Issue: 7/29/2022

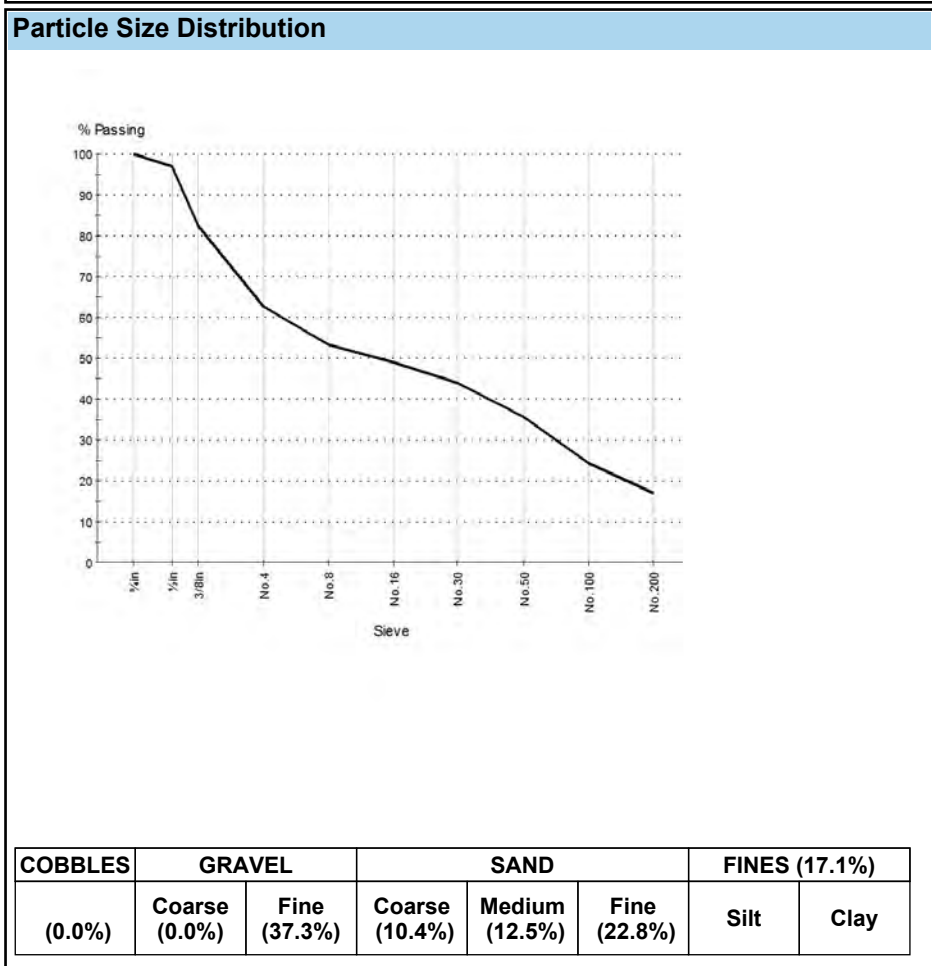
Sample Details

Sample ID AET-066754-S20
Field Sample ID BH-34-2, 65-66.5
Date Sampled
Source
Material
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-2
 65-66.5
Date Submitted

Sample Description:

Atterberg Limit:

Liquid Limit: 22
Plastic Limit: 11
Plasticity Index: 11
Linear Shrinkage (%): N/A



Grading: ASTM C 136, ASTM C 117

Date Tested: 7/20/2022
Tested By: Sara Ostrander

Sieve Size	% Passing	Limits
3/4 in	100.0	
1/2 in	97.0	
3/8 in	82.5	
No. 4	62.7	
No. 8	53.5	
No. 16	48.9	
No. 30	43.9	
No. 50	35.7	
No. 100	24.5	
No. 200	17.1	

D85: 9.9603 **D60:** 3.8685 **D50:** 1.3927
D30: 0.2108 **D15:** N/A **D10:** N/A



American Engineering Testing, Inc.
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Material Test Report

Report No: MAT:AET-066754-S20

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S20
Field Sample ID BH-34-2, 65-66.5
Date Sampled
Source
Material
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-2
65-66.5
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	22	
Plastic Limit (%)	AASHTO T 90	11	
Plasticity Index	AASHTO T 90	11	
Date Tested		7/20/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	3.47	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	

Comments

N/A



American Engineering Testing, Inc.
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Material Test Report

Report No: MAT:AET-066754-S21

Client: TETRA TECH, INC Project: TT HDD 34 Lab Testing Sheridan WY Job No: P-0014212	CC: Draft Report - Subject to change pending final review Date of Issue: 7/29/2022
--	--

Sample Details		Sample Description:
Sample ID Field Sample ID Date Sampled Source Material Specification Sampling Method General Location Location Date Submitted	AET-066754-S21 BH-34-3, 25-26.5 Gradation + Hydrometer In Place Material Ottertail (midwest BH-34-3 25-26.5	Atterberg Limit: Liquid Limit: 34 Plastic Limit: 18 Plasticity Index: 16 Linear Shrinkage (%): N/A

Particle Size Distribution		Grading: ASTM C 136, ASTM C 117																																																									
		Date Tested: 7/20/2022 Tested By: Sara Ostrander																																																									
<table border="1"> <thead> <tr> <th>Sieve Size</th> <th>% Passing</th> <th>Limits</th> </tr> </thead> <tbody> <tr><td>1/2in</td><td>100.0</td><td></td></tr> <tr><td>3/8in</td><td>99.0</td><td></td></tr> <tr><td>No.4</td><td>95.7</td><td></td></tr> <tr><td>No.8</td><td>92.1</td><td></td></tr> <tr><td>No.16</td><td>86.6</td><td></td></tr> <tr><td>No.30</td><td>76.9</td><td></td></tr> <tr><td>No.50</td><td>64.7</td><td></td></tr> <tr><td>No.100</td><td>52.9</td><td></td></tr> <tr><td>No.200</td><td>45.3</td><td></td></tr> </tbody> </table>		Sieve Size	% Passing	Limits	1/2in	100.0		3/8in	99.0		No.4	95.7		No.8	92.1		No.16	86.6		No.30	76.9		No.50	64.7		No.100	52.9		No.200	45.3		<table border="1"> <thead> <tr> <th colspan="2">COBBLES</th> <th colspan="2">GRAVEL</th> <th colspan="3">SAND</th> <th colspan="2">FINES (45.3%)</th> </tr> <tr> <th>(0.0%)</th> <th></th> <th>Coarse (0.0%)</th> <th>Fine (4.3%)</th> <th>Coarse (4.9%)</th> <th>Medium (20.0%)</th> <th>Fine (25.6%)</th> <th>Silt</th> <th>Clay</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	COBBLES		GRAVEL		SAND			FINES (45.3%)		(0.0%)		Coarse (0.0%)	Fine (4.3%)	Coarse (4.9%)	Medium (20.0%)	Fine (25.6%)	Silt	Clay									
Sieve Size	% Passing	Limits																																																									
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Material Test Report

Report No: MAT:AET-066754-S21

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S21
Field Sample ID BH-34-3, 25-26.5
Date Sampled
Source
Material
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-3
25-26.5
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	34	
Plastic Limit (%)	AASHTO T 90	18	
Plasticity Index	AASHTO T 90	16	
Date Tested		7/20/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	1.31	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	

Comments

N/A



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Material Test Report

Report No: MAT:AET-066754-S23

Client: TETRA TECH, INC Project: TT HDD 34 Lab Testing Sheridan WY Job No: P-0014212	CC: Draft Report - Subject to change pending final review Date of Issue: 7/29/2022
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Sample Details		Sample Description:
Sample ID Field Sample ID Date Sampled Source Material Specification Sampling Method General Location Location Date Submitted	AET-066754-S23 BH-34-5, 25-26.5 Gradation + Hydrometer In Place Material Ottertail (midwest BH-34-5 25-26.5	Atterberg Limit: Liquid Limit: 35 Plastic Limit: 16 Plasticity Index: 19 Linear Shrinkage (%): N/A

Particle Size Distribution		Grading: ASTM C 136, ASTM C 117																																																									
		Date Tested: 7/20/2022 Tested By: Sara Ostrander																																																									
<table border="1"> <thead> <tr> <th>Sieve Size</th> <th>% Passing</th> <th>Limits</th> </tr> </thead> <tbody> <tr><td>1/2in</td><td>100.0</td><td></td></tr> <tr><td>3/8in</td><td>99.0</td><td></td></tr> <tr><td>No.4</td><td>96.9</td><td></td></tr> <tr><td>No.8</td><td>93.8</td><td></td></tr> <tr><td>No.16</td><td>88.6</td><td></td></tr> <tr><td>No.30</td><td>81.0</td><td></td></tr> <tr><td>No.50</td><td>71.0</td><td></td></tr> <tr><td>No.100</td><td>60.1</td><td></td></tr> <tr><td>No.200</td><td>52.2</td><td></td></tr> </tbody> </table>		Sieve Size	% Passing	Limits	1/2in	100.0		3/8in	99.0		No.4	96.9		No.8	93.8		No.16	88.6		No.30	81.0		No.50	71.0		No.100	60.1		No.200	52.2		<table border="1"> <thead> <tr> <th colspan="2">COBBLES</th> <th colspan="2">GRAVEL</th> <th colspan="3">SAND</th> <th colspan="2">FINES (52.2%)</th> </tr> <tr> <th>(0.0%)</th> <th></th> <th>Coarse (0.0%)</th> <th>Fine (3.1%)</th> <th>Coarse (4.3%)</th> <th>Medium (16.6%)</th> <th>Fine (23.8%)</th> <th>Silt</th> <th>Clay</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	COBBLES		GRAVEL		SAND			FINES (52.2%)		(0.0%)		Coarse (0.0%)	Fine (3.1%)	Coarse (4.3%)	Medium (16.6%)	Fine (23.8%)	Silt	Clay									
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		D85: 0.8565 D60: 0.1487 D50: N/A D30: N/A D15: N/A D10: N/A																																																									



American Engineering Testing, Inc.
Sheridan
72 E Ridge Rd Unit D
Sheridan, WY 82801
(607) 675-1862
www.teamAET.com

Material Test Report

Report No: MAT:AET-066754-S23

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID AET-066754-S23
Field Sample ID BH-34-5, 25-26.5
Date Sampled
Source
Material
Specification Gradation + Hydrometer
Sampling Method In Place Material
General Location Ottertail (midwest
Location BH-34-5
25-26.5
Date Submitted

Other Test Results

Description	Method	Result	Limits
Liquid Limit (%)	AASHTO T 89	35	
Plastic Limit (%)	AASHTO T 90	16	
Plasticity Index	AASHTO T 90	19	
Date Tested		7/20/2022	
Fineness Modulus	ASTM C 136, ASTM C 117	1.09	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	

Comments

NP = Non Plastic



American Engineering Testing, Inc.
Sheridan
72 E Ridge Rd Unit D
Sheridan, WY 82801
(607) 675-1862
www.teamAET.com

Report No: PTR:AET-066754-S1

Proctor Report

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID: AET-066754-S1

Field ID: BH-34-1 5.1-10.1

Date Sampled:

Sampling Method: In Place Material

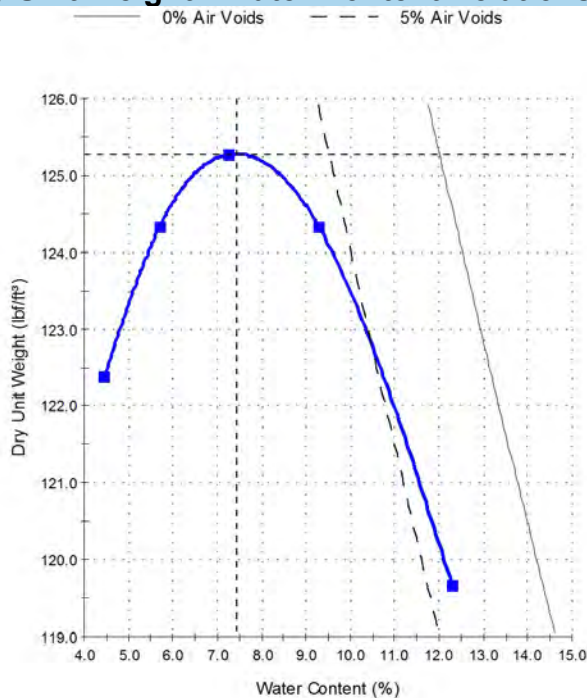
Material: clayey sand

Specification: Gradation + Hydrometer

Location: BH-34-1 bulk sample, 5.1-10.1

Sampled By: Client

Dry Unit Weight - Water Content Relationship



Test Results

ASTM D 698

Maximum Dry Unit Weight (lb/ft³): 125.3

Optimum Water Content (%): 7.4

Method: A

Preparation Method:

Specific Gravity (Fines): 2.65

Retained Sieve No 4 (4.75mm) (%): 0

Passing Sieve No 4 (4.75mm) (%): 100

Tested By: Sara Ostrander

Date Tested: 6/9/2022

AASHTO T 89/T 90

Liquid Limit (%): 26

Plastic Limit (%): 12

Plasticity Index (%): 14

Tested By: Sara Ostrander

Date Tested: 6/9/2022

Comments

PH-7

Resistivity - 1200 ohm-cm

Sulfates - 870 mg SO42/L



American Engineering Testing, Inc.
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Sheridan, WY 82801
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www.teamAET.com

Proctor Report

Report No: PTR:AET-066754-S13

Client: TETRA TECH, INC

CC:

Project: TT HDD 34 Lab Testing

Sheridan WY

Job No: P-0014212

Draft Report - Subject to
change pending final review

Date of Issue:

7/29/2022

Sample Details

Sample ID: AET-066754-S13

Field ID: BH-34-5 5.1-10.1

Date Sampled:

Sampling Method: In Place Material

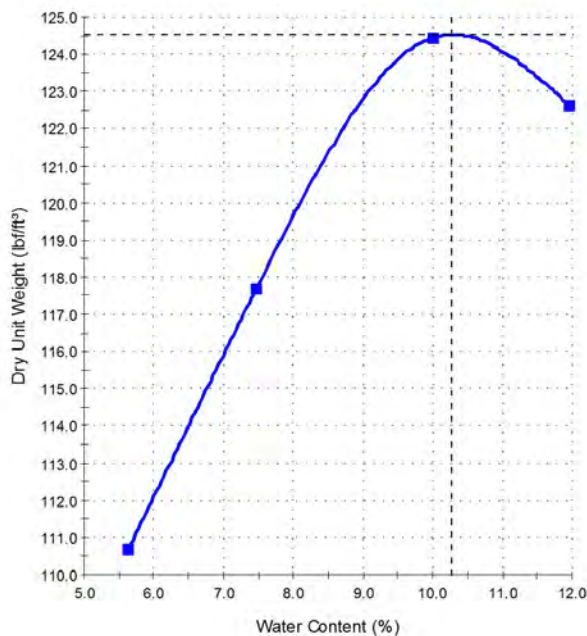
Material: Silty Sand (SM)

Specification: Gradation + Hydrometer

Location: BH-34-5 Bulk Sample, 5.1-10.1

Sampled By: Client

Dry Unit Weight - Water Content Relationship



Test Results

ASTM D 698

Maximum Dry Unit Weight (lb/ft³): 124.5

Optimum Water Content (%): 10.3

Method: A

Preparation Method:

Specific Gravity (Fines): 2.65

Tested By: Sara Ostrander

Date Tested: 7/20/2022

AASHTO T 89/T 90

Liquid Limit (%): 17

Plastic Limit (%): 15

Plasticity Index (%): 2

Tested By: Sara Ostrander

Date Tested: 6/9/2022

Comments

PH-6

Resistivity - 1410 ohm-cm

Sulfates - 660 mg SO42/L

APPENDIX D

Geophysical Seismic Survey Data
(Tables D-1 through D-4)

Table D-1. HDD 34 - Line 1 Summary of S and P Wave Data at Depth with Dynamic Modulus

Depth (ft)	S-Wave Velocity (ft/sec)	P-Wave Velocity (ft/sec)	Density (pcf)	Poisson's Ratio $\sigma_p = [(V_p/V_s)^2 - 2] / [2(V_p/V_s)^2 - 2]$	Shear Modulus $G = dV_s^2$ (psi)	Young's Modulus $E = 2G(1 + \sigma_p)$	Bulk Modulus $K = 1/3(E/(1 - 2\sigma_p))$
0	410	1,526	98	0.46	3,558	10,397	44,501
5	499	1,526	98	0.44	5,272	15,183	42,216
10	607	2,420	98	0.47	7,787	22,838	113,349
15	693	3,269	98	0.48	10,142	29,949	212,294
20	752	4,484	98	0.49	11,957	35,526	409,059
25	774	5,532	98	0.49	12,668	37,750	629,896
30	832	6,220	98	0.49	14,617	43,585	798,204
35	840	6,743	98	0.49	14,927	44,544	940,951
40	847	7,081	98	0.49	15,167	45,280	1,039,649
45	998	7,242	98	0.49	21,054	62,753	1,080,447
50	1,016	7,333	98	0.49	21,828	65,058	1,107,487
55	1035	7421	98	0.49	22,657	67,522	1,133,808
60	1122	7527	98	0.49	26,589	79,164	1,161,997
65	1141	7663	98	0.49	27,530	81,966	1,204,444
70	1159	7900	98	0.49	28,386	84,535	1,281,144
75	1176	8268	98	0.49	29,215	87,041	1,405,777
80	1192	8665	98	0.49	30,025	89,496	1,546,972
85	1208	9047	98	0.49	30,848	91,985	1,688,644
90	1225	9365	98	0.49	31,724	94,620	1,811,175
95	1234	9645	98	0.49	32,196	96,053	1,923,098
100	1238	9645	98	0.49	32,394	96,640	1,922,834

Table D-2. HDD 34 - Line 2 Summary of S and P Wave Data at Depth with Dynamic Modulus

Depth (ft)	S-Wave Velocity (ft/sec)	P-Wave Velocity (ft/sec)	Density (pcf)	Poisson's Ratio $\sigma_p = [(V_p/V_s)^2 - 2] / [2(V_p/V_s)^2 - 2]$	Shear Modulus $G = dV_s^2$ (psi)	Young's Modulus $E = 2G(1 + \sigma_p)$	Bulk Modulus $K = 1/3(E/(1 - 2\sigma_p))$
0	433	2,138	98	0.48	3,954	11,694	91,321
5	538	2,138	98	0.47	6,117	17,936	88,438
10	618	3,359	98	0.48	8,064	23,910	227,661
15	678	4,327	98	0.49	9,711	28,888	382,822
20	790	5,316	98	0.49	13,190	39,272	579,653
25	854	6,340	98	0.49	15,404	45,926	829,134
30	951	6,513	98	0.49	19,107	56,904	871,109
35	977	6,511	98	0.49	20,190	60,106	869,035
40	996	6,623	98	0.49	20,985	62,470	899,042
45	1,023	6,822	98	0.49	22,115	65,836	954,207
50	1,003	6,964	98	0.49	21,251	63,302	996,577
55	986	6986	98	0.49	20,559	61,259	1,004,131
60	1100	7130	98	0.49	25,596	76,164	1,040,232
65	1100	7524	98	0.49	25,596	76,229	1,162,306
70	1109	7901	98	0.49	26,011	77,510	1,284,703
75	1128	8252	98	0.49	26,886	80,145	1,403,333
80	1156	8608	98	0.49	28,265	84,277	1,528,442
85	1196	9018	98	0.49	30,229	90,145	1,678,595
90	1513	9498	98	0.49	48,373	143,861	1,842,057
95	1686	9498	98	0.48	60,054	178,210	1,826,483
100	1781	9498	98	0.48	67,022	198,626	1,817,192

Table D-3. HDD 34 - Line 3 Summary of S and P Wave Data at Depth with Dynamic Modulus

Depth (ft)	S-Wave Velocity (ft/sec)	P-Wave Velocity (ft/sec)	Density (pcf)	Poisson's Ratio $\sigma_p = [(V_p/V_s)^2 - 2] / [2(V_p/V_s)^2 - 2]$	Shear Modulus $G = dV_s^2$ (psi)	Young's Modulus $E = 2G(1 + \sigma_p)$	Bulk Modulus $K = 1/3(E/(1 - 2\sigma_p))$
0	416	1,990	98	0.48	3,655	10,797	78,856
5	477	1,990	98	0.47	4,812	14,142	77,313
10	583	3,494	98	0.49	7,196	21,380	248,483
15	662	4,423	98	0.49	9,258	27,561	401,152
20	758	5,711	98	0.49	12,131	36,176	673,153
25	835	6,649	98	0.49	14,731	43,958	914,659
30	873	6,697	98	0.49	16,096	48,010	926,338
35	910	6,823	98	0.49	17,495	52,169	960,618
40	938	6,864	98	0.49	18,584	55,398	970,932
45	943	6,853	98	0.49	18,803	56,045	967,534
50	987	6,852	98	0.49	20,570	61,273	964,939
55	1024	6855	98	0.49	22,177	66,026	963,632
60	1032	7013	98	0.49	22,528	67,084	1,009,354
65	1059	7399	98	0.49	23,682	70,552	1,125,632
70	1107	7837	98	0.49	25,906	77,191	1,263,521
75	1123	8321	98	0.49	26,642	79,433	1,427,740
80	1140	8810	98	0.49	27,463	81,920	1,603,994
85	1159	9190	98	0.49	28,380	84,681	1,747,043
90	1179	9589	98	0.49	29,403	87,757	1,904,346
95	1191	9589	98	0.49	29,986	89,488	1,903,569
100	1198	9589	98	0.49	30,323	90,489	1,903,120

Table D-4. HDD 34 - Line 4 Summary of S and P Wave Data at Depth with Dynamic Modulus

Depth (ft)	S-Wave Velocity (ft/sec)	P-Wave Velocity (ft/sec)	Density (pcf)	Poisson's Ratio $\sigma_p = [(V_p/V_s)^2 - 2] / [2(V_p/V_s)^2 - 2]$	Shear Modulus $G = dV_s^2$ (psi)	Young's Modulus $E = 2G(1 + \sigma_p)$	Bulk Modulus $K = 1/3(E/(1 - 2\sigma_p))$
0	448	1,823	98	0.47	4,235	12,433	64,620
5	508	1,823	98	0.46	5,463	15,929	62,982
10	677	3,073	98	0.47	9,700	28,604	186,671
15	802	4,006	98	0.48	13,599	40,229	321,102
20	894	5,096	98	0.48	16,895	50,148	526,301
25	947	5,984	98	0.49	18,937	56,325	731,456
30	1,035	6,243	98	0.49	22,641	67,282	793,589
35	1,063	6,357	98	0.49	23,883	70,963	822,382
40	1,121	6,515	98	0.48	26,582	78,933	861,611
45	1,120	6,760	98	0.49	26,520	78,812	930,349
50	1,131	7,112	98	0.49	27,051	80,450	1,033,067
55	1137	7188	98	0.49	27,336	81,306	1,055,485
60	1135	7167	98	0.49	27,244	81,031	1,049,221
65	1197	7209	98	0.49	30,297	90,031	1,057,994
70	1200	7409	98	0.49	30,436	90,487	1,119,753
75	1210	7662	98	0.49	30,960	92,089	1,199,339
80	1230	7962	98	0.49	31,971	95,130	1,297,205
85	1400	8463	98	0.49	41,442	123,161	1,458,481
90	1485	8974	98	0.49	46,602	138,494	1,640,124
95	1539	8974	98	0.48	50,069	148,688	1,635,501
100	1589	8974	98	0.48	53,345	158,309	1,631,133

APPENDIX E

Inadvertent Returns Analysis
(Figures 1E through 3E)

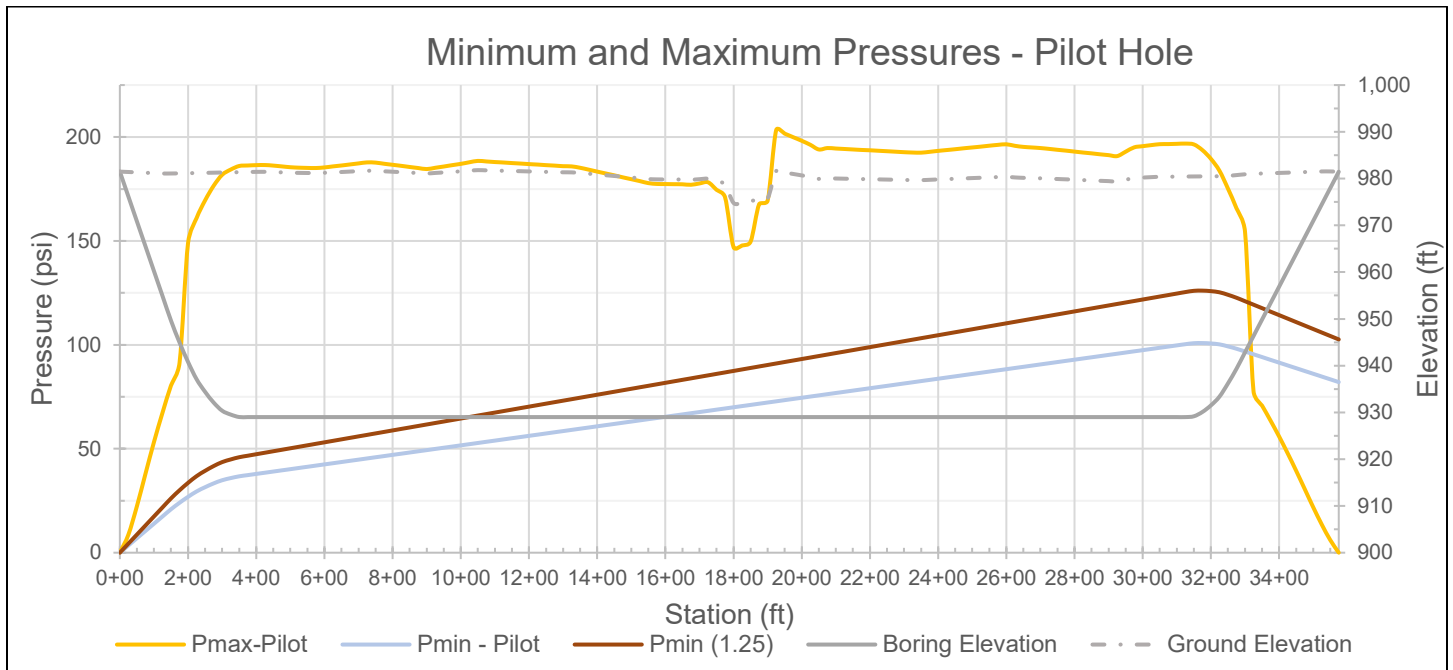


Figure 1E. HDD34 - Plot of minimum and maximum allowable drilling fluid pressures along Otter Tail River HDD bore path to prevent hydrofracture or surface release.

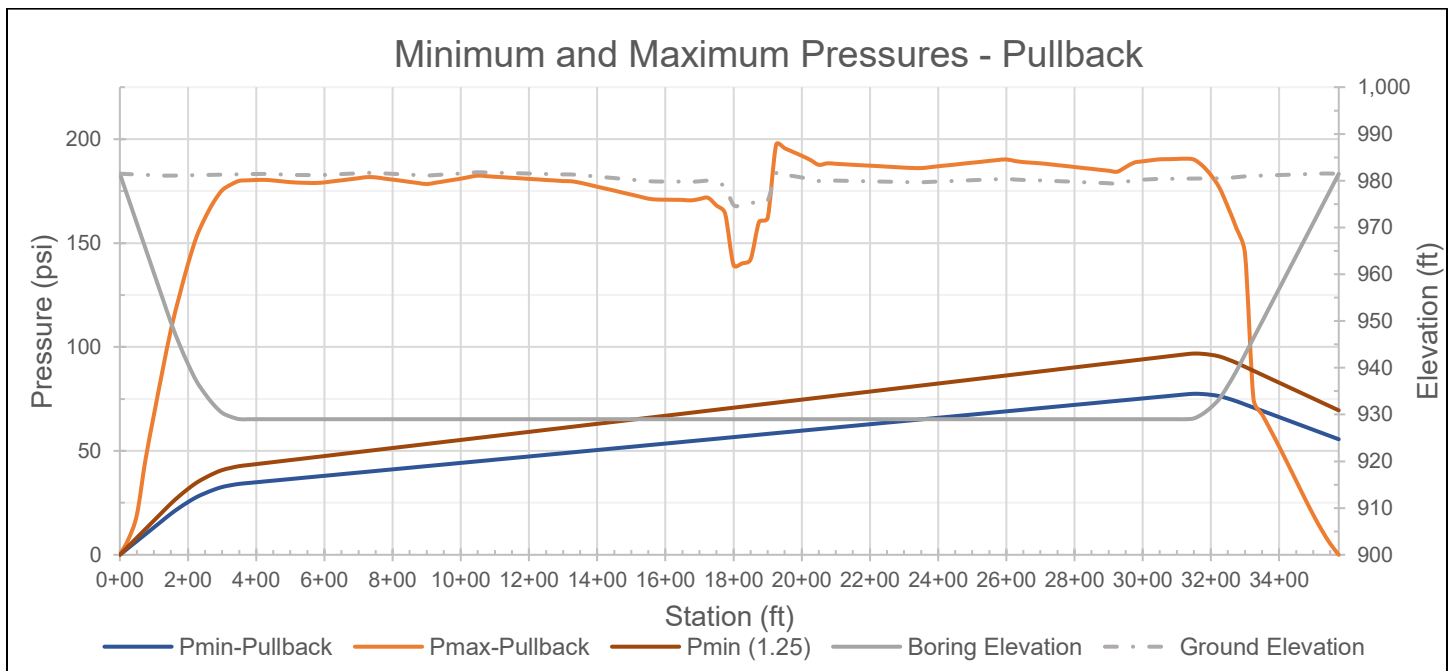


Figure 2E. HDD34 - Plot of minimum and maximum allowable drilling fluid pressures along Otter Tail River HDD bore path to prevent hydrofracture or surface release.

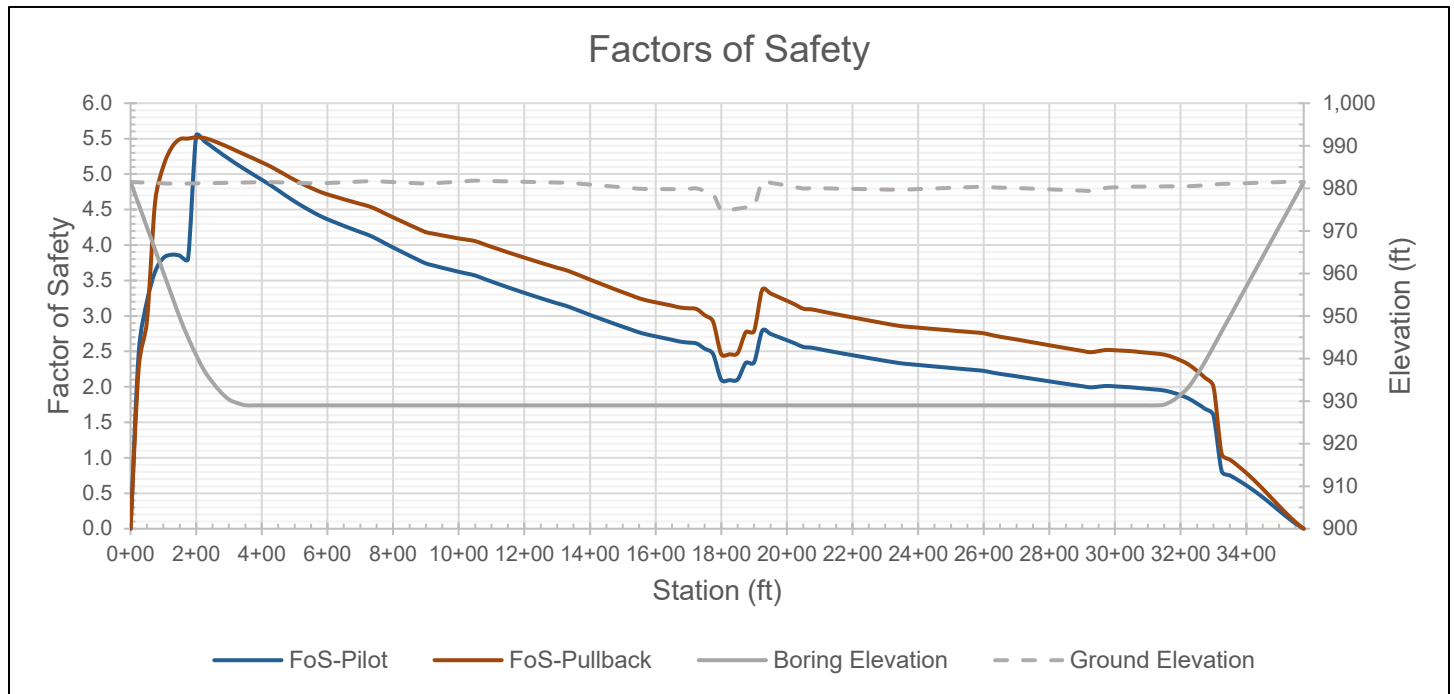


Figure 3E. HDD34 - Plot of Factors of Safety for drilling fluid pressures along Otter Tail River HDD bore path to prevent hydrofracture or surface release.



U.S. Department
of Transportation
**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

9/15/2023

Mr. Lee Blank
CEO
Summit Carbon Solutions
2321 N Loop Dr. Suite 221
Ames, Iowa 50010

Dear Mr. Blank:

The Pipeline and Hazardous Materials Safety Administration (PHMSA) has received several inquiries regarding the ability of federal, state, and local governments to affect the siting, design, construction, operation, and maintenance of carbon dioxide pipelines. The widespread interest in understanding PHMSA's authorities underscores a need to reiterate the message we shared in 2014 with a company proposing a high-visibility interstate pipeline, a message directly related to current pipeline projects proposed by your companies.

As was the case in 2014, PHMSA continues to support and encourage all three levels of government—federal, state, and local—working collaboratively to ensure the nation's pipeline systems are constructed and operated in a manner that protects public safety and the environment.

Congress has vested PHMSA with authority to regulate the design, construction, operation, and maintenance of pipeline systems, including carbon dioxide pipelines, and to protect life, property, and the environment from hazards associated with pipeline operations. While the Federal Energy Regulatory Commission has exclusive authority to regulate the siting of interstate gas transmission pipelines, there is no equivalent federal agency that determines siting of all other pipelines, such as carbon dioxide pipelines. Therefore, the responsibility for siting new carbon dioxide pipelines rests largely with the individual states and counties through which the pipelines will operate and is governed by state and local law.

The Role of PHMSA

Under the federal pipeline safety laws (49 U.S.C. § 60101 *et seq.*), PHMSA is charged with carrying out a nationwide program for regulating the country's pipelines that transport gas, hazardous liquids, and carbon dioxide. With passage of the federal pipeline safety laws, Congress determined pipeline safety is best promoted through PHMSA's development of nationwide safety standards.

PHMSA takes this responsibility seriously and has promulgated comprehensive safety regulations at 49 C.F.R. Parts 190-199. Dozens of current federal requirements regulate the safety of carbon dioxide pipelines' design,¹ construction,² testing,³ operation and maintenance,⁴ operator qualification,⁵ corrosion control,⁶ and emergency response planning.⁷ PHMSA inspects compliance with these requirements and enforces these standards through administrative and judicial enforcement processes.

Recently, PHMSA promulgated new, more stringent standards for automatic and remote shut off valves that affect carbon dioxide pipelines (Additional information: "New rule will help improve public safety and reduce greenhouse gas emissions following pipeline failures").⁸ PHMSA also announced a number of additional actions to strengthen current pipeline safety requirements for carbon dioxide pipelines (Additional information: "PHMSA announces new safety measures to protect Americans from carbon dioxide pipeline failures"),⁹ including a new rulemaking which is currently under way.

While rulemakings like this involve meticulous crafting of highly technical updates, PHMSA also retains broad authority to address imminent risks to the public posed by a pipeline—even if not specifically delineated in a rule or standard. To this extent, PHMSA will engage with all carbon dioxide pipeline project developers to ensure any unique and imminent risks from such projects are adequately mitigated pursuant to PHMSA's statutory safety authority.

The Role of State Pipeline Regulators

Federal safety standards apply to both interstate and intrastate pipeline facilities. Only PHMSA can regulate the safety of interstate pipelines, and federal pipeline safety laws expressly prohibit states from enacting or enforcing pipeline safety standards with respect to interstate pipelines (except one-call notification program regulations). However, through an agreement with PHMSA, a state authority may be authorized to inspect interstate pipelines as an agent of PHMSA, and to refer violations to PHMSA for enforcement. Thus, PHMSA's state partners play an important role in assisting to oversee the safety of the nation's interstate pipelines.

PHMSA's state partners also play a critical role in regulating the safety of intrastate pipelines. A state authority that submits a certification to PHMSA may assume exclusive regulatory authority for the safety of its intrastate pipelines. The certification must document, among other things,

¹ 49 CFR part 195, subpart C (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-C>).

² Subpart D (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-D>).

³ Subpart E (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-E>).

⁴ Subpart F (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-F>).

⁵ Subpart G (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-G>).

⁶ Subpart H (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-H>).

⁷ E.g., Subpart F, §§ 195.402, 195.403, 195.408.

⁸ <https://www.phmsa.dot.gov/news/phmsa-announces-requirements-pipeline-shut-valves-strengthen-safety-improve-response-efforts>

⁹ <https://www.phmsa.dot.gov/news/phmsa-announces-new-safety-measures-protect-americans-carbon-dioxide-pipeline-failures>

that the state has appropriate jurisdiction under state law; has adopted the federal safety standards to which the certification applies; inspects operators for compliance with those standards; and enforces the standards to address noncompliance.

PHMSA's national regulatory program relies heavily on the efforts of these state partners, who employ roughly 70 percent of all pipeline inspectors and whose jurisdiction covers more than 80 percent of regulated pipelines. As noted above, federal law requires certified state authorities to adopt safety standards at least as stringent as, and compatible with, the federal standards. The state authorities will also inspect, regulate, and take enforcement action against operators of intrastate pipelines within their borders.

The Role of Local Governments

Federal preemption of pipeline safety means that states do not have independent authority to regulate pipeline safety but derive that authority from federal law through a certification to PHMSA.

In the case of local governments that are not subject to federal certification of pipeline safety authority, they may still exercise other powers granted to them under state law but none that adopt or enforce pipeline safety standards or contradict federal law.

However, PHMSA cannot prescribe the location or routing of a pipeline and cannot prohibit the construction of non-pipeline buildings in proximity to a pipeline. Local governments have traditionally exercised broad powers to regulate land use, including setback distances and property development that includes development in the vicinity of pipelines. Nothing in the federal pipeline safety law impinges on these traditional prerogatives of local—or state—government, so long as officials do not attempt to regulate the field of pipeline safety preempted by federal law.

PHMSA recognizes local governments have implemented authorities under state law that contribute in many ways to the safety of their citizens. We have seen localities consider measures, such as:

1. Controlling dangerous excavation activity near pipelines.
2. Limiting certain land use activities along pipeline rights-of-way.
3. Restricting land use and development along pipeline rights-of-way through zoning, setbacks, and similar measures.
4. Requiring the consideration of pipeline facilities in proposed local development plans.
5. Designing local emergency response plans and training with regulators and operators.
6. Requiring specific building code design or construction standards near pipelines.
7. Improving emergency response and evacuation plans in the event of a pipeline release.
8. Participating in federal environmental studies conducted under the National Environmental Policy Act (NEPA) and similar state laws for new pipeline construction projects.

Each state treats these issues differently, so pipeline operators should be prepared to deal directly with each locality and state body interested in the siting and construction process.

Collaboration Among Stakeholders

PHMSA believes pipeline safety is the shared responsibility of federal and state regulators as well as all other stakeholders, including pipeline operators, excavators, property owners, and local governments. In 2010, PHMSA launched the Pipelines and Informed Planning Alliance (PIPA)—available at <https://primis.phmsa.dot.gov/comm/pipa/LandUsePlanning.html>—to help pipeline safety stakeholders define their respective roles related to land use practices near pipelines and to develop best practices.

The PIPA documents are 13 years old, but they remain of value today. PHMSA looks forward to you, along with other private and public stakeholders, engaging with PHMSA in updating these documents to focus on the unique circumstances of new pipeline construction. I encourage all pipeline operators to carefully consider and adopt, as appropriate, these best practices to protect their existing and proposed rights-of-way, and to engage all stakeholders in promoting the safety of interstate pipelines.

Each community affected by an existing or proposed pipeline faces unique risks. The effective control and mitigation of such risks involves a combination of measures employed by facility operators, regulatory bodies, community groups, and individual members of the community. As a pipeline release can impact individuals, businesses, property owners, and the environment, it is important that all stakeholders carefully consider land use and development plans to make risk-informed choices that protect the best interests of the public and the individual parties involved. Sharing appropriate information with state or local governments and emergency planners, which may include dispersion models or emergency response plans, may help stakeholders make risk-informed decisions.

Bringing a pipeline into a community is often a complicated endeavor that requires tremendous coordination and open communication among stakeholders to be successful. We greatly value the efforts of pipeline operators who spend the time and energy to make sure the process goes smoothly and are responsive to all parties involved. Thank you for your cooperation in this effort.

Sincerely,

Alan K. Mayberry
Associate Administrator for Pipeline Safety

Summit Carbon Solutions Otter Tail to Wilkin Project Route Permit Application
Construction Emission Calculations
Summary

Description	Emissions (tpy)								
	Criteria Pollutants						GHGs	HAPs	
	NOx	CO	VOC	SO ₂	PM ₁₀	PM _{2.5}	CO ₂ e	Formalde hyde	Total
Off-Road Engine Emissions	75.46	17.15	5.72	0.04	3.12	3.11	3,433	0.68	1.01
Unpaved Roads	--	--	--	--	9.49	0.95	--	--	--
Earthmoving	--	--	--	--	5.50	0.58	--	--	--
Total	75.46	17.15	5.72	0.04	18.11	4.65	3,433	0.68	1.01

Summit Carbon Solutions Otter Tail to Wilkin Project Route Permit Application

Construction Emission Calculations

Emission Factors for Construction Engines

Equipment	Quantity	Hours per	Days per	Number	Total	Max	Load	Loaded	Emission Factors ^{1,2} (g/hp-hr)								
		Day	Week						NOx	CO	VOC	SO ₂	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Air Compressor A	2	5	6	16	960	25	1	25	4.44	1.16	0.44	0.002	0.27	0.27	187.94	0.008	0.002
Air Compressor B	4	10	6	16	3,840	80	0.8	64	4.70	2.37	0.37	0.002	0.25	0.24	187.94	0.008	0.002
Asphalt Paver A	0	0	0	0	0	153	1	153									
Asphalt Paver B	1	5	5	8	200	75	1	75	4.70	2.37	0.37	0.002	0.24	0.24	187.94	0.008	0.002
ATV	5	10	6	16	4800	20	0.5	10	4.44	1.16	0.44	0.002	0.27	0.27	187.94	0.008	0.002
Tractors/Loaders/Backhoes	4	10	6	16	3,840	75	0.8	60	4.70	2.37	0.37	0.002	0.24	0.24	187.94	0.008	0.002
Bulldozer	2	10	6	16	1,920	250	1	250	4.00	0.75	0.31	0.002	0.13	0.13	187.94	0.008	0.002
Compactor	0	0	0	0	0	300	1	300									
Compactor, Vibratory	1	4	5	16	320	100	1	100	4.70	2.37	0.37	0.002	0.25	0.24	187.94	0.008	0.002
Concrete Mixer Truck A	0	0	0	0	0	150	0.8	120									
Concrete Mixer Truck B	2	4	5	8	320	325	1	325	4.34	0.84	0.17	0.002	0.13	0.13	187.94	0.008	0.002
Concrete Pumps A	1	2	5	8	80	300	1	300	4.00	0.75	0.31	0.002	0.13	0.13	187.94	0.008	0.002
Concrete Pumps B	0	0	0	0	0	50	1	50									
Crane, Crawler A	0	10	6	0	0	450	1	450									
Crane, Crawler B	1	10	6	8	480	300	1	300	4.00	0.75	0.31	0.002	0.13	0.13	187.94	0.008	0.002
Crane, Wheeled A	0	10	6	0	0	350	1	350									
Crane, Wheeled B	1	10	6	16	960	165	0.8	132	4.10	0.87	0.34	0.002	0.18	0.18	187.94	0.008	0.002
Dozers A	0	0	0	0	0	410	1	410									
Dozers B	10	10	6	16	9,600	150	1	150	4.10	0.87	0.34	0.002	0.18	0.18	187.94	0.008	0.002
Dump Truck A	3	4	5	16	960	325	0.8	260	4.34	0.84	0.17	0.002	0.13	0.13	187.94	0.008	0.002
Dump Truck B	3	4	5	16	960	325	1	325	4.34	0.84	0.17	0.002	0.13	0.13	187.94	0.008	0.002
Excavator	15	10	6	16	14,400	138	1	138	4.10	0.87	0.34	0.002	0.18	0.18	187.94	0.008	0.002
Fork Lift A	2	10	6	16	1,920	120	1	120	4.10	0.87	0.34	0.002	0.18	0.18	187.94	0.008	0.002
Fork Lift B	1	10	6	16	960	60	1	60	4.70	2.37	0.37	0.002	0.24	0.24	187.94	0.008	0.002
Front End Loaders A	1	10	6	16	960	196	1	196	4.00	0.75	0.31	0.002	0.13	0.13	187.94	0.008	0.002
Front End Loaders B	1	10	6	16	960	196	1	196	4.00	0.75	0.31	0.002	0.13	0.13	187.94	0.008	0.002
Generators	0	0	0	0	0	430	1	430									
Generators	1	10	6	16	960	250	0.5	125	4.00	0.75	0.31	0.002	0.13	0.13	187.94	0.008	0.002
Grader	1	10	6	16	960	140	1	140	4.10	0.87	0.34	0.002	0.18	0.18	187.94	0.008	0.002
Grader	1	10	6	16	960	175	0.8	140	4.10	0.87	0.34	0.002	0.18	0.18	187.94	0.008	0.002
HDD Equip - Rig	2	10	6	5	600	450	0.8	360	4.34	0.84	0.17	0.002	0.13	0.13	187.94	0.008	0.002
HDD - Mudd Unit	2	10	6	5	600	200	0.8	160	4.00	0.75	0.31	0.002	0.13	0.13	187.94	0.008	0.002
HDD - Cleaner	2	10	6	5	600	200	1	200	4.00	0.75	0.31	0.002	0.13	0.13	187.94	0.008	0.002
Guided Bore Machine	3	10	6	8	1,440	150	0.8	120	4.10	0.87	0.34	0.002	0.18	0.18	187.94	0.008	0.002
Light Tower	6	5	6	16	2,880	50	1	50	4.73	1.53	0.28	0.002	0.34	0.34	187.94	0.008	0.002
Man Lift	2	10	6	16	1,920	50	1	50	4.73	1.53	0.28	0.002	0.34	0.34	187.94	0.008	0.002
Medium crane	1	4	5	16	320	200	0.5	100	4.00	0.75	0.31	0.002	0.13	0.13	187.94	0.008	0.002
Pickup truck	75	10	6	16	72,000	150	0.25	38	4.10	0.87	0.34	0.002	0.18	0.18	187.94	0.008	0.002
Piping truck	10	10	6	16	9,600	300	1	300	4.00	0.75	0.31	0.002	0.13	0.13	187.94	0.008	0.002
Scraper A	0	0	0	0	0	488	1	488									
Scraper B	0	0	0	0	0	175	1	175									
Sideboom	4	10	6	16	3,840	240	1	240	4.00	0.75	0.31	0.002	0.13	0.13	187.94	0.008	0.002
Skid steer loader	2	10	6	16	1,920	50	1	50	4.73	1.53	0.28	0.002	0.34	0.34	187.94	0.008	0.002
Trackhoe A	2	10	6	16	1,920	320	1	320	4.34	0.84	0.17	0.002	0.13	0.13	187.94	0.008	0.002
Trackhoe B	10	10	6	16	9,600	138	1	138	4.10	0.87	0.34	0.002	0.18	0.18	187.94	0.008	0.002
Trackhoe C	2	10	6	16	1,920	75	1	75	4.70	2.37	0.37	0.002	0.24	0.24	187.94	0.008	0.002
Water truck	2	10	6	16	1,920	100	0.5	50	4.70	2.37	0.37	0.002	0.25	0.24	187.94	0.008	0.002
Welding Machine	10	10	6	16	9,600	35	0.8	28	4.73	1.53	0.28	0.002	0.34	0.34	187.94	0.008	0.002
Welding Rig	10	10	6	16	9,600	10	0.8	8	4.30	4.11	0.55	0.002	0.50	0.50	187.94	0.008	0.002

¹ Tier 2 EPA 420-P-04-009, Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression Ignition, USEPA, April 2004 - Tier 2 Engines.

² GHG emission factors from Title 40 Subchapter C Part 98 Subpart C Table C-1 and C-2 to Subpart C. Used Distillate Fuel Oil No. 2 for CO2 and Petroleum Products for CH4 and N2O

Grey shaded cells indicate equipment type considered in standard modeling, but not used by the Project.

Summit Carbon Solutions Otter Tail to Wilkin Project Route Permit Application

Construction Emission Calculations

Emission Estimates from Construction Engines

Equipment	Potential Emissions (ton/yr)									
	VOC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	CH ₄	N ₂ O	CO ₂ e
Air Compressor A	0.012	0.031	0.117	0.007	0.007	0.000	4.97	2.0E-04	4.0E-05	4.99
Air Compressor B	0.101	0.641	1.273	0.068	0.065	0.001	50.91	2.1E-03	4.1E-04	51.09
Asphalt Paver A	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0E+00	0.0E+00	0.00
Asphalt Paver B	0.006	0.039	0.078	0.004	0.004	0.000	3.11	1.3E-04	2.5E-05	3.12
ATV	0.023	0.061	0.235	0.014	0.014	0.000	9.94	4.0E-04	8.1E-05	9.98
Tractors/Loaders/Backhoes	0.093	0.601	1.194	0.061	0.061	0.001	47.73	1.9E-03	3.9E-04	47.89
Bulldozer	0.163	0.396	2.116	0.070	0.070	0.001	99.44	4.0E-03	8.1E-04	99.78
Compactor	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0E+00	0.0E+00	0.00
Compactor, Vibratory	0.013	0.083	0.166	0.009	0.008	0.000	6.63	2.7E-04	5.4E-05	6.65
Concrete Mixer Truck A	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0E+00	0.0E+00	0.00
Concrete Mixer Truck B	0.019	0.097	0.497	0.015	0.015	0.000	21.55	8.7E-04	1.7E-04	21.62
Concrete Pumps A	0.008	0.020	0.106	0.003	0.003	0.000	4.97	2.0E-04	4.0E-05	4.99
Concrete Pumps B	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0E+00	0.0E+00	0.00
Crane, Crawler A	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0E+00	0.0E+00	0.00
Crane, Crawler B	0.049	0.119	0.635	0.021	0.021	0.000	29.83	1.2E-03	2.4E-04	29.93
Crane, Wheeled A	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0E+00	0.0E+00	0.00
Crane, Wheeled B	0.047	0.121	0.573	0.025	0.025	0.000	26.25	1.1E-03	2.1E-04	26.34
Dozers A	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0E+00	0.0E+00	0.00
Dozers B	0.537	1.376	6.508	0.286	0.286	0.003	298.32	1.2E-02	2.4E-03	299.34
Dump Truck A	0.046	0.232	1.193	0.036	0.036	0.001	51.71	2.1E-03	4.2E-04	51.89
Dump Truck B	0.057	0.290	1.491	0.045	0.045	0.001	64.64	2.6E-03	5.2E-04	64.86
Excavator	0.741	1.899	8.981	0.394	0.394	0.004	411.68	1.7E-02	3.3E-03	413.09
Fork Lift A	0.086	0.220	1.041	0.046	0.046	0.001	47.73	1.9E-03	3.9E-04	47.89
Fork Lift B	0.023	0.150	0.298	0.015	0.015	0.000	11.93	4.8E-04	9.7E-05	11.97
Front End Loaders A	0.064	0.155	0.830	0.027	0.027	0.000	38.98	1.6E-03	3.2E-04	39.11
Front End Loaders B	0.064	0.155	0.830	0.027	0.027	0.000	38.98	1.6E-03	3.2E-04	39.11
Generators	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0E+00	0.0E+00	0.00
Generators	0.041	0.099	0.529	0.017	0.017	0.000	24.86	1.0E-03	2.0E-04	24.95
Grader	0.050	0.128	0.607	0.027	0.027	0.000	27.84	1.1E-03	2.3E-04	27.94
Grader	0.050	0.128	0.607	0.027	0.027	0.000	27.84	1.1E-03	2.3E-04	27.94
HDD Equip - Rig	0.040	0.201	1.032	0.031	0.031	0.000	44.75	1.8E-03	3.6E-04	44.90
HDD - Mudd Unit	0.033	0.079	0.423	0.014	0.014	0.000	19.89	8.1E-04	1.6E-04	19.96
HDD - Cleaner	0.041	0.099	0.529	0.017	0.017	0.000	24.86	1.0E-03	2.0E-04	24.95
Guided Bore Machine	0.064	0.165	0.781	0.034	0.034	0.000	35.80	1.5E-03	2.9E-04	35.92
Light Tower	0.044	0.243	0.750	0.054	0.054	0.000	29.83	1.2E-03	2.4E-04	29.93
Man Lift	0.030	0.162	0.500	0.036	0.036	0.000	19.89	8.1E-04	1.6E-04	19.96
Medium crane	0.011	0.026	0.141	0.005	0.005	0.000	6.63	2.7E-04	5.4E-05	6.65
Pickup truck	1.007	2.580	12.203	0.536	0.536	0.006	559.35	2.3E-02	4.5E-03	561.27
Piping truck	0.979	2.373	12.699	0.418	0.418	0.006	596.64	2.4E-02	4.8E-03	598.68
Scraper A	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0E+00	0.0E+00	0.00
Scraper B	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0E+00	0.0E+00	0.00
Sideboom	0.313	0.759	4.064	0.134	0.134	0.002	190.92	7.7E-03	1.5E-03	191.58
Skid steer loader	0.030	0.162	0.500	0.036	0.036	0.000	19.89	8.1E-04	1.6E-04	19.96
Trackhoe A	0.113	0.571	2.936	0.089	0.089	0.001	127.28	5.2E-03	1.0E-03	127.72
Trackhoe B	0.494	1.266	5.987	0.263	0.263	0.003	274.45	1.1E-02	2.2E-03	275.39
Trackhoe C	0.058	0.375	0.746	0.038	0.038	0.000	29.83	1.2E-03	2.4E-04	29.93
Water truck	0.039	0.250	0.497	0.026	0.025	0.000	19.89	8.1E-04	1.6E-04	19.96
Welding Machine	0.083	0.454	1.401	0.100	0.100	0.001	55.69	2.3E-03	4.5E-04	55.88
Welding Rig	0.047	0.348	0.364	0.042	0.042	0.000	15.91	6.5E-04	1.3E-04	15.96
Totals:	5.72	17.15	75.46	3.12	3.11	0.04	3,421.33	1.4E-01	2.8E-02	3,433.07
	VOC	CO	NOx	PM₁₀	PM_{2.5}	SO₂	CO₂	CH₄	N₂O	CO₂e

Global Warming Potentials

CO2	Methane	N2O
1	25	298

Hazardous Air Pollutants from Construction

Air Toxic	Fraction of VOC	Emissions (tpy)
Benzene	0.02	0.00
Formaldehyde	0.118	0.68
Acetaldehyde	0.053	0.30
1,3-butadiene	0.002	0.01
Acrolein	0.003	0.02
Total HAPs		1.01

Summit Carbon Solutions Otter Tail to Wilkin Project Route Permit Application									
Construction Emission Calculations									
Fugitive dust emissions from unpaved roads during pipeline construction									
Equipment	Quantity	Total Project Days	Total Days Used	VMT	W	Emission Factor (lb/VMT)		Emissions (ton/yr)	
						PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}
Air Compressor A	2	96	192	96	25	2.11	0.21	0.10	0.01
Air Compressor B	4	96	384	192	25	2.11	0.21	0.20	0.02
Asphalt Paver A	0	0	0	0	0	0.00	0.00	0.00	0.00
Asphalt Paver B	1	40	40	20	20	1.91	0.19	0.02	0.00
ATV	5	96	480	240	20	1.91	0.19	0.23	0.02
Tractors/Loaders/Backhoes	4	96	384	192	50	2.89	0.29	0.28	0.03
Bulldozer	2	96	192	96	30	2.29	0.23	0.11	0.01
Compactor	0	0	0	0	0	0.00	0.00	0.00	0.00
Compactor, Vibratory	1	80	80	40	20	1.91	0.19	0.04	0.00
Concrete Mixer Truck A	0	0	0	0	0	0.00	0.00	0.00	0.00
Concrete Mixer Truck B	2	40	80	40	20	1.91	0.19	0.04	0.00
Concrete Pumps A	1	40	40	20	25	2.11	0.21	0.02	0.00
Concrete Pumps B	0	0	0	0	0	0.00	0.00	0.00	0.00
Crane, Crawler A	0	0	0	0	0	0.00	0.00	0.00	0.00
Crane, Crawler B	1	48	48	24	32	2.36	0.24	0.03	0.00
Crane, Wheeled A	0	0	0	0	0	0.00	0.00	0.00	0.00
Crane, Wheeled B	1	96	96	48	32	2.36	0.24	0.06	0.01
Dozers A	0	0	0	0	0	0.00	0.00	0.00	0.00
Dozers B	10	96	960	480	20	1.91	0.19	0.46	0.05
Dump Truck A	3	80	240	120	21	1.95	0.20	0.12	0.01
Dump Truck B	3	80	240	120	21	1.95	0.20	0.12	0.01
Excavator	15	96	1,440	720	22	1.99	0.20	0.72	0.07
Fork Lift A	2	96	192	96	20	1.91	0.19	0.09	0.01
Fork Lift B	1	96	96	48	20	1.91	0.19	0.05	0.00
Front End Loaders A	1	96	96	48	23	2.03	0.20	0.05	0.00
Front End Loaders B	1	96	96	48	23	2.03	0.20	0.05	0.00
Generators	0	0	0	0	0	0.00	0.00	0.00	0.00
Generators	1	96	96	48	20	1.91	0.19	0.05	0.00
Grader	1	96	96	48	20	1.91	0.19	0.05	0.00
Grader	1	96	96	48	20	1.91	0.19	0.05	0.00
HDD Equip - Rig	2	30	60	30	25	2.11	0.21	0.03	0.00
HDD - Mudd Unit	2	30	60	30	25	2.11	0.21	0.03	0.00
HDD - Cleaner	2	30	60	30	25	2.11	0.21	0.03	0.00
Guided Bore Machine	3	48	144	72	20	1.91	0.19	0.07	0.01
Light Tower	6	96	576	288	20	1.91	0.19	0.28	0.03
Man Lift	2	96	192	96	20	1.91	0.19	0.09	0.01
Medium crane	1	80	80	40	30	2.29	0.23	0.05	0.00
Pickup truck	75	96	7,200	3,600	24	2.07	0.21	3.73	0.37
Piping truck	10	96	960	480	25	2.11	0.21	0.51	0.05
Scraper A	0	0	0	0	0	0.00	0.00	0.00	0.00
Scraper B	0	0	0	0	0	0.00	0.00	0.00	0.00
Sideboom	4	96	384	192	30	2.29	0.23	0.22	0.02
Skid steer loader	2	96	192	96	26	2.15	0.21	0.10	0.01
Trackhoe A	2	96	192	96	40	2.61	0.26	0.13	0.01
Trackhoe B	10	96	960	480	40	2.61	0.26	0.63	0.06
Trackhoe C	2	96	192	96	40	2.61	0.26	0.13	0.01
Water truck	2	96	192	96	20	1.91	0.19	0.09	0.01
Welding Machine	10	96	960	480	5	1.02	0.10	0.25	0.02
Welding Rig	10	96	960	480	10	1.40	0.14	0.34	0.03
Total:								9.49	0.95

Equipment counts based on experience with construction of a pipeline
AP 42 Section 13.2.2 Unpaved Roads, dated November 2006, Equations 1a and 2 TOTALS 11.19 1.12 Surface Silt content based on Table 13.2.2-1 - construction sites
Each vehicle is assumed to travel 0.5 mile per day on site.

Eq 1a: $E = k * (s/12)^a * (W/3)^b$

Eq 2: $E_{ext} = E * [(365-P)/365]$

VMT: Vehicle Miles Traveled

W: Mean Vehicle Weight, tons

S: Mean Vehicle Speed, mph

P

95

days with at least 0.01 inches rain, EPA's AP-42 Figure 13.2.2-1

s

8.5

surface material silt content (%) for construction sites, EPA's AP-42 Table 13.2.2-1

Constants	PM	PM ₁₀	PM _{2.5}
k (lb/VMT)	4.9	1.5	0.15
a	0.7	0.9	0.9
b	0.45	0.45	0.45

E: size-specific emission factor, lb/ VMT
E_{ext}: annual size-specific emission factor extrapolated for natural migration, lb/VMT

Miles per day on site	
0.5	0.5

Summit Carbon Solutions Otter Tail to Wilkin Project Route Permit Application
Construction Emission Calculations
Fugitive Dust Emissions from Earthmoving Activities

Construction Activity	Daily Material Handling		Average Exposed Area (acres)	Emission Factors (lb/ton)		Emissions (ton/yr)	
	Construction Rate (ton/day)	Handling Time (days)		PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}
Topsoil removed	7,355	14	---	0.06	0.01	2.99	0.31
Pipe trench excavation and loading to storage piles	2,865	14	---	0.04	0.00	0.74	0.08
Backfilling pipe trench	2,865	14	---	0.01	0.00	0.24	0.03
Topsoil replacement	7,355	14	---	0.01	0.00	0.62	0.07
Wind erosion of exposed areas	---	14	344	0.38	0.04	0.92	0.10
Total							5.50 0.58

Topsoil removal: 1 foot deep, 1.25 tons per cubic yard

Trench excavation : 15 feet wide at top, 5 yards wide at bottom, 14 yards deep (excluding top soil), 1.25 tons per yard

Topsoil removal by scraper emission factor: AP-42 Section 11.9 Western Surface Coal Mining, Table 11.9-4, July 1998, topsoil removal by scraper

Trench excavation and loading to storage piles emission factor: AP-42 Section 11.9 Western Surface Coal Mining, Table 11.9-4, July 1998, truck loading by batch dump

Backfilling trench and topsoil replacement emission factor: AP-42 Section 11.9 Western Surface Coal Mining, Table 11.9-4, July 1998, overburden replacement

As worst case, PM₁₀ is set equal to Total Particulate Matter. PM_{2.5} is set to 0.105 times PM₁₀ per Table 11.9-1

Wind Erosion Exposed Areas emission factor: AP-42 Section 11.9 Western Surface Coal Mining, Table 11.9-4, July 1998, wind erosion of exposed areas (ton/yr/acre)

Total Facility Potential to Emit													
Structure	Control Equipment	Emission Unit	Emission Sources	PM	PM ₁₀	PM _{2.5}	SO ₂	NO _x	VOC	CO	HAPs		GHG
No.	ID	No.		(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	Acetaldehyde	Total HAPs	CO ₂ e
													(metric tonnes per year)
STRU 02	--	EQUI01	CO2 System Transfer	--	--	--	--	--	--	--	--	--	--
STRU 02	--	--	Startup, Shutdown, Malfunction Vent	--	--	--	--	--	1.69	--	0.13	0.15	7,001
STRU 01	--	EQUI02	Blower Suction Scrubber										
STRU 01	--	EQUI03	Blower Discharge Separator										
STRU 01	--	EQUI04	1st Stage Suction Scrubber, Compressor and Intercooler										
STRU 01	--	EQUI05	2nd Stage Suction Scrubber, Compressor and Intercooler										
STRU 01	--	EQUI06	3rd Stage Suction Scrubber, Compressor and Intercooler										
STRU 01	---	EQUI07	Dehydrator										
STRU 01	---	---	Dehydration Unit Vent	--	--	--	--	--	32.11	--	0.92	1.36	10,221
--	--	EQUI08	4th Stage Suction Scrubber, Compressor and Intercooler										
--	--	--	Space Heating	0.01	0.01	0.0061	0.00	0.17	0.01	0.07	--	--	217.71
FUGI 01	--	FUGI 01	Cooling Tower	0.18	0.13	0.0004	--	--	--	--	--	--	--
FUGI 02	--	FUGI 02	Equipment Leaks	--	--	--	--	--	3.72	--	0.28	0.28	--
TOTAL				0.19	0.15	0.01	0.00	0.17	37.53	0.07	1.32	1.79	17,440
													15,822

Note: Dark grey shading indicates equipment that do not have direct release points to the atmosphere.

Note: The September 2022 Route Permit application calculations for space heating were prepared assuming the use of fuel oil. These tables were updated to assume the use of natural gas, which is how Summit represented this equipment in the February 2023 MPCA capture facility air permit application.

Capture Equipment Potential to Emit (STRU 02)

Raw Material				Inlet CO ₂ Stream		Capture Facility:Startup, Shutdown, Malfunction Vent PTE	
				Maximum ^a	Existing Venting ^b	Emergency Venting ^{c, d}	
						lb/hr	ton/yr
CO ₂ Scrubber Exhaust	scfm	CO ₂ Scrubber PTE	PM	N/A	N/A	--	--
			PM ₁₀	N/A	N/A	--	--
			PM _{2.5}	N/A	N/A	--	--
			VOC	11.28	49.41	11.28	1.69
			Acetaldehyde	0.84	3.68	0.84	0.13
			Methanol	9.50E-02	4.16E-01	9.50E-02	1.43E-02
			Formaldehyde	2.00E-03	8.80E-02	2.00E-03	3.00E-04
			Acrolein	4.00E-02	1.75E-01	4.00E-02	6.00E-03
			Total HAPs	0.98	4.36	0.98	0.15
			CO ₂ e ^e	46,673	204,428	46,673	7,001
CO ₂ e (metric tonnes) ^e	42,342	185,456	42,342	6,351			

Fraction of VOC

7.456%

0.842%

0.018%

0.355%

^a Maximum from: Green Plains Otter Tail LLC Permit (11100077-101), 65 MMGPY facility

^b Calculated assuming 8,760 hours/yr operation.

^c Calculated assuming a maximum of 300 hours/yr emergency venting at SCS facility.

^d Normal operating emissions assume >95% removal of CO₂, >75% removal of acetaldehyde, and >35% removal of total VOCs and HAPs. VOC and HAP removal efficiency is based on process design modeling.

^e CO₂ emission rates based on a conversion factor of 6.2901 lb CO₂/gal ethanol and assume maximum production rates at the ethanol facility. [CO₂e (lbs)= 3,785.41 g ethanol/gal ethanol *0.789 /(46.07 g ethanol/44.01 g CO₂)*0.0022046 lb CO₂/g CO₂].

Assumptions

No changes are proposed to the ethanol facility's fermentation scrubber parameters or emission rates with this permit application.

Note: PTE = potential to emit; lb/hr = pound per hour; tpy = tons per year; PM = particulate matter; PM₁₀ = particulate matter less than 10 microns in diameter; PM_{2.5} = particulate matter less than 2.5 microns in diameter; VOC = volatile organic compounds; CO₂ = carbon dioxide; and CO₂e = carbon dioxide equivalent.

Capture Equipment Potential to Emit (STRU 01)

Raw Material	Emission Factor Citation	Pollutant	Inlet CO ₂ Stream		Capture Facility: Dehydration Unit Vent PTE	
			Maximum ^a	Existing Venting ^b	Process Vent ^{c, d}	
			lb/hr	ton/yr	lbs/hr	ton/yr
CO ₂ Scrubber Exhaust	scfm CO ₂ Scrubber PTE	PM	N/A	N/A	--	--
		PM ₁₀	N/A	N/A	--	--
		PM _{2.5}	N/A	N/A	--	--
		VOC	11.28	49.41	7.33	32.11
		Acetaldehyde	0.84	3.68	0.21	0.92
		Methanol	9.50E-02	4.16E-01	6.17E-02	2.70E-01
		Formaldehyde	2.00E-03	8.80E-02	1.31E-02	5.72E-02
		Acrolein	4.00E-02	1.75E-01	2.60E-02	1.14E-01
		Total HAPs	0.98	4.36	0.31	1.36
		CO ₂ e ^e	46,673	204,428	2,334	10,221
		CO ₂ e (metric tonnes) ^e	42,342	185,456	2,117	9,273

Assumptions

No changes are proposed to the ethanol facility's fermentation scrubber parameters or emission rates with this permit application.

Cooling Tower (FUGI 01)

EQUI / EU No.	Process	Flow (gpm)	Drift Loss	Emission Factor Citation	Pollutant	Potential to Emit		
						Max. lb/hr	Unc. tpy	Lim. tpy
FUGI 01	Cooling Tower	3,412	0.0010%	Manufacturer	PM	0.04	0.18	0.18
					PM ₁₀	0.03	0.13	0.13
					PM _{2.5}	0.0001	0.0004	0.0004

PM_{total} Emission Rate (lb/hr) = Water Circulation Rate (gal/min) * 60 min/hr * 8.34 lb/gal * Drift Loss (%) * TDS (ppm)

Source: EPA AP-42, Chapter 13.4

TSP/PM Emission Rate (lb/hr) = PM_{total} (lb/hr) * 96.288%

PM₁₀ Emission Rate (lb/hr) = PM_{total} (lb/hr) * 70.509%

PM_{2.5} Emission Rate (lb/hr) = PM_{total} (lb/hr) * 0.226%

Source: New Mexico Environment Department Memo:

<https://www.env.nm.gov/aqb/permit/documents/PermittingGuidanceforCoolingTowerParticulateEmissions.pdf>

TDS Concentration (ppm): 2,500

Notes:

gpm = gallons per minute; max = maximum; unc = uncontrolled; lim = limited; lb/hr = pound per hour; tpy = tons per year; PM = particulate matter; PM₁₀ = particulate matter less than 10 microns in diameter; PM_{2.5} = particulate matter less than 2.5 microns in diameter; TDS = total dissolved solids; ppm = parts per million; and TSP = total suspended particles.

Equipment Leaks (FUGI 02)																			
Process Area	Source	Product	Component Count	Emission Factor (Kg/comp-hr) ¹	Uncontrolled Emission Rate (lb/hr)	Control Efficiency ²	Controlled Emission Rate (lb/hr)	TOC weight (%) ³	VOC Emissions		Acetaldehyde ⁴		Formaldehyde ⁴		Methanol ⁴		Acrolein ⁴		Total HAPs ⁴
									lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	TPY
Capture Equipment	Valves	G/V	173	0.00597	2.27	87%	0.30	13%	0.04	0.17	0.003	0.01	5.08E-07	2.22E-06	4.28E-09	1.87E-08	1.52E-11	6.64E-11	0.01
Capture Equipment	Valves	LL	147	0.00403	1.30	84%	0.21	13%	0.03	0.12	0.002	0.01	3.58E-07	1.57E-06	3.02E-09	1.32E-08	1.07E-11	4.69E-11	0.01
Capture Equipment	Pumps	LL	3	0.0199	0.13	69%	0.04	13%	0.01	0.02	0.000	0.00	7.00E-08	3.06E-07	5.89E-10	2.58E-09	2.09E-12	9.15E-12	0.00
Capture Equipment	Compressor Seals	G/V	7	0.228	3.51	0%	3.51	13%	0.46	2.00	0.034	0.15	6.03E-06	2.64E-05	5.08E-08	2.23E-07	1.80E-10	7.89E-10	0.15
Capture Equipment	Pressure-Relief Valves	G/V	11	0.104	2.52	87%	0.33	13%	0.04	0.19	0.003	0.01	5.62E-07	2.46E-06	4.74E-09	2.07E-08	1.68E-11	7.36E-11	0.01
Capture Equipment	Sampling Connections	All	4	0.015	0.13	0%	0.13	13%	0.02	0.08	0.001	0.01	2.27E-07	9.94E-07	1.91E-09	8.37E-09	6.77E-12	2.97E-11	0.01
Capture Equipment	Open-ended Lines	All	16	0.0017	0.06	0%	0.06	13%	0.01	0.03	0.001	0.00	1.03E-07	4.50E-07	8.66E-10	3.79E-09	3.07E-12	1.35E-11	0.00
Capture Equipment	Flanges	All	485	0.00183	1.95	0%	1.95	13%	0.25	1.11	0.019	0.08	3.36E-06	1.47E-05	2.83E-08	1.24E-07	1.00E-10	4.39E-10	0.08
TOTAL			846		11.88		6.53		0.85	3.72	0.063	0.28	1.12E-05	4.91E-05	9.45E-08	4.14E-07	3.35E-10	1.47E-09	0.28

¹ Emission factors taken from Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017.

² Control Effectiveness taken from Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, Table 5-2.

³ Fermentation total organic compound (TOC) weight % is based on daily ethanol weight % testing of beerwell at a representative ethanol plant.

⁴ Actealdehyde and total HAPs calculated based on proportion of each to Total VOCs in the inlet CO₂ stream.

Note kg/comp-hr = kilogram per component-hour; lb/hr = pound per hour; TOC = total organic compounds; VOC = volatile organic compounds; HAP = hazardous air pollutant; G/V = gas / vapor; LL = light liquid; and tpy = tons per year.

Comfort Heating - Criteria Pollutants								
Subject		Pollutant	Capacity (MMcf/hr)	Emission Factor (lb/MMcf)	Emission Factor Citation	lb/hr	Potential to Emit	
Item ID	Description						unrestricted TPY	limited TPY
	Comfort Heating	PM	4.12E-04	7.60	AP-42 Section 1.4	0.003	0.01	0.01
	Comfort Heating	PM ₁₀	4.12E-04	7.60	AP-42 Section 1.4	0.003	0.01	0.01
	Comfort Heating	PM _{2.5} ^a	4.12E-04	3.40	AP-42 Section 1.4	0.001	0.01	0.01
	Comfort Heating	SO ₂	4.12E-04	0.60	AP-42 Section 1.4	0.00	0.00	0.00
	Comfort Heating	NO _x	4.12E-04	94	AP-42 Section 1.4	0.04	0.17	0.17
	Comfort Heating	VOC	4.12E-04	5.50	AP-42 Section 1.4	0.00	0.01	0.01
	Comfort Heating	CO	4.12E-04	40	AP-42 Section 1.4	0.02	0.07	0.07
	Comfort Heating	lead	4.12E-04	0.0005	AP-42 Section 1.4	0.00	0.00	0.00

^a PM_{2.5} emission factor from England, G.C., “Development of Fine Particulate Emission Factors and Speciation Profiles for Oil and Gas-fired Combustion Systems, Final Report, 2004.” Table 3.1, PM2.5 Mass Emission Factor for Gas-Fired Gas-Fired Boilers and Steam Generators.

Comfort Heating - Greenhouse Gasses								
Subject		Pollutant	Capacity (MMcf/hr)	Emission Factor (lb/MMcf)	Emission Factor Citation	lb/hr	Potential to Emit	
Item ID	Description						unrestricted TPY	limited TPY
		CO ₂	4.12E-04	120,000	AP-42 Section 1.4	49.41	216.42	216.42
		N ₂ O	4.12E-04	2.2	AP-42 Section 1.4	0.0009	0.0040	0.0040
		Methane	4.12E-04	2	AP-42 Section 1.4	0.0009	0.0041	0.0041
		CO ₂ e	4.12E-04	--	40 CFR 98 ^a	49.71	217.71	217.71

^a Global Warming Potentials (CO₂ = 1, CH₄ = 25, N₂O = 298)

Comfort Heating - Hazardous Air Pollutants								
Subject		Pollutant	Capacity (MMcf/hr)	Emission Factor (lb/MMcf)	Emission Factor Citation	lb/hr	Potential to Emit	
Item ID	Description						unrestricted TPY	limited TPY
	Comfort Heating	2-Methylnaphthalene	4.12E-04	2.40E-05	AP-42 Section 1.4	9.88E-09	4.33E-08	4.33E-08
	Comfort Heating	3-Methylchloranthrene	4.12E-04	1.80E-06	AP-42 Section 1.4	7.41E-10	3.25E-09	3.25E-09
	Comfort Heating	7,12-Dimethylbenz(a)anthracene	4.12E-04	1.60E-05	AP-42 Section 1.4	6.59E-09	2.89E-08	2.89E-08
	Comfort Heating	Acenaphthene	4.12E-04	1.80E-06	AP-42 Section 1.4	7.41E-10	3.25E-09	3.25E-09
	Comfort Heating	Acenaphthylene	4.12E-04	1.80E-06	AP-42 Section 1.4	7.41E-10	3.25E-09	3.25E-09
	Comfort Heating	Anthracene	4.12E-04	2.40E-06	AP-42 Section 1.4	9.88E-10	4.33E-09	4.33E-09
	Comfort Heating	Benz(a)anthracene	4.12E-04	1.80E-06	AP-42 Section 1.4	7.41E-10	3.25E-09	3.25E-09
	Comfort Heating	Benzene	4.12E-04	2.10E-03	AP-42 Section 1.4	8.65E-07	3.79E-06	3.79E-06
	Comfort Heating	Benzo(a)pyrene	4.12E-04	1.20E-06	AP-42 Section 1.4	4.94E-10	2.16E-09	2.16E-09
	Comfort Heating	Benzo(b)fluoranthene	4.12E-04	1.80E-06	AP-42 Section 1.4	7.41E-10	3.25E-09	3.25E-09
	Comfort Heating	Benzo(g,h,i)perylene	4.12E-04	1.20E-06	AP-42 Section 1.4	4.94E-10	2.16E-09	2.16E-09
	Comfort Heating	Benzo(k)fluoranthene	4.12E-04	1.80E-06	AP-42 Section 1.4	7.41E-10	3.25E-09	3.25E-09
	Comfort Heating	Chrysene	4.12E-04	1.80E-06	AP-42 Section 1.4	7.41E-10	3.25E-09	3.25E-09
	Comfort Heating	Dibenzo(a,h)anthracene	4.12E-04	1.20E-06	AP-42 Section 1.4	4.94E-10	2.16E-09	2.16E-09
	Comfort Heating	Dichlorobenzene	4.12E-04	1.20E-03	AP-42 Section 1.4	4.94E-07	2.16E-06	2.16E-06
	Comfort Heating	Fluoranthene	4.12E-04	3.00E-06	AP-42 Section 1.4	1.24E-09	5.41E-09	5.41E-09
	Comfort Heating	Fluorene	4.12E-04	2.80E-06	AP-42 Section 1.4	1.15E-09	5.05E-09	5.05E-09
	Comfort Heating	Formaldehyde	4.12E-04	7.50E-02	AP-42 Section 1.4	3.09E-05	1.35E-04	1.35E-04
	Comfort Heating	Hexane	4.12E-04	1.80E+00	AP-42 Section 1.4	7.41E-04	3.25E-03	3.25E-03
	Comfort Heating	Indeno(1,2,3-cd)pyrene	4.12E-04	1.80E-06	AP-42 Section 1.4	7.41E-10	3.25E-09	3.25E-09
	Comfort Heating	Napthalene	4.12E-04	6.10E-04	AP-42 Section 1.4	2.51E-07	1.10E-06	1.10E-06
	Comfort Heating	Phenanathrene	4.12E-04	1.70E-05	AP-42 Section 1.4	7.00E-09	3.07E-08	3.07E-08
	Comfort Heating	Pyrene	4.12E-04	5.00E-06	AP-42 Section 1.4	2.06E-09	9.02E-09	9.02E-09
	Comfort Heating	Toluene	4.12E-04	3.40E-03	AP-42 Section 1.4	1.40E-06	6.13E-06	6.13E-06
	Comfort Heating	Arsenic	4.12E-04	2.00E-04	AP-42 Section 1.4	8.24E-08	3.61E-07	3.61E-07
	Comfort Heating	Beryllium	4.12E-04	1.20E-05	AP-42 Section 1.4	4.94E-09	2.16E-08	2.16E-08
	Comfort Heating	Cadmium	4.12E-04	1.10E-03	AP-42 Section 1.4	4.53E-07	1.98E-06	1.98E-06
	Comfort Heating	Chromium	4.12E-04	1.40E-03	AP-42 Section 1.4	5.76E-07	2.52E-06	2.52E-06
	Comfort Heating	Cobalt	4.12E-04	8.40E-05	AP-42 Section 1.4	3.46E-08	1.51E-07	1.51E-07
	Comfort Heating	Manganese	4.12E-04	3.80E-04	AP-42 Section 1.4	1.56E-07	6.85E-07	6.85E-07
	Comfort Heating	Mercury	4.12E-04	2.60E-04	AP-42 Section 1.4	1.07E-07	4.69E-07	4.69E-07
	Comfort Heating	Nickel	4.12E-04	2.10E-03	AP-42 Section 1.4	8.65E-07	3.79E-06	3.79E-06
	Comfort Heating	Selenium	4.12E-04	2.40E-05	AP-42 Section 1.4	9.88E-09	4.33E-08	4.33E-08
Total HAPs						0.00	0.00	0.00

Assumptions:

Maximum Firing Capacity: 0.42 MMBtu/hr
0.0004 MMcf/hr (@1,020 Btu/cf) - Nat Gas

Max. Hours of Operation: 8760 hr/yr

Note: The September 2022 Route Permit application calculations for space heating were prepared assuming the use of fuel oil. These tables were updated to assume the use of natural gas, which is how Summit represented this equipment in the February 2023 MPCA capture facility air permit application.

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: November 17, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: Preferably no later than November 27, 2023

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: *“Requested information sent to whom by what means on date.”*

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. Please provide a one-page, 8.5 x 11-inch figure showing a simple plan of the proposed capture facility. The figure could be similar to the one provided as Appendix 3 to the RPA, but should have labels that are visible at the 8.5 x 11-inch scale and appropriate for use in the EIS.

The requested figure is available on the Otter Tail to Wilkin Project Sharepoint site as Attachment 7-1.

2. The response to SII 4 Question 8 about HDD noise indicates “If noise mitigation is required, temporary sound dampening barrier walls will be placed around the equipment.” Clarify how the contractor would determine if noise mitigation is needed. Would noise monitoring be conducted and, if so, at what locations? Additionally, clarify if the noise levels provided in the response are in decibels on the A-weighted scale (dBA rather than dB).

The noise levels presented in response to SII 4 Question 8 are in decibels (dB). As stated in Section 19 of the Scoping EAW, Summit expects the Project to conform to state noise standards. The equipment needed to construct the HDD would have a temporary and short-term impact on noise levels in the vicinity of the Project, which would decrease from the levels presented in the response to SII 4 Question 8 based on distance, topography, and weather conditions. Summit will coordinate with nearby landowners along the Project prior to execution of HDDs. Summit’s Contractor will determine the need for noise mitigation and noise monitoring based on feedback received from landowners during construction.

3. Is any corn stover (in addition to corn grain) used for ethanol production at the plant?

No.

4. Is any natural gas required for operating the carbon capture facility? If so, how much per year?

No. However, Summit may elect to use natural gas for space (comfort) heating, although the type and size of space heating equipment has not been determined. In the air permit application for the capture facility, natural gas-fired space heating equipment sized up to 0.42 million British Thermal Units per hour was assumed, with gas consumption up to 3.61 million cubic feet per year (assuming unlimited operation). Space heating equipment would only be used as needed during colder temperatures, so actual natural gas consumption would likely be lower than presented in the air permit application.

5. Regarding the existing ethanol plant, please provide the following:

a. A description and, if available, a diagram, of the processes at the Green Plains ethanol plant.

See description on the Otter Tail to Wilkin Project Sharepoint site as Attachment 7-5a.

b. Are any energy systems sub-metered? For example, is there a separate electric meter on plug loads, lighting, milling process, distillation process, centrifuge for DDGS, etc.

For electrical utility service, there are two large meters split in zones but there are no distinct operational areas. For natural gas, there is one large meter for the plant and sub-metering for boilers.

c. Are there any additional energy needs anticipated by the Green Plains ethanol plant over the next 25 years?

It is difficult to predict future energy needs as capital is deployed based on current market conditions.

d. What is the percent composition of total corn biomass used as fuel feedstock at the ethanol plant? That is, does the ethanol plant use a mix of residues and grain? If a mix is used, what is the percent composition of the feedstock, for example, percent grain and percent corn stover? If a mix is used, are shipments of grain and residues separate?

Corn stover/corn biomass is not used to produce ethanol.

e. Does the ethanol plant produce other co-products besides distillers grains such as corn oil?

The Green Plains Ethanol Plant produces corn oil which serves as a valuable low-CI feedstock for the production of biodiesel, renewable diesel, and sustainable aviation fuel.

f. How many gallons of water is used per year by the ethanol plant? Is the water sourced from the Fergus Falls Water Filtration/ Treatment Plant?

The Green Plains Ethanol Plant consumed 131 million gallons of water in 2022 (174 million gallons withdrawn, 43 million gallons discharged). Water is sourced from the Green Plains Ethanol Plant groundwater wells.

6. Provide an estimate (as a percent of the total acreage) of the source corn for the ethanol plant that has been grown using the following practices: cover crops, conservation tillage, no till, and precision fertilizer application? If so, please also provide the source for this information/data.

The Green Plains Ethanol Plant does not have a good way to estimate this today.

7. Scoping comments implied the company is overestimating its CO₂ capture rate. How much of the CO₂ produced by fermentation at the ethanol plant will be captured by the capture facility? How was this value determined? How will the capture facility achieve this capture rate and how does it compare to other similar (i.e., ethanol) capture facilities?

The capture facility system is designed to capture 100% of the CO₂ produced by the Green Plains Ethanol Plant. The capacity of the capture facility was determined by understanding the current ethanol production and building in margin for potential growth at the facility. All of the equipment, piping, and ancillary components have been designed/sized to accommodate 100% of the CO₂ production.

A conversion factor of 6.2901 pounds CO₂ per gallon of ethanol, determined by mass balance, was used to calculate potential CO₂ production at the Green Plains Ethanol Plant. The same conversion factor is used for each capture facility across the larger Midwest Carbon Express Project. The Green Plains Ethanol Plant is limited in its air permit to producing 65 million gallons of ethanol per year, so a maximum CO₂ production rate of 204,428 tons per year was calculated. In the air permit application for the capture facility, a conservative (i.e., low) 95% removal (or, capture) rate of CO₂ was assumed, with the balance assumed, for permitting purposes, to be emitted to atmosphere due to process inefficiencies or equipment downtime.

The capture facility will achieve this capture rate by adhering to standard operating procedures and minimizing equipment downtime through preventative maintenance programs. Summit has designed the capture facility to capture as much CO₂ emissions from the Green Plains Ethanol Plant as possible, as release of CO₂ into the atmosphere would not support/realize the purpose of the Project, which is to capture the CO₂ for transportation and ultimate sequestration.

8. The scoping decision indicates that different capture rates and their methodologies will be discussed. Provide a summary of other CO₂ capture systems and methodologies that could be used to capture CO₂ at an ethanol plant or predict capture rates. Did Summit consider any other technology for the capture facility. Describe how the proposed capture facility equipment was chosen. Should the company like to respond to this statement beyond the questions here, please do.

The industry standard methodology to capture CO₂ at an ethanol plant (e.g., capture of CO₂ for food-grade purposes) is to tie-in a connection at the CO₂ scrubber stack and then process the CO₂ to the desired chemistry to transport and/or store the CO₂. As stated in response to SII Number 7, this methodology was chosen because it has the potential to capture 100% of the CO₂ produced by the Green Plains Ethanol Plant. The Project design follows this methodology, utilizing reciprocating compressors to pressure the CO₂ into a supercritical phase, as well as a triethylene glycol dewatering system to remove any excess

water from the CO₂. While different types of compressors were considered, reciprocating compressors were deemed the best fit for the Project's compression requirements. Summit is not aware of any other commercially viable capture methodologies that have the proven ability to capture 100% of the CO₂ emissions.

9. Clarify if the startup, shutdown, malfunction vent and the startup, shutdown, malfunction stack are the same; see for example Scoping EAW Section 17.a and Table 17-2.

Yes, the terms 'startup, shutdown, malfunction vent' and 'startup, shutdown, malfunction stack' are interchangeable.

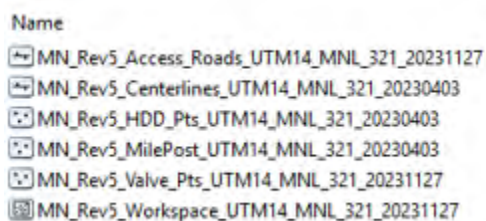
10. Provide emissions of CO₂ from pipeline facilities including valves during operation or explain why they are inconsequential to operational air emissions.

Pipeline facilities that could result in emissions of CO₂ during operation (excluding the capture facility) include mainline valves and the pipeline inspection gauge ("pig") launcher. These include the following:

- Launcher and MLV at milepost (MP) 0.0;
- MLV at MP 4.8 (new – see note below);
- MLV at MP 18.8;
- MLV at MP 20.4; and
- MLV at MP 27.8.

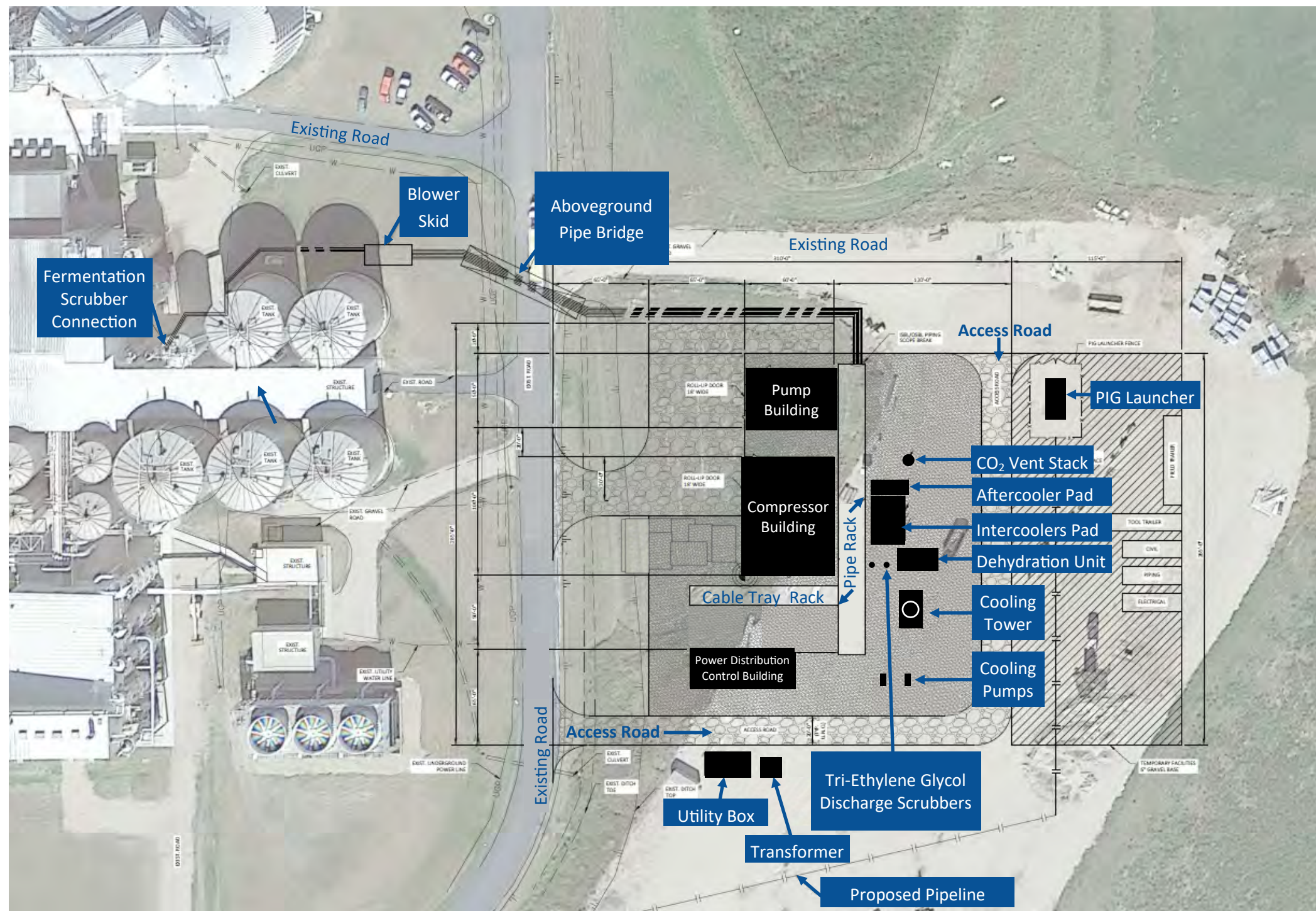
Potential emissions from these pipeline facilities are estimated at 0.20 tons per year of CO₂. Calculations are included in the table provided on the Otter Tail to Wilkin Project Sharepoint site. Minnesota Administrative Rule 4410.4300, Subpart 15, Part B, requires preparation of an EAW for stationary source facilities generating 100,000 tons or more of GHG annually or increasing GHG emissions by 100,000 tons or more annually. A reasonable conclusion is that a project with CO₂ emissions below 100,000 tons per year does not have the potential to result in significant GHG effects. Therefore, the 0.2 tons of CO₂ emissions from the pipeline facilities during operation are anticipated to be inconsequential.

Regarding the new MLV at MP 4.8, this was recently added to the Project design in accordance with 49 CFR 195, to meet and exceed the valve spacing requirements at 49 CFR 195.260(c). A map showing the location of this MLV has been provided on the Otter Tail to Wilkin Project Sharepoint site as Attachment 7-10, along with a geodatabase which includes the MLV point and label, MLV footprint, and permanent access road. Within the geodatabase, the files for mainline valve, footprint, and access roads have been updated with the new information and the date of "20231127" as shown on the image of the geodatabase files, below.



Name

- [-] MN_Rev5_Access_Roads_UTM14_MNL_321_20231127
- [-] MN_Rev5_Centerlines_UTM14_MNL_321_20230403
- [+] MN_Rev5_HDD_Pts_UTM14_MNL_321_20230403
- [+] MN_Rev5_MilePost_UTM14_MNL_321_20230403
- [+] MN_Rev5_Valve_Pts_UTM14_MNL_321_20231127
- [+] MN_Rev5_Workspace_UTM14_MNL_321_20231127



June 30, 2022

Summary of the Ethanol Production Process

Green Plains ethanol plants are designed to convert starch-containing raw material into ethanol. The raw material used at our facilities is corn. The corn is converted into ethanol using a process known as fermentation. The remainder of the corn is recovered and sold as animal feed ingredients. The wet product is referred to as wet distiller's grains with solubles or WDGS.

The entire procedure for this conversion of corn to ethanol and feed ingredients is both mechanical (such as corn grinding) and chemical (conversion of corn to ethanol). The overall process is continuous, which means the flow of materials into and out of the plant does not stop, except for outages (both scheduled and unscheduled) or maintenance.

The first step in the process is the delivery of corn by truck. Corn is sampled and tested at the probe shack, then weighed. Corn is then dispensed by corn trucks into a grain unloading pit through a grate. Corn is then removed from the pit by a conveyor to a bucket elevator to the grain storage silos.

Hammer mills then grind the corn to flour. Corn is metered to the hammer mills to control the process flour addition rate. Flour is transferred to the mash prep area by a conveyor.

Mash Preparation- flour is mixed with hot process condensate in the slurry tank. The pH of the mash is lowered with the addition of a base. Mash is pumped into liquefaction tank.

Liquefaction- The purpose of this stage is to allow time for the added enzyme to convert the starch molecules to complex sugars. The liquefaction tank ensures complete starch conversions.

Fermentation- the purpose of this stage is to convert dextrin into simple sugars through saccharification, then to convert simple sugars into ethanol. Once the fermenter is filled with mash, yeast and nutrients, the contents will ferment for a period of time. During this time, the conversion of complex sugars to simple sugars, then simple sugars to alcohol, takes place. While the mash is fermenting, carbon dioxide is also produced. This CO₂ is vented from the fermenter to the scrubber, where trace ethanol is recovered by direct contact with fresh water.

Distillation- The purpose of distillation is to separate ethanol from the fermented mash (beer) and concentrate it to 95% by volume in the case of 190 proof ethanol. The distillation system consists of three distillation columns: the beer column, rectifier column and stripper column. The beer column will separate the fermented mash into 120 proof ethanol (60% ethanol by volume), whole stillage and carbon dioxide. The purpose of the rectifier column is to purify the ethanol to 95% by volume (190 proof.) The rectifier also provides heat to the first effect evaporator. The stripper column recovers trace ethanol from the rectifier bottoms.

Ethanol Storage- this area is the location where ethanol product is stored, tested, blended and held before being transferred off-site. In the case of production of denatured ethanol, denaturant is a substance added to ethanol to make it unfit for human consumption, so that it is not subject to taxation as beverage alcohol.

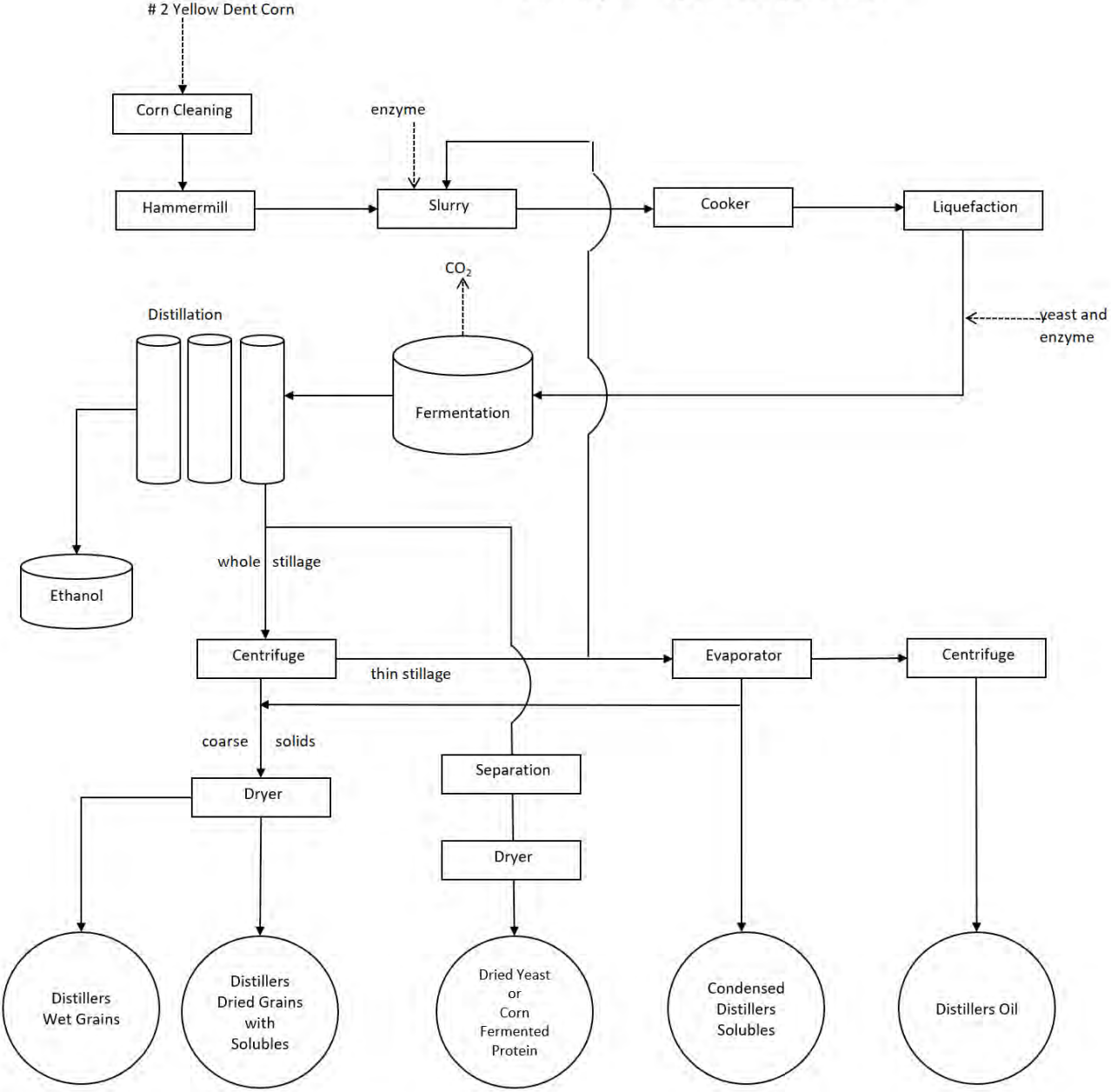
Sincerely,



Cynthia Stricker

QA/QC Coordinator

Corn Dry-Milling Process Overview



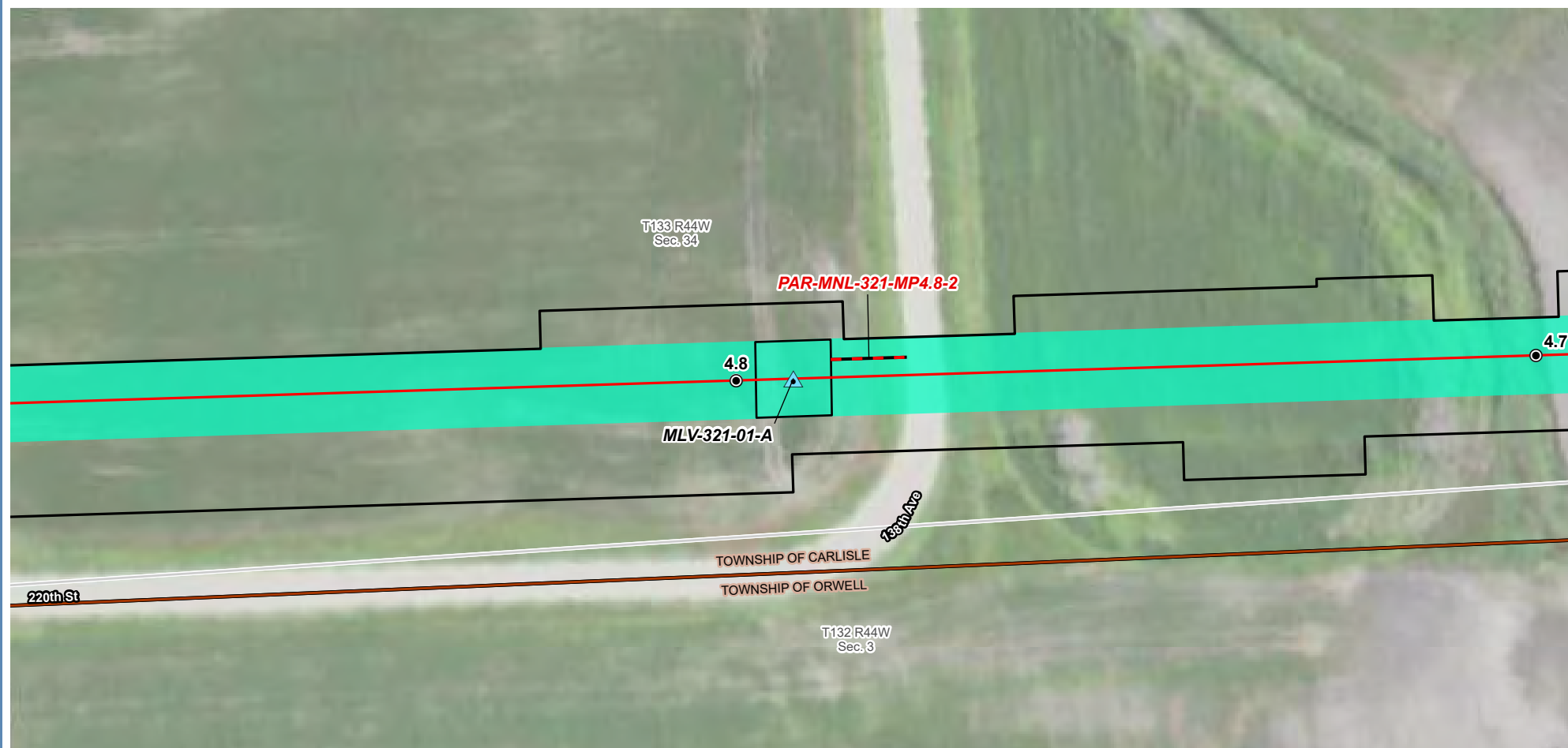
Summit Carbon Solutions, LLC
 Otter Tail to Wilkin Project
 Pipeline Operating Emission Calculations
 GHG Emissions from Equipment Leaks

Description	Count	Emissions ^a (kg/hr/source)	Emissions (lb/hr)	Potential Emissions (tons/year)			GHG Emissions tons CO ₂ e / year
				CO ₂	CH ₄	N ₂ O	
Connector	134	0.0000930	0.0275	0.12	0.00	0.00	0.12
Block Valve	5	0.0016863	0.0186	0.08	0.00	0.00	0.08
Control Valve	0	0.0276650	0.0000	0.00	0.00	0.00	0.00
Pressure Relief Valve	0	0.0017795	0.0000	0.00	0.00	0.00	0.00
Regulator	0	0.0001095	0.0000	0.00	0.00	0.00	0.00
Orifice Meter	0	0.0052938	0.0000	0.00	0.00	0.00	0.00
Other Flow Meter	0	0.0000102	0.0000	0.00	0.00	0.00	0.00
Blowdown System	0	0.0017086	0.0000	0.00	0.00	0.00	0.00
Sum			0	0.20	0.00	0.00	0.20

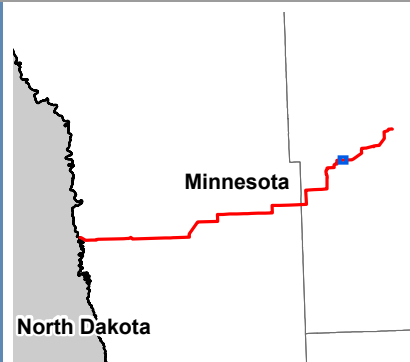
^a Source: Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage, Volume 1 - GHG Emission Estimation Methodologies and Procedures, by Interstate Natural Gas Association of America (INGAA). Table 4-6 using no-leak emission factors for methane (CH₄). The CH₄ emission factors were then converted to CO₂ by multiplying by the molecular weight of CO₂ (44) and dividing by the molecular weight of CH₄ (16).

Pollutant	CO ₂	CH ₄	N ₂ O
Emission Factor - CO ₂ ^a	1	0	0
Global Warming Potential	1	25	298

^a Assumes all pipeline gas is CO₂.



VICINITY MAP



LEGEND

- Milepost
- ▲ Mainline Valve
- Centerline
- Permanent Access Road
- Permanent Right-of-Way
- Construction Workspace
- Section Boundary
- Municipal Boundary

MPCA = Minnesota Pollution Control Agency
 MDNR = Minnesota Department of Natural Resources
 MBS = Minnesota Biological Survey
 BWSR = Board of Water and Soil Resources
 NSR = Noise Sensitive Receptors
 PWI = Public Waters Inventory

0 50 100
 Feet

PREPARED BY

Summit Carbon Solutions

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 United States of America

www.summitcarbonsolutions.com



REVISIONS

Date: 11/27/2023

Revised by: TR

Checked by:

Revision 0

Date:

Revised by:

Checked by:

SUMMIT CARBON SOLUTIONS OTTER TAIL TO WILKIN PROJECT

Figure Title:

MLV-321-01-A
 Otter Tail County, Minnesota

Figure Number:

1

Scale:
 1:1,200
 1 in = 100 ft



Projection:
 Transverse Mercator
 NAD 1983 UTM Zone 14

Sheet:
 Sheet 1
 Sheet 1 of 1

Drawing Number:
 003-00041
 Current Revision

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: November 29, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: As soon as possible

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: *“Requested information sent to whom by what means on date.”*

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. Please provide locations and other available information for the Ecological Unusually Sensitive Areas (Eco USAs) on each of the 3 route alternatives.

When Summit conducted its review of Eco USAs (as defined in 49 CFR 195.6 (b)) for the Proposed Route (Alternative 3), it encompassed a large enough area to fully contain the location of RA-Hybrid (Alternative 2). There are no U.S. Pipeline and Hazardous Materials Safety Administration (PHMSA) Eco USAs along the Proposed Route (Alternative 3) or RA-Hybrid (Alternative 2). A portion of this analysis area also covered the easternmost portion of RA-North (Alternative 1). However, a western portion of RA-North (Alternative 1) extended beyond the prior area of study. Summit reviewed this area in response to this request and determined that there are no Eco USAs along the previously unstudied part of RA-North (Alternative 1). In conclusion, there are no Eco USAs crossed by the Proposed Route or either of the proposed route alternatives.

2. Does the average annual electricity consumption for the plant of 38,062,620 kWh include the pumping and treating of water from the Green Plains Ethanol Plant wells? If not, what is the annual electricity consumption for this pumping and treating?

Yes.

3. Please provide the rationale for why the new MLV was added as mentioned in the response to SII #7. If the need for an additional MLV is based on new information, please provide that information so we may include it in our analysis.

Other Populated Areas (OPAs), as defined within 49 CFR 195.450, are defined and delineated by the U.S. Census Bureau using statistical data (i.e., population density). These delineations are publicly available within the National Pipeline Mapping System (NPMS). However, PHMSA encourages operators to take a deeper look and factor non-statistical data when assessing integrity management, stating “as with all national [High Consequence Area] HCA GIS data layers, local knowledge, data, or field assessments would be more accurate than any national-level GIS data and should not be excluded from an operator’s analysis.”¹

Due to the continual refinement of the NPMS’ OPA boundaries as part of the Summit Integrity Management Program, the delineation of the City of Fergus Falls created a new HCA “could-affect.” In accordance with 49 CFR 195, MLV-321-01-A was implemented to meet and exceed the requirements of 49 CFR 195.260(c).

4. Provide a table listing each MLV for each of the three route alternatives by milepost. Include the location of a new valve along RA-North and RA-Hybrid based on CFR 195.260(c). We understand that this location may be an approximation. This will provide a necessary and appropriate comparison for dispersion modeling and the EIS.

The requested table is below. Mainline valves (MLVs) along the Proposed Route (Alternative 3) are the same as was presented in the response to Inquiry #7 on November 27, 2023. When locating MLVs along the RA-North (Alternative 1) and RA-Hybrid (Alternative 2) alternatives, Summit used the mileposts (MPs) provided in response to Inquiry #2 (Revision 2) on November 15, 2023 (file titled “Inquiry 2-2 Otter Tail to Wilkin Route Alternative NSRs_Rev2_20231115.zip”).

Proposed Route (Alternative 3)	RA-North (Alternative 1)	RA-Hybrid (Alternative 2)
MP 0.0	MP 0.0	MP 0.0
MP 4.8	MP 4.6	MP 4.6
MP 18.8	MP 17.6	MP 19.9
MP 20.4	MP 22.9	MP 21.5
MP 27.8		MP 28.9

5. In the company’s response to SII #4, it was stated that “The corn CI from the CARB Tier1 calculator is 6,442.02 grams of carbon dioxide equivalent per bushel of grain (gCO₂e/bu) and in the case of the Green Plains Ethanol Plant, this is equivalent to 21.44 grams of carbon dioxide equivalent per megajoule (gCO₂e/MJ).” Please explain how the corn CI of 21.44 gCO₂e/MJ was derived. Was the corn plug value used, or were specific input values determined from data the ethanol plant has on the farming practices of their corn producers? If so, what were those input values?

The corn plug value was used.

¹ PHMSA Public Meetings and Documents, Liquid Pipeline Advisory Committee (LPAC) Meeting, LPAC transcript for August.

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: December 14, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: As soon as possible

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: *“Requested information sent to whom by what means on date.”*

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. Was the GHG emission factor, used in Scoping EAW Table 18-1, calculated using the CA-GREET model or was it directly obtained from the model? If the factor was calculated, what percentage of electricity resources was used in determining the factor? Please provide calculation.

An electricity emission factor of 684.35 gCO₂e/kWh was used in Scoping EAW Table 18-1. This number was obtained from the CA-GREET 3.0 Model, file “[ca-greet30-corrected.xlsm](#)”, tab “EF”, cell C130 for the MROW Mix.

2. During scoping, one commenter requested information on “soil shrinkage” (shrink-swell soils), which was a factor in a Kansas pipeline rupture. Provide a description of shrink-swell soils and how they can impact pipelines, and an assessment of the potential for these soils to be present in the project area for each alternative pipeline route. If they are or could be present, describe the potential risks to pipeline integrity and measures to mitigate the risk.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and

swelling can cause damage to buildings, roads, and other structures and to plant roots¹. Linear extensibility can change as you move through horizons within a given soil, based on features such as soil texture, moisture content, and type and amount of clay present in the soil horizon.

The Project is proposed to be installed with a minimum of 54 inches depth of cover over the top of the pipe. The minimum depth of cover will be increased to 60 inches at waterbody and drainage ditch crossings as well as private road crossings as measured at the bottom of the road ditch. This translates to a trench depth between 58-64 inches deep. SSURGO data published by the NRCS was analyzed to determine the shrink-swell potential of the soils present at the approximate depths that the majority of the Project will be installed, which is generally the bottom-most soil horizon for each soil in the SSURGO dataset.

Based on this analysis, most of the soils along each alternative are classified as either low or moderate shrink-swell potential, as outlined in the following table. Note that while the overall shrink-swell classifications of soils outlined by the NRCS in the National Soil Survey Handbook include soils with a linear extensibility percent (LEP) of 3.0 – 5.9 percent, soils crossed by the alternatives do not exceed a LEP of 4.5 percent.

The University of Minnesota Extension notes that Vertisol soils (with the suborder Aquerts being the main suborder in Minnesota), are wet, clay-textured soils formed in lake sediments, and these soils have shrink-swell capacity. These are rare in Minnesota (1.2% statewide).² Vertisol soils are represented in the table below as “high” potential soils. There are no “very high” potential soils crossed by any of the alternatives.

Shrink-Swell Potential of Bottom-most Soil Horizon					
	Total Miles	Low ¹	Moderate ^{1,2}	High ¹	Very High ¹
		Miles / %	Miles / %	Miles / %	Miles / %
Alternative 1	23.0	11.6 / 50.6%	10.8 / 46.8%	0.6 / 2.6%	--
Alternative 2	29.1	13.4 / 45.9%	15.7 / 54.1%	<0.01 / <0.003%	--
Alternative 3 (Proposed Route)	28.1	12.5 / 44.5%	15.6 / 55.5%	<0.01 / <0.004%	--
¹ The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. ² Based on SSURGO data, all soils categorized within the Moderate rating for the listed Alternatives have a linear extensibility between 3 and 4.5 percent.					

National Soil Survey Handbook Section 618.42 Linear Extensibility Percent	
Shrink-Swell Class	LEP
Low	<3.0
Moderate	3.0 - 5.9
High	6.0 - 8.9
Very High	≥9.0
Source: U.S. Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. https://directives.sc.egov.usda.gov (accessed December, 2023).	

¹ U.S. Department of Agriculture, Natural Resources Conservation Service. National Soil Survey Handbook, title 430-VI. <https://directives.sc.egov.usda.gov>.

² <https://extension.umn.edu/soil-management-and-health/soil-orders-and-suborders-minnesota#vertisols-1383916>

Expansive soils are of higher concern to non-metallic buried pipelines with more restrained points branch connections and tie-points. Expansion and retraction of soils typically occurs slowly over large areas, and linear steel pipelines are able to adjust to these conditions without sustaining damage. Due to the relative absence of these soils within the areas of analysis and the lack of risk to pipeline integrity, Summit does not propose any mitigation measures.

3. Provide a plain English explanation describing the root cause of why Summit is installing another valve. For example, provide a specific reason for why this additional valve was needed and why the location was chosen.

The mainline valve was added to meet and exceed the requirements of 49 CFR 195. This specific location was selected because it meets and exceeds federal requirements 49 CFR 195 for valve placement, is accessible via existing road access, has electric power available to serve the location, and is located on land Summit has under voluntary easement.

4. What is Summit doing to ensure that the pipeline is properly protected from equipment and material failure as a result of lessons learned from CO₂ pipeline ruptures in the past? Given that the dominant failure modes for CO₂ pipelines are very different from typical oil and gas pipelines, what specifically will be different in Summit's design and construction standards, O&M manuals that address 49 CFR 195.416, and Integrity Management Plan that will prevent and mitigate these dominating CO₂ failure modes not readily experienced in typical oil and gas pipelines? For reference, see "Carbon dioxide pipelines: A statistical analysis of historical accidents" in the Journal of Loss Prevention in the Process Industries at: <https://www.sciencedirect.com/science/article/abs/pii/S0950423023001596?via%3Dihub>.

It is a mischaracterization to state that carbon dioxide pipeline failure modes are "very different" and "not readily experienced" when compared to oil and gas pipelines. Equipment failure, natural force damage, and material failure are all failure modes present in "typical" pipelines and are readily addressed in PHMSA regulations.

As stated within the linked article, "rupture is the most common failure mode of gas transmission pipelines and responsible for 38% of the incidents." For carbon dioxide pipelines, "leakage is the main form of accidents and rupture is the most unusual failure mode" and "extremely rare." Thus, in the case of a carbon dioxide release, a potentially smaller volume leak is more likely to occur than a rupture.

Furthermore, the article notes the "absence of injuries or fatalities and minimal property damage costs" associated with carbon dioxide pipelines. In support of this, the article states, "that the release of carbon dioxide poses an insignificant risk."

Summit's mitigative measures and PHMSA exceedances to address the potential equipment and material failures include, but are not limited to:

- Summit will exceed the requirements of 49 CFR 195.234 by requiring 100 percent of all girth welds to be nondestructively tested and incorporating auditing of nondestructively test results, records, and procedures.

- Summit will exceed the requirements of 49 CFR 195.214 by incorporating additional mechanical testing in excess of API 1104 Section 5 and 12 by conducting Charpy V-Notch Testing, Vickers Hardness Testing and Cross Weld Reduced Section Tensile.
- Summit will exceed the requirements of 49 CFR 195.304 hydrotesting requirements by testing all pipe systems for (8) hours at 125% maximum operating pressure (MOP) prior to operations.
- Summit will exceed the requirements of 49 CFR 195.112. SCS pipelines will be specified to API 5L, PSL-2 standards which mandates the additional metallurgical requirements, inspections, and record retention. In addition, all pipelines will be manufactured in accordance with SCS developed Line Pipe Specification with considerations to more stringent requirements for mechanical properties for fracture control design, stringent dimensional requirements where applicable for improved constructability and stringent inspection and testing criteria to include non-destructive evaluation of the welded pipes.
- Summit will exceed the requirements of 49 CFR 195.111 by engaging the services of ITI and Microalloy to assist with an extensive fracture propagation and ductility analysis to determine the required metallurgical properties for the proposed pipeline system as well as utilizing crack arrestors.
- Summit will exceed the requirements of 49 CFR 195.250 by utilizing a 24-inch clearance between the outside of the pipe and the extremity of any underground structure, including drain tiles, where feasible. In the event a 24-inch clearance cannot be achieved, Summit will meet the minimum requirements stated in 49 CFR 195.
- Summit will exceed the requirements of 49 CFR 195.406 by implementing redundant pressure indicator (transmitter or PIT) on pump discharge, overlapping over pressure protection control logic, soft high pressure alarms well below MOP, and pump shutdown control logic below MOP. Additionally, Summit performed a comprehensive surge study that showed anticipated surge pressures to be well within regulation even when only local controls were considered.
- Summit will exceed the requirements of 49 CFR 195.407 by implementing a system wide dual communication path to all pump stations, mainline valve sites, PLR sites, and capture sites.
- Summit will be performing inspections on all phases of the pipe manufacturing process at each pipe mill to ensure full compliance with all QC measures. In addition, Summit will perform a factory acceptance test for each premanufactured component for facilities (pumps, compressors, dehydration units). In addition to this, all the components will be inspected at the site of installation.
- Interior and exterior infrared cameras will be placed at the capture facility to detect a potential carbon dioxide leak.
- Interior carbon dioxide and oxygen detectors will be placed at pump facilities to detect both the presence of hazardous vapors and confirm that there is sufficient oxygen for a safe environment.
- Summit consulted with two separate engineering consultants to review valve soft composite material compatibility with the Summit product composition standards.
- All PHMSA-regulated facilities are designed to be “piggable” with inline inspection (ILI) tools.
- Summit will conduct aerial patrols along the pipeline system to monitor and identify surrounding environmental conditions.

5. The EIS will provide a brief update regarding the Midwest Carbon Express project as a whole. Please provide an update on permitting in other states as well as timeframes associated with future segments in Minnesota. Discuss the MCE project's anticipated in-service date.

The Midwest Carbon Express Project is in the permitting phase across the 5-state footprint. In Iowa, hearings before the Iowa Utilities Board (IUB) are now complete, and a final decision is expected in Q1 2024. In South Dakota, Summit plans to submit a permit application to the South Dakota Public Utility Commission (SDPUC) in 1Q 2024. South Dakota's permitting process is anticipated to take up to one year to complete. In North Dakota, Summit is working to submit supplemental information and preparing for additional hearings as part of the reconsideration process before the North Dakota Public Service Commission (NDPSC). In Nebraska, permitting is underway and occurs at the county level. In Minnesota, a route permit application is pending before the Minnesota Public Utilities Commission (MPUC) for the Otter Tail to Wilkin Project, and Summit expects to submit additional route permit applications in the future. Summit submitted Pre-Construction Notifications to the United States Army Corps of Engineers (USACE) under Nationwide Permit (NWP) 58 in North Dakota, South Dakota, Nebraska, and Iowa, and the Utility Regional General Permit in Minnesota, and anticipates receiving authorization from the USACE in Q4 2024. Summit anticipates having permits for all pending applications in hand to facilitate a start of construction for portions of the project by Q1 2025 and plans to be operational by mid-2026.

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: December 29, 2023

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: As soon as possible

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

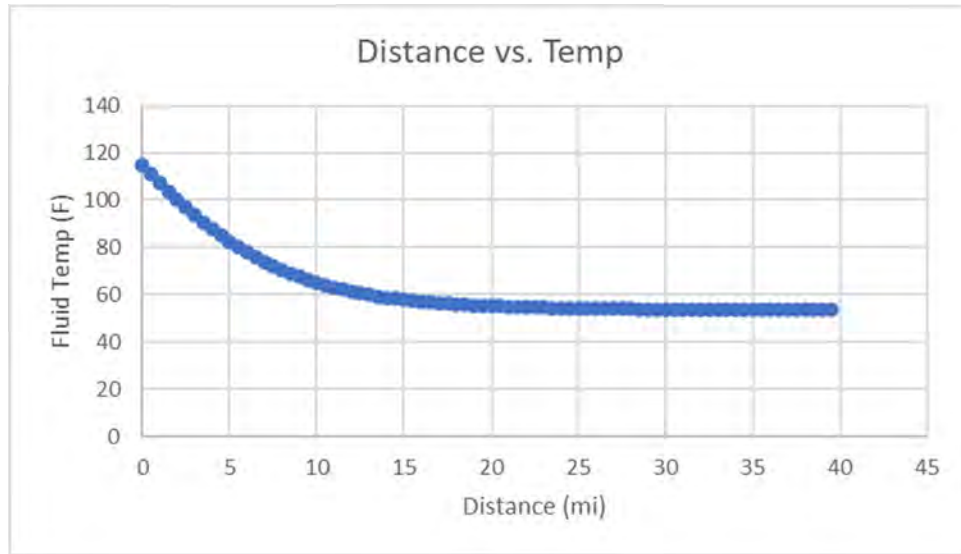
Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: *“Requested information sent to whom by what means on date.”*

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. To assist us in responding to the DNR’s request that the EIS consider effects of the elevated pipe temperature on surrounding soils, wetlands, and waterbodies, please provide an estimate of the distance from the capture plant that it would take for the pipeline to cool to ambient temperatures. Also include a range of the approximate distance from the pipe that soil warming would occur.

Summit retained Lake Superior Consulting to perform an analysis to determine the approximate distance it will take for the pipeline to cool to ambient ground temperatures from the carbon dioxide (CO₂) capture facility. In this analysis, a temperature of 115°F was used, based on summer conditions, for the approximate temperature of the CO₂ in the pipeline as it leaves the capture facility, and a temperature of 53°F was assumed for an average ambient temperature of the soil. The results show a significant decline in temperature from 115°F to 60°F in the first 12 miles of the pipeline followed by a temperature decay in a logarithmic fashion until the pipe and soil temperatures converge at 53 degrees a distance of 27 miles from the injection point at the capture facility. The results can be seen below in Figure 1.

Figure 1



To address the second part of the inquiry, Lake Superior Consulting performed an analysis to determine the approximate distance from the pipe that soil warming could occur. Rather than utilizing specific CO₂ and soil temperatures, which vary based on season, a temperature differential of 65°F between the CO₂ temperature and the ground temperature was used in the calculation to account for both summer and winter conditions. In addition to using conservative temperature differentials, a rate of heat transfer from the CO₂ to the pipe to the soil was calculated using 115°F, which was the maximum fluid temperature assumption used in part one of this inquiry. Using this conservative approach, Lake Superior Consulting calculated that the soil temperature surrounding the pipe will reach equilibrium with the ambient soils at an approximate distance of 13 inches from the outside wall of the pipe.

From: Levi, Andrew (COMM) <andrew.levi@state.mn.us>
Sent: Friday, January 19, 2024 9:07 AM
To: Sedarski, Joe; Storey, Catherine; Terhaar, Patricia
Subject: FW: Action Required: Costs

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Here is costs for RA-North without ND. As explained to me acquisition costs are not identical per mile to RA-South because benchmark costs associated with land values has increased since the company started actively acquiring easements. Please include this email in the SII Appendix.

Thank you.

—Andrew

From: Scott O'Konek <sokonek@summitcarbon.com>
Sent: Friday, January 19, 2024 9:23 AM
To: Levi, Andrew (COMM) <andrew.levi@state.mn.us>
Cc: Dornfeld, Richard <Richard.Dornfeld@ag.state.mn.us>; Christina Brusven <cbrusven@fredlaw.com>
Subject: RE: Action Required: Costs

This message may be from an external email source.

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Andrew, here is the adjusted cost estimate only including MN for RA-North. Hope your Friday is going great!

Engineering Cost Estimate	
North Route (23 miles)	
Work Item	Cost
Planning / Permitting*	\$ 4,075,000
ROW Acquisition*	\$ 13,750,000
Engineering*	\$ 625,000
Procurement	\$ 2,100,000
Construction	\$ 16,000,000
Closure	\$ 1,250,000
Total	\$ 40,000,000
Estimate Accuracy: +/- 15%	
* The estimate includes realized costs to date, plus the estimated cost to complete work items for the 23 miles of alternative route proposed in MN.	

From: Levi, Andrew (COMM) <andrew.levi@state.mn.us>
Sent: Friday, January 19, 2024 8:24 AM
To: Scott O'Konek <sokonek@summitcarbon.com>
Subject: Action Required: Costs
Importance: High

Hi Scott.

I need a cost estimate for RA-North WITHOUT the ND portion. I need this as soon as possible, preferably before noon today.

Please let me know you've received this email.

Thank you.

—Andrew

Andrew Levi
Environmental Review Manager

Energy Environmental Review and Analysis
Department of Commerce
85 Seventh Place East, Suite 280 | Saint Paul, MN 55101
P: (651) 539-1840 | F: (651) 539-0109
Schedule: Tuesday – Friday



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To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: February 15, 2024

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: March 8, 2024

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation, as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: *“Requested information sent to whom by what means on date.”*

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. Please respond to mitigation proposed or discussed in the draft EIS or proposed during the public comment period—safety related or otherwise. List those mitigations the company would agree to undertake.

*Please see the file loaded to the Otter Tail to Wilkin ShareFile site titled “**SII 11_1_SCS_ Otter Tail to Wilkin Response to DEIS Recommendations**”.*

2. The final EIS may include a recommendation to use a combination of check valves and pressure control valves where possible instead of only SCADA-controlled block valves for pipeline isolation. Please provide comment on this potential recommendation.

Since the block valves proposed for this project can take up to 10 minutes to isolate the pipeline (that is, 10 minutes from rupture to valve closure), a combination of check valves and pressure-controlled valves (PCVs), also called “slam-shut” valves, could close instantaneously or nearly instantaneously in the event of rapid pipeline depressurization.

Summit does not agree with this potential recommendation. This recommendation appears to misunderstand the assumed valve closure time used in the dispersion analysis. Summit chose a 10-minute closure time in the dispersion model to produce conservative results. The mainline valves can cycle to closed in 17 seconds. Check valves in a mainline can cause complications while running smart tools,

potentially leading to failed smart tool runs due to damage from the internal components within the check valve.

3. The desktop studies Allied performed suggest different frost depths throughout the project area than those generated by the applicant's desktop studies. Both studies use available, generalized data which does not reliably indicate the actual frost depth or soil type at all points along the proposed pipeline centerline.

Therefore, the final EIS may suggest the applicant engage a qualified geotechnical firm to 1) create a soil-testing program to ensure the pipeline is installed beneath all potential frost heave areas or 2) conduct an engineering analysis using field-collected data that demonstrates why a burial depth is appropriate for each length of the proposed pipeline. This analysis would be based on engineering logic applicable to this pipeline, not on generalized data. If this second option is used, a qualified geotechnical firm should perform the soil testing on field-collected soil samples, which is necessary to understand if the local soil conditions pose a frost heave threat to the proposed pipeline.

Please provide comment on this potential recommendation.

Should the applicant have plans to test local soils along the right-of-way during construction activities, please describe that testing.

Summit does not agree with this potential recommendation and does not plan to conduct soil testing across the Project. For frost heave to be considered an issue for pipelines, there are three criteria to that need to be met: 1) the pipeline would need to be installed above the frost depth; 2) there must be presence of sufficient soil moisture/water; and 3) there must be the presence of susceptible soils, which are generally considered fine grained soils (> 10% of material smaller than 0.075 millimeters (mm), and >3% of material less than 0.02 mm).

As stated in the Scoping Environmental Assessment Worksheet (EAW), Section 6.b, "SCS's Contractor would install the pipeline to allow for a minimum of 54 inches depth of cover, measured from the top of the pipe to ground surface, in accordance with MDA agricultural area standards at Minnesota Statutes Section 216G.07 or landowner agreements. The minimum depth of cover would be increased to 60 inches at waterbody and drainage ditch crossings as well as private road crossings as measured at the bottom of the road ditch." Also, Section 11.b of the Scoping EAW notes: "The typical dimensions of the pipeline trench would be approximately 5.4 feet (65 inches) deep."

Notably, Summit's placement of the pipeline at a standard 54 inches of depth of cover is consistent with the Minnesota Department of Agriculture's recommendation for greater depth in agricultural lands. The U.S. Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) establishes minimum depth of cover requirements in 49 CFR 195.248 which range from 30 inches to 48 inches. Summit's depth of cover commitment at 54 inches also exceeds PHMSA requirements. These depth of cover standards have been in place for decades, and Summit is unaware of any documented frost heave issues on pipelines installed across the state of Minnesota at these depths.

It should also be noted that the carbon dioxide (CO₂) entering the pipeline is estimated to be 80 degrees Fahrenheit during winter months. This warmer CO₂ stream will prevent soil in the immediate vicinity of the pipeline from freezing. In addition, if frost depths reach beyond 58 inches, the amount of movement at such a depth would be very small given the relation to the thickness of any underlying ice lenses. Today's

materials have evolved including the introduction of more ductile steels allowing greater allowable deformation due to external loads.

4. Provide a cover page for the Minnesota ECP indicating the different projects in Minnesota and the different pipeline diameters associated with each project.

Please see the file loaded to the Otter Tail to Wilkin ShareFile site titled "*SI 11_4_SCS_Otter Tail to Wilkin ECP Cover Page*" which can be used by EERA to help clarify pipeline diameters presented on the typical drawings within the Minnesota ECP.

5. Provide further information concerning how water will be used at the capture facility.

Water is necessary for capture facility operation to cool the CO₂, lubricating oil, and glycol moving through and being used by the capture facility. Cooling water circulates through the capture facility's heat exchangers to cool off CO₂ as it is compressed, to cool off lubricating oil from the compressors, and to cool off glycol from the dehydration unit regeneration system. The cooling water, which is cooler than the warmer CO₂, lubricating oil, and glycol used during the CO₂ capture process, pulls heat from the CO₂, lubricating oil, and glycol as the water passes through heat exchangers. No water comes into direct contact with the CO₂, lubricating oil, or glycol in any part of the process.

The water, which is now warm, then flows to the capture facility cooling tower. The purpose of the cooling tower is to bring air in contact with the warm water, which cools the water. During this process, a small volume of water is evaporated/vaporized. Some vaporized water will also leave the system through windage, or drift, from the cooling tower. This vaporized and/or drifted amount of water must then be made up by more fresh water to maintain a consistent volume of water within the system. Some water is also discharged from the cooling tower to manage mineral content in the water circulating within the bulk water system. The discharged amount of water must then also be made up by fresh water to maintain a consistent volume of water within the system.

The underlined sections in the description above are the only consumptive uses of water from the capture facility. The quantity of water used by the capture facility is equal to the amount of water vaporized in the cooling tower, plus any windage or drift from the cooling tower (negligible), plus water discharged from the cooling tower. There are no additional consumptive uses.

6. Please verify CO₂ capture rates at the facility.

The capture facility will capture approximately 100% of the CO₂ emissions from the Green Plains Ethanol Plant's scrubber stack during normal operations. CO₂ can only be captured if the Green Plains Ethanol Plant is operational, and the operational rates will vary over time. The capture facility may also not be operational during periods of maintenance. Summit has based its initial CO₂ capture rate estimates using best available assumptions on these variables.

Captured CO₂ will be metered as it is injected into the pipeline. The CO₂ emitted by the capture facility will be determined based on mass balance. The capture facility will report annual air emissions, including CO₂, to the Minnesota Pollution Control Agency as required by the capture facility's air permit. The actual CO₂ capture rates may be determined by comparing the amount of captured CO₂ to the potential CO₂ produced by the Green Plains Ethanol Plant.

Recommendation	Reference	Response
Surveys		
[EERA] Potential impacts to ground-nesting birds during construction would be lessened or avoided by conducting surveys for these species and their nests, per USFWS standards, at appropriate timing ahead of construction.	5-114	Summit intends to follow USFWS guidance regarding compliance with the Migratory Bird Treaty Act (MBTA) and will continue to consult with the USFWS regarding MBTA. Additionally, a MBTA plan is under development for company use with the contractors during construction and during operations. Summit will also work with MDNR to determine if additional surveys are necessary prior to construction. To avoid duplicative, and potentially conflicting requirements, Summit recommends any special condition related to this issue reference adherence to USFWS and MDNR's Natural Heritage Review recommendations rather than including the specific language suggested on DEIS page 5-114.
[EERA] Prior to construction, field surveys should be conducted for state-listed species. Surveys for state-listed plants should follow the MnDNR protocol described in the April 2022 "Guidance for Documenting and Collecting Rare Plants."	5-115	Summit is coordinating with MDNR on required surveys and protocols. To date, surveys have not identified concerns for impacts to state-listed species. Pages 75-76 of the Scoping EAW contain additional discussion of this issue.
[EERA] Appropriate surveys for archaeological resources should occur regardless of which route alternative is selected. If archaeological resources are found, treatment plans should be prepared in consultation with Tribes and SHPO as appropriate.	5-80; 11-13	Summit will complete archeological surveys regardless of the route selected and is committed to avoiding impacts to any identified eligible cultural resources and Tribal areas of interest through route modifications or construction methodology. If identified resources cannot be avoided, then treatment plans would be developed with Tribes and SHPO, as appropriate. To date, Summit has surveyed 99.8% of RA-South, and the construction of the Project will not impact any cultural resources eligible

Recommendation	Reference	Response
		for listing under the National Historic Preservation Act or Tribal areas of interest.
Restoration		
[CURE] Proper restoration of native vegetation communities would benefit rare and unique species. The proposed performance standard of 70 percent vegetation density relative to background native vegetation cover is too low and should be higher. In addition, revegetation goals should be met throughout the life of the project.	5-115	<p>There is no regulatory requirement that mandates a performance standard greater than 70 percent; and therefore, Summit does not agree with this recommendation. The proposed 70 percent revegetation standard is in accordance with the revegetation standards contained within Condition 13.2 of the Minnesota Pollution Control Agency's (MPCA) Construction Stormwater General Permit. The condition is as follows:</p> <p><i>Permittees must complete all construction activity and must install permanent cover over all areas prior to submitting the NOT. Vegetative cover must consist of a uniform perennial vegetation with a density of 70 percent of its expected final growth. Vegetation is not required where the function of a specific area dictates no vegetation, such as impervious surfaces or the base of a sand filter. [Minn. R. 7090].</i></p>
[EERA] A Vegetation Management Plan (VMP) should be prepared in consultation with the Vegetation Management Plan Working Group (VMPWG), a multi-agency group led by EERA staff in conjunction with several other state agencies, to address potential impacts related to pipeline construction, operation, and maintenance. The VMP should discuss existing vegetation, reestablishment and restoration, seed mixes, noxious weeds and invasive species, herbicide use, sensitive plant communities, and other topics identified during coordination with the VMPWG. Preparation and Implementation of such a plan would improve recovery efforts for state-listed plants and their habitats potentially affected by the project.	5-115	Summit will prepare a Vegetation Management Plan in consultation with the Vegetation Management Working Group prior to the start of construction of the Project.

Recommendation	Reference	Response
[MPCA] Details be provided in the ECP for preventing excessive crowning or subsidence above the restored centerline, and for addressing excessive crowning or subsidence if it is discovered during post-construction monitoring.	5-145	Summit will include details in the ECP for preventing excessive crowning or subsidence above the restored centerline. Summit will restore the construction workspace to as close to the original pre-construction contours as practicable. If uneven settling occurs or surface drainage problems develop as a result of pipeline construction, Summit will provide additional land leveling services after receiving a landowner's written notice, weather and soil conditions permitting. Alternatively, Summit will negotiate with the landowner for reasonable compensation in lieu of restoration.
Environmental Impact Mitigation		
If the selected route alignment is near the Foxhome Prairie High Biodiversity MBS site, the alignment should follow the south side of the road in the area and avoid crossing the MBS site.	5-115	The Applicant's Preferred Route (RA-South) does not cross this MBS site, so there would be no impacts to the site. If the RA-North route were to be selected, Summit would evaluate resources along the route and coordinate with MDNR to avoid impacts to the Foxhome Prairie High Biodiversity MBS site.
[DNR] One additional mitigation for nesting birds in areas of grass/shrub vegetation to be cleared for construction would be to mow/cut these areas during non-nesting season prior to actual construction so suitable nesting habitat is not present prior to final clearing and construction	5-115 and 5-151	Summit intends to follow USFWS guidance regarding compliance with MBTA and will continue to consult with the USFWS regarding MBTA. Additionally, a MBTA plan is under development for company use with the contractors during construction and during operations. Summit recommends the Commission not establish separate conditions on this issue but rather defer to USFWS and the MDNR's Natural Heritage Review for appropriate measures to minimize potential impacts to nesting birds.

Summit Carbon Solutions
Otter Tail to Wilkin Project
SII 11_1_Summit_ Otter Tail to Wilkin Response to DEIS Recommendations

Recommendation	Reference	Response
<p>[EERA] The applicant should use only “bio-netting” or “natural netting” types and mulch products without synthetic (plastic) fiber additives.</p> <p>[MNDOT] And to reduce potential construction impacts on state-listed species, MnDOT recommended the use of erosion control techniques that avoid entrapping or entangling small wildlife.</p>	5-116 and 5-151; 5-115	Summit has already agreed to use wildlife-friendly erosion and sediment control BMPs that contain biodegradable netting (Category 3N or 4N natural fibers) and to avoid the use of plastic mesh. Both BMPs help to minimize wildlife mortality resulting from the use of erosion and sediment control materials. See DEIS Appendix D (Minnesota Environmental Construction Plan).
[MNDOT] Follow MnDOT’s 2020 Standard Specifications for Construction for rolled erosion control materials that specify only natural fibers with no plastic mesh be used	5-151	During construction, Summit will follow MnDOT’s 2020 Standard Specifications for Construction for rolled erosion control materials that specify only natural fibers with no plastic mesh be used.
[EERA] No temporary workspace areas shall be placed within or adjacent to wetlands or water resources, as practicable.	5-138	This is not practicable, as the crossing of wetlands will require some temporary workspace. Summit is reducing the width of temporary workspace required for the crossing of wetlands from 50 feet to 25 feet to minimize the temporary impacts to the wetland. Additionally, additional temporary workspace (ATWS) will be sited outside of wetlands to the extent practicable (See DEIS Appendix D (Minnesota Environmental Construction Plan).
[EERA] “Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area.” and “Water resource areas disturbed by construction activities shall be restored to pre-construction conditions in accordance with the requirements of applicable state and federal permits or laws and landowner agreements. All requirements of the U.S. Army Corps of Engineers (USACE), Minnesota Department of Natural Resources (DNR), and local units of government shall be met.”	5-138	This requirement would be in conflict of Condition 14 of the USACE’s Utility Regional General Permit. The condition is as follows [bolded for emphasis]: Restoration of Temporary Impacts: All temporary impacts in waters of the US, including discharges resulting from side casting material excavated from trenching, that occur as a result of the regulated activity must be fully contained with appropriate erosion control or containment methods, be restored to pre-construction contours and elevations, and, as appropriate, revegetated with native, non-invasive

Recommendation	Reference	Response
		vegetation, unless otherwise conditioned in a Corps RGP verification. All temporary access roads constructed in waters of the US must be properly bridged or culverted to maintain surface flows. In temporarily excavated wetlands, the top 6 to 12 inches of the excavation should normally be backfilled with topsoil originating from the wetland. No temporary excavation area, including, but not limited to trenches, may be constructed, or backfilled in such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a French drain effect).
[EERA] The applicant provide documentation of coordination with the Fergus Falls Fish & Game Club.	5-56; 11-13	Summit agrees with this recommendation. As discussed in the Application, Summit is coordinating closely with the Fergus Falls Fish & Game Club to minimize impacts to its land and associated recreational economies during construction and operation of the Project. Application at 40-41. Summit will continue to coordinate with the club and, if RA-South is approved, will provide documentation of such coordination prior to construction.
Sheet Piling/Crossing Methods/Construction Specifications		
[DNR] Exploratory borings should be conducted to characterize the shallow subsurface anywhere sheet piling would be used and submitted to DNR groundwater staff for evaluation. Exploratory borings should be conducted to at least the maximum depth of any construction impacts.	5-139	Summit agrees with this recommendation and will conduct exploratory borings anywhere sheet piling would be used.
[DNR] At a minimum, Pennsylvania standards for trench breaker placement should be used, and knowledge gained from additional subsurface site characterization may provide further guidance on where to place trench breakers most effectively. Trench breakers should be	5-139	Permanent trench breaker placement is discussed in Section 2.9.1 of the Minnesota ECP. As committed to the MDNR in Enclosure 2 of its September 1, 2022 Project introduction letter (see Route Permit Application, Appendix 8), Summit is presently

Recommendation	Reference	Response
<p>used at the entrance and exit of every waterbody regardless of slope (except for HDD crossings).</p>		<p>proposing to install trench breakers at the entry and exit from every public water crossing, except for at HDD crossings. In addition, as outlined Section 5.5 of the Minnesota ECP, trench breakers will be installed at wetland boundaries where the pipeline trench may cause a wetland to drain, or the trench bottom will be sealed to maintain wetland hydrology. Summit plans to select the location of trench breakers across the Project based on field conditions at the time of construction and will consider the degree and length of slope, presence of down-slope sensitive resource areas such as wetlands and waterbodies, and proximity to other features such as roads and/or railroads. Generally, slopes are higher in the eastern portion of the Project, while the majority of the Project, and particularly the western portion of the Project, is located in areas where slope is not a concern (0.001-6.71 degree slope; see Figure 11-3 of the Scoping EAW).</p> <p>Summit plans account for the substantial body of knowledge that it has and will gain regarding the placement of trench breakers. In Summit's view, those plans are consistent with the intent of the Pennsylvania standards, while also accounting for local, site-specific knowledge to use trench breakers most effectively. Use of this field condition review will ensure that Summit will not install trench breakers where they would not provide the intended benefit (i.e., on steep slopes where trench line erosion has the risk of occurring and at slopes adjacent to wetlands and waterbodies). In other</p>

Summit Carbon Solutions
Otter Tail to Wilkin Project
SII 11_1_Summit_ Otter Tail to Wilkin Response to DEIS Recommendations

Recommendation	Reference	Response
		words, while Summit does not intend to specifically implement the Pennsylvania Standards, Summit's plans will achieve the same or greater levels of protection, which is consistent with the Pennsylvania Standards regarding the use of alternate BMPs.
[DNR] The pipeline should be installed deep enough to prevent pipe exposure over time. The DNR's Area Hydrologists may have specific data on depth of cover for river and stream crossings and should be consulted.	5-139	Summit agrees with this recommendation and will consult with the MDNR when crossing designs are prepared for construction at Public Waters.
[DNR] Unintentional release evaluations should be conducted for water crossings proposed to be installed via HDD to ensure the soils are amenable to HDD. (As indicated in Section 5.7.3.3, the applicant has completed geotechnical evaluations for two of the three HDD crossings at waterbodies and plans to conduct an investigation at the third once access is obtained. An assessment of the potential for an inadvertent release of drilling mud is part of the feasibility analysis and design for HDDs.)	5-139 and 5-115	Unintentional release evaluations will be conducted to ensure soils are amenable for HDD crossing method. Summit's contractor will develop an HDD contingency plan to address unintended return or release of drilling fluid within wetlands, waterbodies, and areas immediately adjacent to wetlands and waterbodies, such as stream banks or steep slopes, where drilling fluid releases can quickly reach surface waters. Containment, response, and clean-up equipment would be available at both sides of an HDD crossing location and one side of a bore prior to commencement to assure a timely response in the event of an inadvertent release of drilling fluid.
[DNR] The applicant should continue to consult with DNR on groundwater investigations for the potential routes and on construction methods in relation to groundwater.	5-139	Summit currently has an ongoing groundwater investigation underway and will continue to consult with the MDNR.
[EERA] Geotechnical investigations prior to construction in beach ridge areas would identify areas where sheet pile use should be avoided	5-137	Summit has committed to not using sheet piling in the beach ridge areas.
[EERA] The applicant should provide to the Commission results of geotechnical evaluations of groundwater conditions for any beach ridge areas in which sheet piling would be used for pipeline construction. The evaluations should be provided 30 days prior to the Plan and Profile submittal, and the applicant should document coordination with DNR	5-139 and 11-13	Summit has committed to not using sheet piling in the beach ridge areas, so the recommendations are not applicable.

Recommendation	Reference	Response
staff. The submittal could include DNR staff concurrence regarding use of sheet piling."		
[EERA/MDH] The applicant should provide documentation of coordination with residents located within 1,320 feet of HDD entries. The submittal should document locations of sound dampening barrier walls and include a plan for monitoring noise levels at these locations during HDD operations. The information should be provided 30 days prior to submittal of the Plan and Profile. In its review of a preliminary version of the draft EIS, the Minnesota Department of Health concurred with this mitigation measure.	5-37; 11-12	The equipment needed to construct the HDD would have a temporary and short-term impact on noise levels in the vicinity of the Project, which would decrease from the levels presented in the response to SII 4 Question 8 based on distance, topography, and weather conditions. Summit will coordinate with nearby landowners along the Project prior to execution of HDDs. Summit's Contractor will determine the need for noise mitigation and noise monitoring based on feedback received from landowners during construction.
[EERA] Isolated dry trench crossing methods should be used on all stream crossings instead of the proposed open trench method. This method reduces silt and sediment suspension and transport to downstream waterbodies. This would reduce potential impacts from local and downstream transport of disturbed sediments on state-listed mussel species.	5-115	Summit will implement the isolated dry trench crossing method on streams with perceivable water flow during construction. If a stream is dry and has no perceivable water flow, then Summit intends to use the proposed open trench method.
[DNR] Selecting a crossing technique that is most appropriate for each waterbody, after consultation with DNR.	5-150	Summit will consult with the MDNR when designing and selecting Public Water waterbody crossing methods.
[EERA] A special permit condition requiring the applicant to identify locations of fracture arrestors and any locations of thicker-walled pipe on the Plan and Profile filed with the Commission is reasonable.	8-26 and 11-13	Yes. Summit can provide this information. The Project will be constructed of 4-inch nominal diameter pipeline. The 4-inch pipe is all 0.189 inches thick and is self-arresting.
Emergency Response		
[EERA] Applicant-provided indoor CO2 detectors for residences within 1,000 feet of the project is a reasonable mitigation measure. This distance was chosen based on the most impactful scenario as described in Appendix G.	8-26 and 11-13	While Summit agrees with Dr. Micheal Lumpkin's testimony, Summit is willing to supply CO ₂ detectors to residents within 1,000 feet of the Project centerline, if required by the Commission.

Recommendation	Reference	Response
[EERA] A special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission is reasonable.	8-26 and 11-13	As discussed in the Application, Summit has prepared a draft Emergency Response Plan (provided as Application Appendix 6) and will develop a final Emergency Response Plan in accordance with PHMSA requirements which will be provided to PHMSA. Summit has no objection to inclusion of a special permit condition requiring Summit to file with the Commission its final Emergency Response Plan that is provided to PHMSA.
[EERA] A special permit condition requiring the applicant to provide an accidental release plan, developed in coordination with local emergency responders, for Commission review 30 days prior to submittal of the Plan and Profile is reasonable.	8-26 and 11-13	As noted above, the Emergency Response Plan will include the information required by PHMSA, and any additional/other information required by the Commission would be addressed in a separate document.
[EERA – row above continued] The accidental release plan could include the specific equipment, training, and reimbursement that could be provided to emergency managers.		Summit will file a compliance filing describing its coordination with county emergency managers, including information about equipment, training, and reimbursement provided to emergency managers.
[EERA – row above continued] The plan could also list the names of the emergency responders and a provision to update contact information as needed.		Summit’s Emergency Response Plan will include contact information for Summit’s qualified and trained response personnel as well as contact information of the county emergency managers.
[EERA – row above continued] The plan could discuss the feasibility of a “reverse 911” notice that goes out to landowners’ telephones in the event of an emergency shutdown or rupture.		In accordance with PHMSA regulations, in the event of an emergency condition on the pipeline, Summit’s control center will immediately notify the public safety answering point (PSAP) for each county. Depending on the incident type and severity, additional regulatory notifications, including notifying the public will occur. Summit plans to utilize

Summit Carbon Solutions
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Recommendation	Reference	Response
		an electronic notification system, such as Send Word Now, to notify the PSAP in each county.
[EERA – row above continued] The release plan could identify how the applicant would pay for costs of any repair to public infrastructure or private property (including crops and livestock) that might occur during an accidental release.		Summit does not object to filing a compliance filing identifying how the applicant would pay for costs of any repair to public infrastructure or private property (including crops and livestock) that might occur during an accidental release.
[EERA] A special permit condition requiring the applicant to provide its public education plan for Commission review 30 days prior to submittal of the Plan and Profile is reasonable. The public education plan could include specific safety information for neighboring landowners, including what to do in case of a rupture.	8-26 and 11-13	Summit agrees with a special permit condition requiring it to provide its public education plan for Commission review 30 days prior to submittal of the Plan and Profile. As discussed in the Application, Summit will implement comprehensive public awareness and education outreach programs, including damage prevention programs, that meet or exceed industry standards and regulatory requirements concerning public awareness of pipelines and pipeline operations. Application at 26. The public awareness programs are intended to inform members of the public in the vicinity of the pipeline and facilities to protect the public from injury, prevent or mitigate effects on the environment, protect the pipeline and facility assets from damage by the public, and provide ongoing public awareness.
[MCEA] Public concerns about the Project have largely centered around the possibility of a pipeline leak or rupture. The DEIS acknowledges receiving comments about the possibility of adding an odorant to the CO ₂ to help mitigate this concern. However, the DEIS did not adequately address whether this is a feasible or effective mitigation measure. The FEIS must address the concerns of the public, in part, by exploring the efficacy in mitigating the effects of a rupture by adding an odorant.	8-25	Summit does not plan to add an odorant to the pipeline. 49 CFR Part 195 does not identify a requirement for the use of odorant in hazardous liquid or carbon dioxide pipelines. Odorant requirements typically apply to low pressure natural gas distribution pipelines and are primarily intended to alert occupants of a gas leak occurring inside of a residence

Recommendation	Reference	Response
		<p>or structure. If federal regulations are amended in the future to require the use of an odorant in CO₂ pipelines, Summit believes that mandate will be preceded by research establishing whether the combination of CO₂ and commercially available odorants will compromise the integrity of pipeline systems and sequestration facility components.</p> <p>Presently, the primary component in many odorants is concentrated Methyl Mercaptan. This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). Odorizing a pipeline system would require multiple injection facilities and would introduce additional logistic and design changes needed for the safe storage and overland transport of concentrated Methyl Mercaptan.</p>

Environmental Construction Plan

This Minnesota Environmental Construction Plan (ECP) would be applicable to any Midwest Carbon Express pipeline that is constructed by Summit Carbon Solutions in the state of Minnesota. The ECP contains typical drawings which are applicable to a variety of pipeline diameters.

As of March 2024, Summit Carbon Solutions has one project before the Minnesota Public Utilities Commission, the Otter Tail to Wilkin Project in Otter Tail and Wilkin Counties. This pipeline has a 4 inch diameter.

Other potential pipeline infrastructure in Minnesota, by county, includes:

- Kandiyohi, Chippewa – 8 inch diameter
- Renville – 6 and 8 inch diameter
- Yellow Medicine – 8 inch diameter
- Redwood – 8 and 10 inch diameter
- Cottonwood, Jackson – 10 inch diameter
- Martin – 6 and 8 inch diameter

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: February 29, 2024

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: ASAP

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: *“Requested information sent to whom by what means on date.”*

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. The final EIS may include a recommendation that any land application of drill cuttings and drilling mud within the construction workspace must be done prior to replacing topsoil. Please provide comment on this potential recommendation.

Summit assumes that in asking this question, EERA is envisioning that drill cuttings and drilling mud be placed within excavated trenches or HDD pits, and then topsoil be placed over the materials. Summit does not agree with this recommendation as it has the potential to result in logistical challenges related to construction timing and additional environmental impacts.

Execution of HDDs is conducted by a specialized construction crew which is not responsible for mainline pipeline installation. The installation of the mainline pipe on either side of the HDD might be completed before and/or after the HDD. If the mainline pipeline near the HDD had already been installed, but the HDD had not yet occurred or would not yet occur for some time, this would lead to extended, and potentially lengthy, periods of time where the trench must stay open, and topsoil must remain piled on the right-of-way while awaiting drilling materials. As stated in the Environmental Construction Plan (ECP), Summit intends to minimize the length of time any open excavation is left open to the extent practicable. Section 3.2 of the Minnesota ECP states that, “Except at boreholes and tie-ins, the Contractor will limit the amount of excavated open trench in uplands to a maximum of 15 days of anticipated welding production per spread, or 15 miles per spread. For locations along the Project where the USACE Section 404 Utility RGP applies (i.e., waters of the U.S.), this will be limited to 5,280 linear feet of open trench.”

Leaving the trench or any other excavation open to await placement of drilling materials is inconsistent with this goal and would add to the concern raised in Question 4, below, regarding entrapment of wildlife in open excavations.

If the mainline pipeline near the HDD had not yet been installed, the topsoil may have not yet been removed and there would therefore be no place to apply drilling materials. Drill materials may then need to be stored nearby while awaiting an open trench, or transported to another location on the right-of-way, for disposal. It is highly likely that either scenario would occur at each HDD because it is rare that the construction ROW is returned to its pre-construction state at the same time as adjacent drilling activities.

Furthermore, drill cuttings and drilling mud are traditionally land-applied by mixing with topsoil. As previously stated in response to SII #5, Question 14, the Minnesota Pollution Control Agency (MPCA) does not require a permit or approval to land apply drilling mud with additives that are approved by Minnesota Department of Health (MDH) or additives that meet ANSI/NSF Standard 60 (drinking water well material standards). Drilling mud mixed with additives that are not on the MDH approved additive list and/or do not meet ANSI/NSF Standard 60 must be disposed of as a solid waste at an approved facility or Summit must obtain a land application permit from MPCA.

It is not a common practice within the pipeline industry to bury drilling mud. Burying a mass of clay material between the subsoil and topsoil could lead to localized differences in permeability related to the surrounding soils. Burying mud would also displace either topsoil or subsoil from the trench and require that topsoil or subsoil be disposed of elsewhere. Furthermore, drilling mud properly mixed in to topsoil can prove to be a beneficial amendment to improve water retention in loamy sand soils.

Sections 4.5.6 and 10.4 of the Minnesota ECP state that the contractor will dispose of HDD drill cuttings and drilling mud at a SCS-approved location with landowner approval. This process allows for the appropriate flexibility and permissions for managing these materials. Please also see response to SII #5, Question 15, for additional information on how Summit plans to manage drill cuttings and drilling mud.

2. Summit has stated that water for operation of the Project (approximately 13 million gallons per year) would be from onsite wells at the ethanol plant. Clarify how many wells would be used and what aquifers they are completed in. Does Summit propose to obtain the water by amending an existing DNR Water Appropriation Permit, or would a new permit be needed? Has Summit determined the source(s) of water to be used during construction of the pipeline and the source and volume of water for construction of the capture facility?

Regarding water needed for operation of the capture facility, the Green Plains Ethanol Plant currently has two groundwater wells. The Minnesota Well Index (MWI) ID for the first well is 795966; it was completed to a depth of 211 feet in a quaternary buried artesian aquifer.¹ This is a commercial well. The MWI ID for the second well is 846639; it was completed to a depth of 199 feet in an undocumented aquifer.² This is a domestic well. Should the capture facility utilize water from the Green Plains Ethanol Plant wells, it would likely utilize the commercial well (MWI ID 795966). However, Summit has not yet finalized these plans with the Green Plains Ethanol Plant and Summit has not yet held conversations with the MDNR regarding the need to amend an existing MDNR Water Appropriation Permit, or the need to obtain a new permit, for the capture facility's operational water needs.

¹ <https://mnwellindex.web.health.state.mn.us/mwi/index.xhtml?wellId=0000795966>

² <https://mnwellindex.web.health.state.mn.us/mwi/index.xhtml?wellId=0000846639>

As stated in the Direct Testimony of Jason Zoller filed on February 13, 2024, “Summit is currently exploring options for appropriation of water, including duration of use, volume, and appropriation location(s). These could be private, municipal, or surface water sources. Once proposed/preferred and contingency sources and volumes are finalized, these details would be reviewed by the MDNR.” Summit has not yet determined the source(s) of water to be used during construction of the pipeline. Summit has also not yet determined the source and/or volume of water needed for construction of the capture facility.

3. Discuss the potential risk of some soil types to cause corrosion of the underground pipeline and whether any of those soils are present along the route alternatives. If applicable, describe Summit’s plans to mitigate or minimize potential for degradation of infrastructure from these soils, aside from the standard measures of epoxy coating and installation of a cathodic protection system.

All soil types will cause corrosion on an unprotected pipeline through the process of galvanic corrosion. The pipe protections applied to counter this will be the same for all soil types, including coating and cathodic protection (CP) as required by 49 CFR Subpart H – Corrosion Control (Section 195.563 and Sections 195.567 through 195.577). Summit will complete site specific soil resistivity testing along the permitted route to finalize CP design. If soil resistivity conditions are found that warrant additional protection, additional current sources may be applied, or voltage potentials may be adjusted to ensure proper protection against galvanic corrosion. The CP system will be in operation under the timeline defined by 49 CFR Subpart H – Section 195.563(a) and will be continuously monitored once commissioned.

4. State whether Summit would adhere to DNR’s recommendations that a) any open trenches incorporate escape routes so that any animals that enter the trench can escape, such as by including moderate grade ramps; and b) trenches would be inspected immediately prior to backfilling, and that any trapped animals present would be removed.

As stated in the Minnesota ECP, Section 3.2, “Plugs of subsoil in the ditch will be left or bridges may also be constructed to allow the passage of wildlife and livestock.” Summit believes this is sufficient. In addition, because the pipeline is only 4 inches in diameter, the trench will be excavated with a single backhoe bucket. This will result in a trench width that is approximately 10.5 inches at the bottom and 30 inches at the top, with a trench depth of approximately 59 inches. These dimensions will not allow for installation of “moderate grade ramps” within the trench. Summit’s Route Permit Application, page 58, also states: “Trenches may also be sloped where they start and end to allow ramps for livestock or other wildlife to escape.” Summit will commit to adding this sentence in Section 3.2 of the ECP.

Wildlife entrapment is typically more of an issue on pipeline projects with a large pipe diameter, deeper trench, wider excavation, and location within wildlife habitat. As the Project is occurring in agricultural areas, where native wildlife habitat is scarce, Summit anticipates that this will be a relatively small issue. However, Summit will commit to adding this sentence in Section 3.3 of the ECP: “The Contractor will inspect the trench prior to backfilling to determine if there are any trapped animals, and if there are, the animals will be removed.”

5. Does the pipeline construction design consider the prevention of French drain effects via the pipeline trench across the entire project, and especially in the beach ridge area? At a minimum, address the following statement: “Pennsylvania standards for trench breaker placement should be used and additional knowledge gained from more expansive subsurface site characterization may provide further guidance on where to place trench breakers most effectively.”

Portions of this response are repeated from Summit's response to SII #5, Question 20. Permanent trench breaker placement is discussed in Section 2.9.1 of the Minnesota ECP. As committed to the MDNR in Enclosure 2 of its September 1, 2022 Project introduction letter (see Route Permit Application, Appendix 8), Summit is presently proposing to install trench breakers at the entry and exit from every public water crossing, except for at HDD crossings. In addition, as outlined Section 5.5 of the Minnesota ECP, trench breakers will be installed at wetland boundaries where the pipeline trench may cause a wetland to drain, or the trench bottom will be sealed to maintain wetland hydrology.

Summit plans to select the location of trench breakers across the Project based on field conditions at the time of construction and will consider the degree and length of slope, presence of down-slope sensitive resource areas such as wetlands and waterbodies, and proximity to other features such as roads and/or railroads. Generally, slopes are higher in the eastern portion of the Project, while the majority of the Project, and particularly the western portion of the Project, is located in areas where slope is not a concern (0.001-6.71 degree slope; see Figure 11-3 of the Scoping EAW).

Use of this field condition review will ensure that Summit will not install trench breakers where they would not provide the intended benefit (i.e., on steep slopes where trench line erosion has the risk of occurring and at slopes adjacent to wetlands and waterbodies). When trench breakers are installed in areas where they do not provide any benefit, they have the potential to further disturb existing drainage patterns. This is especially important to prevent in agricultural fields where landowners have installed tile systems to effectively manage water on their property.

The "Pennsylvania standards" for trench breaker (plug) placement can be found in the Pennsylvania Department of Environmental Protection (DEP)'s "Erosion and Sediment Pollution Control Program Manual" (DEP Manual)¹ in Standard Construction Detail #13-4, and as shown below in Table 13.1 of the Manual.

PA DEP

TABLE 13.1
Maximum Spacing and Materials for Trench Plugs

Trench Slope (%)	Spacing L (FT)	Plug Material
< 5	1,000	* Clay, Bentonite, or Concrete Filled Sacks
5 - 15	500	* Clay, Bentonite, or Concrete Filled Sacks
15 - 25	300	* Clay, Bentonite, or Concrete Filled Sacks
25 - 35	200	* Clay, Bentonite, or Concrete Filled Sacks
35 - 100	100	* Clay, Bentonite, or Concrete Filled Sacks
> 100	50	Cement Filled Bags (Wetted) or Mortared Stone

***TOPSOIL MAY NOT BE USED TO FILL SACKS.**

Impervious trench plugs are required for all stream, river, wetland, or other water body crossings.

The DEP Manual describes the materials within as BMPs and design standards to minimize accelerated erosion and sediment pollution associated with construction activities in Pennsylvania, and to ensure compliance with Pennsylvania regulations found at 25 Pa. Code Chapter 102 (DEP Manual, p. i and ii). The policies and procedures in the DEP Manual are "not an adjudication or a regulation. There is no intent by DEP to give the rules in these policies that weight or deference" (DEP Manual, p. i). The DEP Manual offers

Pennsylvania users the options to utilize alternate BMPs that are not listed in this manual but that provide the same (or greater) level of protection (DEP Manual, p. i).

When describing the occurrence of the “French Drain” effect, DEP noted that the backfill considered was “usually permeable aggregate” (DEP Manual, p. 286). The Project will not backfill the trench with permeable aggregate but with native material, which on the Project will be subsoil and topsoil soil free from rocks or other materials that would damage the pipeline. There are no locations in which the Project would use permeable aggregate to backfill the Project, although this practice is used in other parts of the United States where rocky, stony, or bedrock trenches are excavated and filled with coarse material that would be more likely to cause the “French Drain” effect.

It is not practical, nor would it provide any additional protection, to install trench breakers at “all stream, river, wetland, or other waterbody crossings” as suggested in the DEP Manual. For example, trench breakers do not need to be installed at waterbodies crossed by the HDD method. The HDD method is a trenchless method that involves no direct excavation of the features crossed. Furthermore, at the point that the HDD crosses the waterbody feature, it is generally located between 30 to 40 feet below the stream bed. Here, installation of a trench breaker is not necessary and would be impractical.

Summit’s commitment to installation of trench breakers in specific locations as outlined in the Minnesota ECP, and additional site review considering slope and other conditions, will adequately prevent “French Drain” effects via the pipeline trench while working to ensure that landowner’s existing drainage patterns are maintained to the extent practicable and are not unnecessarily modified. Prior to construction, Summit will identify the general location of trench breakers on construction alignment sheets with a note to “Field Verify” the precise location through coordination between Summit’s EIs and the Contractor. It is possible that Summit’s work with the MDNR in the beach ridge area may offer insight into where trench breakers may be desirable, and if such areas are identified during this process, Summit will consider these locations in its pre-construction planning. During construction, trench breakers may be moved short distances in either direction from the location identified on the construction alignment sheets to more stable soils, or to accommodate other site-specific conditions. Additional trench breakers may also be added depending on site-specific conditions. Summit will require the Contractor to have additional materials on hand to install additional trench breakers as needed.

6. Provide a response to DNR’s recommended changes to Summit’s Environmental Construction Plan in its comment filed February 23, 2024.

The MDNR’s February 23, 2024 comments on the ECP are repeated below, with Summit’s response following. Note that the MDNR did not preface all of these comments on the ECP as “recommended changes;” therefore, where Summit will reflect a change in a revised ECP in response to MDNR comment, those changes are noted in bold.

Page 5. The DNR recommends that erosion control mesh be limited to materials that specify only natural fibers, with no plastic.

- As stated in Jason Zoller’s Direct Testimony filed on February 13, 2024, “Summit will follow MnDOT’s 2020 Standard Specifications for Construction for rolled erosion control materials that specify only natural fibers with no plastic mesh be used.” This was a recommendation of the MDNR that EERA included in the DEIS. Therefore, Summit will revise the statement on page 5 of the ECP as follows: “The Contractor will ~~select wildlife-friendly erosion control fabric that~~

~~contains biodegradable netting (Category 3N or 4N natural fibers) and will avoid the use of plastic mesh follow MnDOT's 2020 Standard Specifications for Construction (or more recent edition) for rolled erosion control materials that specify only natural fibers with no plastic mesh be used."~~

Page 7, trench breakers. The DNR previously provided recommendations to follow Pennsylvania standards for trench breaker placement. The draft EIS includes these recommendations in sections 4.6 and 5.7.83, which discuss mitigation measures offered during scoping. The DNR continues to recommend that Pennsylvania standards for trench breakers be utilized, and recommends that the ECP be updated.

- See response to Question 5, above. Summit is not proposing ECP revisions in response to this comment.

The ECP should clarify if travel lanes will be used on HDD river crossings. If a travel lane is used across waterbodies, significantly more vegetation removal and disturbance will occur, including bridge construction. The DNR recommends that no travel lanes be utilized across waters that use HDD.

- For this Project, Summit will not use travel lanes or bridges across any HDD crossings. As stated in Section 2.4.2 of the DEIS, "No ground disturbance would occur between the entry and exit of HDDs."

The Minnesota ECP is a general construction document that would apply to any Midwest Carbon Express infrastructure constructed in Minnesota and does not contain information on specific crossing methods or bridge use. Therefore, this revision would not be appropriate, and Summit is not proposing ECP revisions in response to this comment. Summit needs to retain the ability to consider using bridges at future HDD crossings because there may not be adequate road infrastructure in the area surrounding future HDDs to support a work-around.

Where trench crossings are used for streams, we recommend segregating the streambed surface material for restoring streambed surface material that is usually courser than underlying material (similar to how topsoil is segregated in uplands).

- Summit will add the following statement to Section 4.8 of the Minnesota ECP. "Where trenched crossings were used, the Contractor will restore the stream by first replacing underlying streambed materials in the trench before replacing streambed surface/substrate materials to support the consistency of the disturbed stream bottom relative to undisturbed areas."

The DNR recommends not using flowing open cut method for any stream crossing.

- While the flowing open cut method is presented as a general construction method in Section 4.5.2 of the ECP, Summit is not proposing to use this method at any waterbodies that are crossed by the Project. The ECP does not contain information on specific crossing methods.

As Jason Zoller describes in Direct Testimony filed on February 13, 2024, "Summit will implement the isolated dry trench crossing method on delineated waterbodies with perceivable water flow during construction. If a delineated waterbody is dry and has no perceivable water flow, then Summit intends to use the proposed open trench method." Jason Zoller's Rebuttal Testimony filed on March 14, 2024 states, "If a delineated waterbody is dry and has no perceivable water

flow, then Summit intends to use open cut methods...Open cut methods are employed in areas where no perceivable water flow is present or anticipated to be present from initial disturbance and final stabilization as an industry standard method for installation of pipe across dry waterbodies, and this method will comply with applicable permit regulations and conditions.” Therefore, Summit will keep the flowing open cut method description in the ECP as a general construction method, but it is not proposed for use on the Project. Summit is not proposing ECP revisions in response to this comment.

The ECP should address trench crowning/subsidence. The ECP should address post construction monitoring for topography and crowning/subsidence, vegetation restoration, erosion, and monitoring groundwater expressions along the project route.

- As stated in Scott O’Konek’s Direct Testimony filed on February 13, 2024, “Summit will include details in the [ECP] for preventing excessive crowning or subsidence above the restored centerline. Summit will restore the construction workspace to as close to the original pre-construction contours as practicable. If uneven settling occurs or surface drainage problems develop as a result of pipeline construction, Summit will provide additional land leveling services after receiving a landowner's written notice, weather and soil conditions permitting.” **Summit will revise the ECP to address trench crowning/subsidence.**

Section 8.2 of the ECP states, “SCS will monitor areas where stabilization and restoration methods are implemented in accordance with requirements in state permits and landowner agreements. Monitoring will identify areas where remedial measures are required to establish a stable surface for reclamation to be successful. This may include re-grading, re-seeding, re-mulching, and additional monitoring.” Summit suggests that further details on post-construction monitoring and restoration is best addressed in a post-construction monitoring plan with the appropriate regulatory agencies.

Page 14. The ECP states that HDD drilling fluids and additives will be nontoxic to the aquatic environment and humans. Toxicity is primarily related to magnitude of release, as larger amounts of even “nontoxic” drilling fluids could be harmful to aquatic life. The contingency plan to address inadvertent release response should include equipment such as a functioning vac-truck on site and other equipment/materials. This contingency plan should be in coordination with the DNR utility license application.

- As stated in Section 4.5 of the ECP, “The Contractor will develop a contingency plan to address an inadvertent return during a directional drill. The contingency plan will include instructions for monitoring during the directional drill and mitigation in the event that there is a release of drilling fluids. Containment, response, and clean-up equipment will be available at both sides of an HDD crossing location and one side of a guided or road bore prior to commencement to assure a timely response in the event of an inadvertent release of drilling fluid.” Summit’s Contractor will prepare these plans closer to the time of construction and will provide them to the MDNR as part of the public water licensing effort. Summit is not proposing ECP revisions in response to this comment.

7. Respond to numerous comments that questioned the ability of the project to capture 100% of the CO₂ emissions from the ethanol plant.

This response is repeated from Summit's response to SII #11, Question 6. The capture facility will capture approximately 100% of the CO₂ emissions from the Green Plains Ethanol Plant's scrubber stack during normal operations. CO₂ can only be captured if the Green Plains Ethanol Plant is operational, and the operational rates will vary over time. The capture facility may also not be operational during periods of maintenance. Summit has based its initial CO₂ capture rate estimates using best available assumptions on these variables.

8. Will water recycling ponds be used at the capture facility during operation?

No.

9. Provide more details on drilling mud additives that would be used. Include a description of any additives that are not on the MDH-approved additive list and the potential environmental impacts of these additives in the event of an inadvertent return.

Summit will seek to utilize MDH-approved additives before considering other options; The drilling mud additives will be determined closer to construction by Summit's HDD contractor. Because Summit is not aware of any non-MDH-approved additives under consideration, it is not possible to describe the environmental impacts of such additives in the event of an inadvertent return.

10. Describe any measures Summit proposes to follow the PHMSA advisory bulletin issued in May 2022. Include measures that plan for and mitigate risks related to shrink-well soils and frost-heave.

Summit has addressed both shrink-swell soils and frost heave in other data requests. Summit consults with geotechnical engineers across its footprint and will develop a Phase I Geohazard Assessment for the Project. The Phase I Geohazard Assessment is designed to comply with the recommendations within Advisory Bulletin (ABD-2022-01). The Phase I Assessment is a desktop assessment intended to identify and assess potential geohazards (i.e., naturally occurring or human-triggered geologic conditions, ongoing geologic processes, or potential natural events that could adversely affect construction and/or operation of a pipeline) along the Project route. The information collected during the Phase I Assessment can be used to understand where potentially hazardous geologic, hydrologic, or atmospheric features and conditions may be present along the proposed pipelines and may ultimately be used to guide best management practices during pipeline construction and operation to avoid, mitigate, and/or monitor possible geohazards. Based on the perceived threat potential, select hazards identified during a Phase I Assessment may be further assessed through more detailed assessment(s), such as Phase II Assessment (e.g., field reconnaissance), and possibly Phase III Assessment (site-specific investigations), where necessary, to improve understanding and characterization of the selected hazard(s). Additional phase assessments will be at the recommendation of a geohazard consultant. In addition, Summit will run an inertial measurement unit (IMU) smart tool as part of the baseline assessment after construction. During operations, Summit will have the ability to run additional IMU smart tools to track movement, strain, and stress within the pipeline.

To: Scott O’Konek
Summit Carbon Solutions

Sent via email to sokonek@summitcarbon.com

From: Andrew Levi
Energy Environmental Review and Analysis

Date: June 5, 2024

Project: Otter Tail to Wilkin CO₂ Pipeline Project
IP 7093/PPL-22-422

Respond: As soon as possible

Please respond to the following questions or provide the requested data or information. Staff will use the information provided to develop the environmental document for the project, which is a public document. Your response, in its entirety, will be included in the environmental document as an appendix; therefore, **responses will be publicly available** unless otherwise designated by the respondent as “nonpublic information” pursuant to Minnesota Statute § 13.02, subdivision 12.

Directions: Responses to questions should be contained within this form to the greatest extent possible (**11-point Calibri, plain text font, RGB 192, 0, 0**). Attach supporting documentation as necessary. While data and information requests, for example, shapefiles or draft plans, will not be contained within this form, document their submittal using this form as follows: “*Requested information sent to whom by what means on date.*”

Do not eFile your response. Return the completed form, as a PDF, along with necessary supporting documentation, and/or requested data or information to andrew.levi@state.mn.us. Contact me at (651) 539-1840 with questions.

1. Summit has indicated that it would be solely responsible for costs associated with an accidental release of CO₂. However, commenters asked who would have financial responsibility for clean-up and damages in the case of a release of CO₂. Representative comment includes: “Who will be liable if there’s an accident with the pipeline or construction causes damage to the natural environment, farmland, or built structures?” Please respond to this comment and confirm Scott O’Konek’s response to a question asked at the Breckenridge public meeting on February 6, 2024, that Summit would be responsible for 100 percent of costs in case of an accident.

Confirmed as to Mr. O’Konek’s prior statement.

2. Respond to concerns about ability of landowners to obtain insurance and increased costs of insurance. Representative comments include:
 - a. “Also, we’ve recently been notified from our insurance company that there are ‘a lot of red flags that could lead to a gap in coverage as it relates to liability for damages and/or bodily injury related to this pipeline.’ I think we also need solid clarification on who is responsible for all the scenarios surrounding a rupture/accident that happens on privately held land.”
 - b. “The EIS is inadequate because it does not address the increased cost of insurance for those households, farms, and businesses living with in the 1,600 ROI.”

The Interstate Natural Gas Association of America (INGAA) Foundation published a report dated February 2016 titled “Pipeline Impact to Property Value and Property Insurability” (the INGAA Report). The INGAA Report provides an evaluation of valuations and insurability of lands along interstate natural gas pipeline easements located in Ohio, Virginia, New Jersey, Pennsylvania, and Mississippi. While the INGAA Report is not focused on Minnesota farmlands or CO₂ pipelines specifically, the results provide useful insight regarding potential impacts to insurability along interstate pipelines. Some of the major conclusions from the INGAA report are as follows: (1) insurance companies and agents have said that there is no indication that the presence of a natural gas pipeline would hinder a buyer’s ability to acquire property insurance; and (2) insurance companies and agents have said that there is no indication that premiums paid for insurance policies would increase because of the proximity to a natural gas pipeline.

Regarding potential gaps in insurance coverage, Summit has taken steps to ensure that landowners do not incur uninsurable risk because of the pipeline. Specifically, Summit has agreed to indemnify landowners for loss resulting from Summit’s use of the easements, which would include loss resulting from the pipeline. Summit includes the following language in its template easement agreements with landowners: “Company shall pay commercially reasonable costs and indemnify and hold Landowner harmless for any loss, damage, claim, or action resulting from Company’s use of the Easements, except to the extent such loss, damage, claim or action arises out of, relates to, and/or results from the gross negligence or willful misconduct of Landowner, its tenants, guests, invitees, agents, and the like, and/or those acting by or through them or subject to their control.” Notably, Summit is obtaining its agreements on a voluntary basis and landowners have had the opportunity to further address liability issues to their satisfaction before granting Summit the easements. Further, based on Summit’s review in Minnesota and elsewhere, there is not a plausible scenario in which owners of land adjoined to the pipeline would be held liable, or carry insurance for, an accidental release from the pipeline. Likewise, Summit has no indication that insurance coverages would be required of landowners, either on the pipeline route or otherwise, related to the pipeline.

3. Provide an updated construction schedule for the pipeline and the capture facility. Is winter construction planned?

Summit has prepared the following revised construction schedule. These dates do not include a winter construction season, and, at this time, Summit does not plan to construct the Project during the winter.

- Pipeline Construction August 2025 – October 2025
- Capture Facility Construction August 2025 – March 2026

4. Respond to the following comment on the Draft EIS: “In Appendix E,6.3 it states that in frozen conditions a ripper can be used to scarify the topsoil to aid in removal. How would the operator in this case be able to determine topsoil depth? If he goes too deep, mixing top and subsoil will occur and cause even more permanent damage to the land.”

As stated in the Draft EIS, Appendix E, Section 2 (Summit’s Agricultural Protection Plan), “[Summit] will employ Agricultural Inspectors whose role is to verify compliance with the requirements of the [Agricultural Protection Plan] during construction of the pipeline.” Listed duties in this section include, but are not limited to, “provide construction personnel with field training on specific topics, such as protocols for topsoil stripping” and “observe construction activities on agricultural land on a continual basis” and

“be responsible for verifying [Summit’s] compliance with provisions of the [Agricultural Protection Plan] during construction.” Further, the Agricultural Inspector has the authority to stop construction activities that are determined to be out of compliance with the provisions of the Agricultural Protection Plan.

5. Respond to the following comment on the Draft EIS: “Appendix F 2.8.2 states that in frost conditions that Summit has the right to modify the plans. What does this mean?”

Appendix F 2.8.2 (Summit’s Winter Construction Plan) states that, “Trench topsoil will be segregated as practicable but modified dependent on depth of frost, thickness of topsoil, and the trenching method used.” Prior to this statement, the Winter Construction Plan states that “Where frozen blocks have been cut, excavation equipment (e.g., a backhoe or excavator) will be used to remove the large frozen blocks and to place them adjacent to the trench.” The sentence in question indicates that depending on conditions, the ability to segregate topsoil will require flexibility in methodology. Segregation of topsoil in winter with a shallow frost depth will occur differently than with a deep freeze in more saturated soil conditions where soil may need to be cut in blocks. Soils with little to no frost layer may still be able to be segregated in separate piles by topsoil and subsoil, but segregation may not occur in the same manner when soil must be stored in blocks. See response to Supplemental Information Request Number 4 regarding the oversight responsibilities of the Agricultural Monitor.

6. Respond to the following comment from the Minnesota DNR on the Draft EIS: “In addition to the stated potential risk of sheet pile causing a breach in a confining layer, the proposed depth of excavation for the pipeline may also be deep enough to compromise shallow confining layers, if present. This may be of heightened concern through the beach ridge system or near wetlands and surface water features. The EIS should discuss these potential impacts, as well as proposed mitigation.”

Following coordination with the MDNR, Summit has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge area crossed by the pipeline to further define existing conditions and advise on construction methodology. Summit has also committed to not using sheet piling in the beach ridge area.

7. In applicant surrebuttal testimony on March 28, 2024, Scott O’Konek responded to a question regarding pipeline construction in beach ridge areas with the following: “If the horizontal direction drill (HDD) method is used *outside* [emphasis added] the beach ridge area, pipe will be installed to a depth of six to ten feet. A shallow bore installed to a depth of six to ten feet will minimize the likelihood of intersecting groundwater.” Table 2-2 of the DEIS indicates, based on information provided by the applicant, that the minimum cover at the lowest point for the five HDDs proposed for the project (none of which would be within the beach ridge area crossed between MPs 4 and 9) would range from 20 to 25 feet. Section 2.4.8 of the DEIS also states: “The actual depths of the HDDs could be greater. For example, the geotechnical investigation report for the Otter Tail River crossing indicates an estimated HDD depth of 46 feet below the bottom of the river channel.” Explain this apparent discrepancy in how deep the pipeline sections constructed via HDD would be installed and clarify what the actual HDD depths would be, if available.

This statement in Mr. O’Konek’s testimony should have stated, “If the horizontal direction drill (HDD) method is used *inside*....” Summit will make this correction to the testimony prior to the hearing. The shallower depth inside of the beach ridge area is intended to provide mitigation for potential shallow

groundwater in areas where Summit does not have additional construction workspace. Referenced text in Table 2-2 and Section 2.4.8 is correct.

8. Respond to the following comment from the Minnesota DNR on the ECP: “Where trench crossings are used for streams, we recommend segregating the streambed surface material for restoring streambed surface material that is usually coarser than underlaying material (similar to how topsoil is segregated in uplands).” Please respond to this comment.

See response to Supplemental Information Inquiry Number 12, Question 6 (page 6 of 8).

9. Provide additional details on the effectiveness/efficiency of the sequestration site in North Dakota, such as a range of permanent sequestration rates, and citations to applicable studies. Discuss potential for leaks during and after the sequestration process. How much CO₂ could potentially be lost to leaks? Describe proposed monitoring and maintenance at the sequestration site.

Below are links to detailed information on the size of the storage reservoir, injection rates, design elements to ensure safe and permanent storage of the CO₂ in the formation. They also contain the monitoring plan for during injection and post injection.

- <https://www.dmr.nd.gov/dmr/sites/www/files/documents/Oil%20and%20Gas/Class%20VI/Summit/SCS%20%231/C30869.pdf>
- <https://www.dmr.nd.gov/dmr/sites/www/files/documents/Oil%20and%20Gas/Class%20VI/Summit/SCS%20%232/C30873.pdf>
- <https://www.dmr.nd.gov/dmr/sites/www/files/documents/Oil%20and%20Gas/Class%20VI/Summit/SCS%20%233/C30877.pdf>

10. Please provide clarification on applicant testimony from Alex Lange on February 13, 2024, that stated: “When emergency conditions indicate a small leak, in addition to closing valves and isolating the pipe segment, Summit’s operations team would also open vents and complete a controlled blowdown at the MLV site to safely evacuate the pipeline segment of product such that the duration of the leak would be much shorter **longer** than described in the DEIS.” The DEIS describes a guillotine rupture, which has the shortest leak duration possible. Is the correction in red (replacement of the word “shorter” with “longer”) what was meant? If not, please explain what was meant. As written, it sounds like a controlled blowdown would provide a leak duration shorter than what is described in the DEIS, that is, a guillotine rupture.

Mr. Lange’s quoted statement describes conditions related to a small leak, and the statement is accurate as written.

11. Please provide the letter from PHMSA to the applicant that is mentioned by commenters. Representative comments include: “PHMSA has expressly said in public letters to CO₂ pipeline companies like Summit that state and local authorities can exercise their powers to regulate land use—including setback distances—and that “nothing in the federal pipeline safety law impinges on these traditional prerogatives of local—or state—government.”

Please see Attachment 13-11, *PHMSA Letter to Summit Clarifying Federal, State, and Local Government Pipeline Authorities*.

12. Please update the tables of noise sensitive receptors provided for each route alternative (Table 5-6, Table 5-7, and Table 5-8 in Section 5.4.5 of the Draft EIS) to expand the definition of a noise sensitive receptor from residences and businesses to the longer list of receivers within areas grouped according to land activities by the noise area classification system established in Minnesota Rule 7030.0050, Subp. 2, using Noise Area Classification 1. Provide revised shapefiles with newly identified noise receptors. The revised tables should identify any of the following within 1,600 feet of the route width of RA-North, RA-Hybrid, and RA-South:

- Household Units (includes farmhouses)
- Hotels, motels, or other overnight lodging
- Mobile home parks or courts
- Other residential units
- Motion picture production
- Medical and other health services
- Correctional institutions
- Educational services
- Religious activities
- Cultural activities and nature exhibitions
- Entertainment assembly
- Camping and picnicking areas (designated)
- Resorts and group camps
- Other cultural, entertainment, and recreational activities

Summit has prepared updated tables of noise sensitive receptors (NSRs) with 1,600 feet of Alternative Route 1 (previously referred to as CURE alternative route 2); Alternative Route 2 (previously CURE alternative route 3); and Alternative Route 3 (Summit's proposed route) using the requested terms (see Attachment 13-12). Note:

- Summit has changed the previously reported "residences" to "household units."
- Summit previously reported each "Garage/Barn." This is a category which is not represented in the above list, so these features were not relabeled.
- Summit previously reported each "Industrial" and "Business." If the type of "Industrial" or "Business" feature was not represented on the list, it was not relabeled.

For all receptors within the 1,600-foot route buffers, Summit did not locate any NSRs beyond those of Household Unit, Garage/Barn, Business, or Industrial.

A zip file with the following shapefiles has also been provided on the Summit ShareFile site:

Contents	Preview	Description
Name		
Alternative_Route_1.shp		
Alternative_Route_1_Route_Width.shp		
Alternative_Route_2.shp		
Alternative_Route_2_Route_Width.shp		
Alternative_Route_3.shp		
Alternative_Route_3_Route_Width.shp		
MP_Alternative_Route_1.shp		
MP_Alternative_Route_2.shp		
MP_Alternative_Route_3.shp		
Receptor_Alternative_Route_1_1600ft.shp		
Receptor_Alternative_Route_2_1600ft.shp		
Receptor_Alternative_Route_3_1600ft.shp		

13. In applicant testimony on February 13, 2024, Jason Zoller listed additional studies that have been performed for the project. Provide these studies.

A copy of the following reports has been provided with this response (see Attachment 13-13 folder):

- Wetland and Waterbody Delineation Report – Minnesota [dated October 3, 2022]
- Wetland and Waterbody Delineation Supplemental Report for MNL-305 and 20 MNL-321 (2022) – Minnesota [dated March 31, 2023]
- Results of 2022 Field Surveys for Listed Butterfly and Plant Species in Minnesota [dated February 28, 2023] - **Marked as NONPUBLIC**
- Results of 2022-2023 Field Surveys for Listed Butterfly and Plant Species in Minnesota [dated January 18, 2024] – **Marked as NONPUBLIC**

The following report is not provided with this response as Summit is currently addressing comments received from the SHPO regarding the content of the report. Once, the report is revised and resubmitted to the SHPO, Summit will provide a copy of the report.

- Draft Minnesota Conventional Archaeological Resources Survey (Phase 1) 12 Volume 4: Fieldwork Report Addendum (MNL-305 and MNL-321) For Work Completed Between July 2, 2022, and November 14, 2022 on MNL-321 in Otter Tail County and MNL-305 in Martin County, and Since December 3, 2021, for the Eliminated Segment of MNL-305 in Faribault County [dated March 31, 2023]

14. Sherri Webb filed a comment dated February 23, 2024, that is included in eDockets Document ID 20243-204403-01. Please describe the 13 permit applications that are noted in her comment on page 340 of 461 of the PDF.

Summit has not applied for 13 water well permits. Summit has applied for one permit in Lawler, Iowa.

15. Please confirm that the entire pipeline project would be designed and built in a manner that would arrest crack propagation and that, therefore, fracture arrestors are not needed.

Confirmed.

16. Does Summit know of any precedent for adding an odorant to CO₂ pipelines? If so, please provide the name of the project, pipeline, and details of use of odorant in other CO₂ pipelines.

No.

17. Please clarify the updated calculations in this portion of Benjamin Nelson's March 14, 2024, applicant rebuttal testimony to Dr. Grubert's earlier testimony: "this results in emission sources of 26,349 MT CO₂e, or 14% of the 0.19 metric tons per annum. As such, an expected 14% reduction would result in a reduction of 5.0 gCO₂e/MJ from the base impact of 36.3 gCO₂e/MJ mentioned above." Provide sources for updated assumptions in this calculation.

Mr. Nelson's full response on this point is as follows, with the portion quoted in question 17 in bold:

"The carbon capture and storage process is designed for 100% electrical use. Summit agrees that these sources of emissions should be incorporated into the impact of the CI score. The system is designed to utilize 38.5 million kWh. Utilizing the GREET emission factor for MROW of 684 g CO₂e/kWh (as done by DEIS), **this results in emission sources of 26,349 MT CO₂e, or 14% of the 0.19 mmtpa. As such, an expected 14% reduction would result in a reduction of 5.0 g CO₂e/MJ from the base impact of 36.3 g CO₂e/MJ mentioned above.**"

Sources and Calculations:

CO₂e emissions:

38.5 million kWh. The DEIS report stated 39.3 million kWh (Table 5-39, footnote e). The 38.5 million kWh assumption is updated to reflect Summit's response to Question 6 in Summit's Response to Supplemental Information Inquiry 5.

GREET emission factor for MROW of 684 g CO₂e/kWh.

Source: <https://www.energy.gov/eere/greet>.

Note that this is the same assumption the DEIS uses in Table 5-39, footnote e.

Calculation of CO₂ sources:

$38.5 \text{ million kWh} * 684 \text{ g CO}_2\text{e/kWh} / 1,000,000 \text{ g/MT} = 26,349 \text{ MT CO}_2\text{e}$

CI impact of CO₂ emissions:

0.19 million MT captured.

This assumption is the same as used in the DEIS report. For example, Table 5-39 lists it as 185,454 (without rounding).

Calculation of emissions sources to captured CO₂:

$26,349 / 185,454 = 14\%$

Calculation of impact to CI:

$$36.3 \text{ g CO}_2\text{e/MJ} * 14\% = 5 \text{ g CO}_2\text{e/MJ}$$

18. Please explain in relative detail how the project would provide tax revenue to the local economy. For example, how is the project taxed? How is the money distributed?

In Minnesota, a CO₂ pipeline should be subject to property tax and centrally assessed by the Commissioner of Revenue at its market value as of January 2 each year. The January 2 assessment date forms the basis for the tax due and payable in the following year (e.g., the January 2, 2024, assessed value forms the basis for the taxes payable in 2025). The market value of a centrally assessed property is set forth in Administrative Rule 8100, and generally requires the operating property of the entire pipeline to be valued as a unit using a combination of the income and cost approaches. The unit value is then allocated back to Minnesota and to each county and local taxing district in which the CO₂ pipeline is located. The tax is then administered by the treasurer's office for each county, who will issue property tax statements and distribute the tax collected in the same manner as all other property taxes.

19. Public commenters ask about electricity use at the capture facility. Representative comments include: "EERA should revisit the potential for impacts to the electrical system and other Lake Region Coop customers and member-owners. It is important to know both the total expected energy use as well as the variable demand that is anticipated by the project's additional electric usage. Will the project's use spike at the same time as the existing plant's demand? Will Lake Region Coop have to implement peak-shaving policies and technologies elsewhere to manage this new intense use? Even if no immediate upgrades are required to deliver energy to the plant, will this increase member-owners' exposure to power outages or brown-outs in times of peak demand?" Also, "who is paying for that electricity? Summit or the ethanol facility? And if the latter, will those cost increases be passed on to producers or other member-owners?"

When operating, the CO₂ capture facility is expected to draw 3,678 kW of electrical load from the grid. Summit plans to install variable frequency drives on all medium-voltage electrical loads to limit the impact on the electrical grid as loads come online. To serve our load, Lake Region Electric Coop (LREC) plans to upgrade a feeder in the existing substation. They have indicated to Summit that their system has ample capacity to manage the incremental load without issue. Summit is responsible for all costs associated with the upgrade and operation of the capture facility, including the cost of the utility power. LREC has not indicated to Summit that the additional load would cause the utility to implement peak-shaving policies or technologies anywhere in their system. LREC has not indicated that, nor does Summit anticipate an increase in other member-owners exposure to power outages or brown-outs.



U.S. Department
of Transportation
**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

9/15/2023

Mr. Lee Blank
CEO
Summit Carbon Solutions
2321 N Loop Dr. Suite 221
Ames, Iowa 50010

Dear Mr. Blank:

The Pipeline and Hazardous Materials Safety Administration (PHMSA) has received several inquiries regarding the ability of federal, state, and local governments to affect the siting, design, construction, operation, and maintenance of carbon dioxide pipelines. The widespread interest in understanding PHMSA's authorities underscores a need to reiterate the message we shared in 2014 with a company proposing a high-visibility interstate pipeline, a message directly related to current pipeline projects proposed by your companies.

As was the case in 2014, PHMSA continues to support and encourage all three levels of government—federal, state, and local—working collaboratively to ensure the nation's pipeline systems are constructed and operated in a manner that protects public safety and the environment.

Congress has vested PHMSA with authority to regulate the design, construction, operation, and maintenance of pipeline systems, including carbon dioxide pipelines, and to protect life, property, and the environment from hazards associated with pipeline operations. While the Federal Energy Regulatory Commission has exclusive authority to regulate the siting of interstate gas transmission pipelines, there is no equivalent federal agency that determines siting of all other pipelines, such as carbon dioxide pipelines. Therefore, the responsibility for siting new carbon dioxide pipelines rests largely with the individual states and counties through which the pipelines will operate and is governed by state and local law.

The Role of PHMSA

Under the federal pipeline safety laws (49 U.S.C. § 60101 *et seq.*), PHMSA is charged with carrying out a nationwide program for regulating the country's pipelines that transport gas, hazardous liquids, and carbon dioxide. With passage of the federal pipeline safety laws, Congress determined pipeline safety is best promoted through PHMSA's development of nationwide safety standards.

PHMSA takes this responsibility seriously and has promulgated comprehensive safety regulations at 49 C.F.R. Parts 190-199. Dozens of current federal requirements regulate the safety of carbon dioxide pipelines' design,¹ construction,² testing,³ operation and maintenance,⁴ operator qualification,⁵ corrosion control,⁶ and emergency response planning.⁷ PHMSA inspects compliance with these requirements and enforces these standards through administrative and judicial enforcement processes.

Recently, PHMSA promulgated new, more stringent standards for automatic and remote shut off valves that affect carbon dioxide pipelines (Additional information: "New rule will help improve public safety and reduce greenhouse gas emissions following pipeline failures").⁸ PHMSA also announced a number of additional actions to strengthen current pipeline safety requirements for carbon dioxide pipelines (Additional information: "PHMSA announces new safety measures to protect Americans from carbon dioxide pipeline failures"),⁹ including a new rulemaking which is currently under way.

While rulemakings like this involve meticulous crafting of highly technical updates, PHMSA also retains broad authority to address imminent risks to the public posed by a pipeline—even if not specifically delineated in a rule or standard. To this extent, PHMSA will engage with all carbon dioxide pipeline project developers to ensure any unique and imminent risks from such projects are adequately mitigated pursuant to PHMSA's statutory safety authority.

The Role of State Pipeline Regulators

Federal safety standards apply to both interstate and intrastate pipeline facilities. Only PHMSA can regulate the safety of interstate pipelines, and federal pipeline safety laws expressly prohibit states from enacting or enforcing pipeline safety standards with respect to interstate pipelines (except one-call notification program regulations). However, through an agreement with PHMSA, a state authority may be authorized to inspect interstate pipelines as an agent of PHMSA, and to refer violations to PHMSA for enforcement. Thus, PHMSA's state partners play an important role in assisting to oversee the safety of the nation's interstate pipelines.

PHMSA's state partners also play a critical role in regulating the safety of intrastate pipelines. A state authority that submits a certification to PHMSA may assume exclusive regulatory authority for the safety of its intrastate pipelines. The certification must document, among other things,

¹ 49 CFR part 195, subpart C (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-C>).

² Subpart D (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-D>).

³ Subpart E (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-E>).

⁴ Subpart F (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-F>).

⁵ Subpart G (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-G>).

⁶ Subpart H (<https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195/subpart-H>).

⁷ E.g., Subpart F, §§ 195.402, 195.403, 195.408.

⁸ <https://www.phmsa.dot.gov/news/phmsa-announces-requirements-pipeline-shut-valves-strengthen-safety-improve-response-efforts>

⁹ <https://www.phmsa.dot.gov/news/phmsa-announces-new-safety-measures-protect-americans-carbon-dioxide-pipeline-failures>

that the state has appropriate jurisdiction under state law; has adopted the federal safety standards to which the certification applies; inspects operators for compliance with those standards; and enforces the standards to address noncompliance.

PHMSA's national regulatory program relies heavily on the efforts of these state partners, who employ roughly 70 percent of all pipeline inspectors and whose jurisdiction covers more than 80 percent of regulated pipelines. As noted above, federal law requires certified state authorities to adopt safety standards at least as stringent as, and compatible with, the federal standards. The state authorities will also inspect, regulate, and take enforcement action against operators of intrastate pipelines within their borders.

The Role of Local Governments

Federal preemption of pipeline safety means that states do not have independent authority to regulate pipeline safety but derive that authority from federal law through a certification to PHMSA.

In the case of local governments that are not subject to federal certification of pipeline safety authority, they may still exercise other powers granted to them under state law but none that adopt or enforce pipeline safety standards or contradict federal law.

However, PHMSA cannot prescribe the location or routing of a pipeline and cannot prohibit the construction of non-pipeline buildings in proximity to a pipeline. Local governments have traditionally exercised broad powers to regulate land use, including setback distances and property development that includes development in the vicinity of pipelines. Nothing in the federal pipeline safety law impinges on these traditional prerogatives of local—or state—government, so long as officials do not attempt to regulate the field of pipeline safety preempted by federal law.

PHMSA recognizes local governments have implemented authorities under state law that contribute in many ways to the safety of their citizens. We have seen localities consider measures, such as:

1. Controlling dangerous excavation activity near pipelines.
2. Limiting certain land use activities along pipeline rights-of-way.
3. Restricting land use and development along pipeline rights-of-way through zoning, setbacks, and similar measures.
4. Requiring the consideration of pipeline facilities in proposed local development plans.
5. Designing local emergency response plans and training with regulators and operators.
6. Requiring specific building code design or construction standards near pipelines.
7. Improving emergency response and evacuation plans in the event of a pipeline release.
8. Participating in federal environmental studies conducted under the National Environmental Policy Act (NEPA) and similar state laws for new pipeline construction projects.

Each state treats these issues differently, so pipeline operators should be prepared to deal directly with each locality and state body interested in the siting and construction process.

Collaboration Among Stakeholders

PHMSA believes pipeline safety is the shared responsibility of federal and state regulators as well as all other stakeholders, including pipeline operators, excavators, property owners, and local governments. In 2010, PHMSA launched the Pipelines and Informed Planning Alliance (PIPA)—available at <https://primis.phmsa.dot.gov/comm/pipa/LandUsePlanning.html>—to help pipeline safety stakeholders define their respective roles related to land use practices near pipelines and to develop best practices.

The PIPA documents are 13 years old, but they remain of value today. PHMSA looks forward to you, along with other private and public stakeholders, engaging with PHMSA in updating these documents to focus on the unique circumstances of new pipeline construction. I encourage all pipeline operators to carefully consider and adopt, as appropriate, these best practices to protect their existing and proposed rights-of-way, and to engage all stakeholders in promoting the safety of interstate pipelines.

Each community affected by an existing or proposed pipeline faces unique risks. The effective control and mitigation of such risks involves a combination of measures employed by facility operators, regulatory bodies, community groups, and individual members of the community. As a pipeline release can impact individuals, businesses, property owners, and the environment, it is important that all stakeholders carefully consider land use and development plans to make risk-informed choices that protect the best interests of the public and the individual parties involved. Sharing appropriate information with state or local governments and emergency planners, which may include dispersion models or emergency response plans, may help stakeholders make risk-informed decisions.

Bringing a pipeline into a community is often a complicated endeavor that requires tremendous coordination and open communication among stakeholders to be successful. We greatly value the efforts of pipeline operators who spend the time and energy to make sure the process goes smoothly and are responsive to all parties involved. Thank you for your cooperation in this effort.

Sincerely,

Alan K. Mayberry
Associate Administrator for Pipeline Safety

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 1 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 1 Centerline (feet)	Direction from Alternative Route 1
0.01	Garage/Barn	1,383	SE
0.01	Household Unit	1,491	SE
0.01	Garage/Barn	1,607	SE
0.01	Garage/Barn	1,317	SE
0.07	Industrial	752	N
0.07	Industrial	545	N
0.08	Industrial	330	N
0.08	Industrial	662	N
0.10	Industrial	475	N
0.15	Business	245	N
0.23	Industrial	700	N
0.24	Household Unit	930	NW
0.24	Garage/Barn	835	NW
0.24	Garage/Barn	817	NW
0.24	Garage/Barn	979	NW
0.41	Garage/Barn	781	S
0.41	Garage/Barn	715	S
0.41	Garage/Barn	846	S
0.42	Household Unit	721	S
0.75	Industrial	296	N
0.75	Industrial	256	N
0.96	Garage/Barn	475	S
0.97	Household Unit	417	S
0.99	Garage/Barn	520	S
1.06	Household Unit	267	N
1.07	Garage/Barn	312	N
1.10	Household Unit	420	N
1.10	Garage/Barn	572	N
1.11	Garage/Barn	439	N
1.11	Garage/Barn	500	N
1.11	Garage/Barn	309	N
1.12	Household Unit	262	N
1.21	Household Unit	1,044	S
1.23	Garage/Barn	1,107	S
1.23	Garage/Barn	1,141	S
1.86	Garage/Barn	378	SW
1.89	Household Unit	295	NE
1.89	Garage/Barn	437	NE
1.96	Household Unit	279	S
1.97	Garage/Barn	476	S
1.97	Garage/Barn	398	S
1.98	Garage/Barn	592	S
2.01	Garage/Barn	391	S
2.01	Garage/Barn	483	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 1 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 1 Centerline (feet)	Direction from Alternative Route 1
2.04	Garage/Barn	912	N
2.06	Garage/Barn	973	N
2.07	Garage/Barn	1,142	N
2.07	Garage/Barn	1,096	N
2.08	Garage/Barn	305	S
2.09	Garage/Barn	1,018	N
2.09	Household Unit	920	N
2.09	Garage/Barn	350	S
2.09	Garage/Barn	1,071	N
2.09	Garage/Barn	196	S
2.10	Garage/Barn	446	S
2.10	Garage/Barn	1,117	N
2.11	Garage/Barn	286	S
2.11	Household Unit	382	S
2.97	Household Unit	381	NW
2.97	Garage/Barn	595	NW
3.09	Garage/Barn	681	N
3.09	Garage/Barn	473	N
3.10	Garage/Barn	757	N
3.11	Garage/Barn	505	N
3.57	Household Unit	1,542	S
3.59	Garage/Barn	1,496	S
3.60	Garage/Barn	1,539	S
3.61	Garage/Barn	1,652	S
3.98	Garage/Barn	877	N
4.00	Garage/Barn	807	N
4.05	Household Unit	468	N
4.05	Garage/Barn	724	N
4.06	Garage/Barn	538	N
4.07	Garage/Barn	709	N
4.89	Industrial	144	S
5.27	Garage/Barn	966	N
5.30	Household Unit	976	N
5.31	Garage/Barn	796	N
5.32	Garage/Barn	981	N
5.34	Garage/Barn	888	N
5.35	Garage/Barn	935	N
5.36	Garage/Barn	873	N
5.67	Garage/Barn	1,248	N
5.69	Garage/Barn	1,190	N
5.69	Household Unit	1,008	N
5.69	Household Unit	353	S
5.70	Garage/Barn	448	S
5.71	Garage/Barn	1,342	N

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 1 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 1 Centerline (feet)	Direction from Alternative Route 1
5.71	Garage/Barn	1,094	N
5.71	Garage/Barn	215	S
5.71	Garage/Barn	421	S
5.75	Garage/Barn	362	S
5.75	Garage/Barn	422	S
5.75	Garage/Barn	257	S
6.21	Garage/Barn	434	N
6.23	Garage/Barn	506	N
6.24	Garage/Barn	568	N
6.24	Household Unit	367	N
6.25	Garage/Barn	382	N
6.25	Garage/Barn	494	N
6.26	Garage/Barn	390	N
6.26	Garage/Barn	445	N
9.89	Garage/Barn	478	N
9.92	Household Unit	306	N
9.94	Garage/Barn	391	N
10.82	Household Unit	1,164	N
10.84	Garage/Barn	1,435	N
10.84	Garage/Barn	1,118	N
10.86	Garage/Barn	1,161	N
10.89	Garage/Barn	1,031	N
12.31	Household Unit	299	N
12.32	Garage/Barn	341	N
12.33	Garage/Barn	406	N
12.34	Garage/Barn	357	N
12.35	Garage/Barn	416	N
13.59	Garage/Barn	634	N
13.60	Garage/Barn	275	N
13.61	Household Unit	402	N
17.72	Household Unit	553	S
17.73	Garage/Barn	486	S
17.74	Garage/Barn	396	S
17.74	Garage/Barn	557	S
20.42	Garage/Barn	330	N
20.43	Garage/Barn	350	N
20.44	Household Unit	182	N
20.45	Garage/Barn	289	N
20.87	Garage/Barn	496	S
20.87	Garage/Barn	347	S
20.90	Garage/Barn	475	S
21.39	Garage/Barn	311	S
21.39	Business	700	S
21.39	Garage/Barn	672	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 1 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 1 Centerline (feet)	Direction from Alternative Route 1
21.49	Garage/Barn	462	N
21.50	Garage/Barn	445	N
21.53	Household Unit	285	N
21.60	Household Unit	1,824	S
21.62	Garage/Barn	369	N
21.63	Household Unit	258	N
21.64	Garage/Barn	252	N
21.64	Garage/Barn	377	N
22.66	Garage/Barn	741	N
22.66	Garage/Barn	374	N
22.67	Garage/Barn	450	N
22.67	Garage/Barn	665	N
22.68	Household Unit	831	N
22.68	Household Unit	516	N
22.69	Household Unit	305	N
23.02	Household Unit	823	NW
23.02	Garage/Barn	981	NW
23.02	Garage/Barn	800	NW
23.02	Garage/Barn	1,360	S
23.02	Garage/Barn	1,343	S
23.02	Garage/Barn	1,149	S
23.02	Garage/Barn	1,089	S
23.02	Household Unit	1,244	S
23.02	Garage/Barn	972	S
23.02	Garage/Barn	1,062	S
23.02	Garage/Barn	1,116	S
23.02	Garage/Barn	1,499	NW
^a Mileposts for Alternative Route 1 are unofficial distances along the centerline from the Green Plains Ethanol Plant and are included here to help describe the location of noise sensitive receptors (NSR).			

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
0.01	Garage/Barn	1,607	SE
0.01	Garage/Barn	1,383	SE
0.01	Household Unit	1,491	SE
0.01	Garage/Barn	1,317	SE
0.07	Industrial	545	N
0.07	Industrial	752	N
0.08	Industrial	330	N
0.08	Industrial	662	N

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
0.10	Industrial	475	N
0.15	Business	245	N
0.23	Industrial	700	N
0.24	Garage/Barn	817	NW
0.24	Household Unit	930	NW
0.24	Garage/Barn	835	NW
0.24	Garage/Barn	979	NW
0.41	Garage/Barn	846	S
0.41	Garage/Barn	781	S
0.41	Garage/Barn	715	S
0.42	Household Unit	721	S
0.75	Industrial	296	N
0.75	Industrial	256	N
0.96	Garage/Barn	475	S
0.97	Household Unit	417	S
0.99	Garage/Barn	520	S
1.06	Household Unit	267	N
1.07	Garage/Barn	312	N
1.10	Garage/Barn	572	N
1.10	Household Unit	420	N
1.11	Garage/Barn	439	N
1.11	Garage/Barn	500	N
1.11	Garage/Barn	309	N
1.12	Household Unit	262	N
1.21	Household Unit	1,044	S
1.23	Garage/Barn	1,107	S
1.23	Garage/Barn	1,141	S
1.86	Garage/Barn	378	SW
1.89	Household Unit	295	NE
1.89	Garage/Barn	437	NE
1.96	Household Unit	279	S
1.97	Garage/Barn	476	S
1.97	Garage/Barn	398	S
1.98	Garage/Barn	592	S
2.01	Garage/Barn	391	S
2.01	Garage/Barn	483	S
2.04	Garage/Barn	912	N
2.06	Garage/Barn	973	N
2.07	Garage/Barn	1,142	N
2.07	Garage/Barn	1,096	N
2.08	Garage/Barn	305	S
2.09	Garage/Barn	1,018	N
2.09	Household Unit	920	N
2.09	Garage/Barn	350	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
2.09	Garage/Barn	1,071	N
2.09	Garage/Barn	196	S
2.10	Garage/Barn	446	S
2.10	Garage/Barn	1,117	N
2.11	Garage/Barn	286	S
2.11	Household Unit	382	S
2.97	Household Unit	381	NW
2.97	Garage/Barn	595	NW
3.09	Garage/Barn	681	N
3.09	Garage/Barn	473	N
3.10	Garage/Barn	757	N
3.11	Garage/Barn	505	N
3.57	Household Unit	1,542	S
3.59	Garage/Barn	1,496	S
3.60	Garage/Barn	1,539	S
3.61	Garage/Barn	1,652	S
3.98	Garage/Barn	877	N
4.00	Garage/Barn	807	N
4.05	Household Unit	468	N
4.05	Garage/Barn	724	N
4.06	Garage/Barn	538	N
4.07	Garage/Barn	709	N
4.89	Industrial	144	S
5.27	Garage/Barn	966	N
5.30	Household Unit	976	N
5.31	Garage/Barn	796	N
5.32	Garage/Barn	981	N
5.34	Garage/Barn	888	N
5.35	Garage/Barn	935	N
5.36	Garage/Barn	873	N
5.67	Garage/Barn	1,248	N
5.69	Garage/Barn	1,190	N
5.69	Household Unit	1,008	N
5.69	Household Unit	353	S
5.70	Garage/Barn	448	S
5.71	Garage/Barn	1,342	N
5.71	Garage/Barn	1,094	N
5.71	Garage/Barn	215	S
5.71	Garage/Barn	421	S
5.75	Garage/Barn	362	S
5.75	Garage/Barn	422	S
5.75	Garage/Barn	257	S
6.21	Garage/Barn	434	N
6.23	Garage/Barn	506	N

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
6.24	Garage/Barn	568	N
6.24	Household Unit	367	N
6.25	Garage/Barn	382	N
6.25	Garage/Barn	494	N
6.26	Garage/Barn	390	N
6.26	Garage/Barn	445	N
8.49	Garage/Barn	806	E
8.49	Garage/Barn	643	E
8.51	Household Unit	765	E
10.01	Industrial	408	W
14.51	Garage/Barn	1,571	S
14.53	Household Unit	1,147	S
14.54	Garage/Barn	1,392	S
14.56	Garage/Barn	1,270	S
15.30	Garage/Barn	1,126	S
15.32	Garage/Barn	966	S
15.33	Garage/Barn	1,202	S
15.33	Household Unit	1,054	S
19.62	Garage/Barn	2,626	N
19.62	Garage/Barn	2,725	N
19.65	Garage/Barn	2,929	N
19.67	Household Unit	2,574	N
19.75	Household Unit	3,837	N
19.76	Household Unit	1,542	S
19.77	Garage/Barn	3,945	N
19.78	Garage/Barn	1,704	S
19.78	Garage/Barn	1,638	S
19.78	Garage/Barn	4,082	N
20.96	Household Unit	973	NW
20.98	Garage/Barn	1,115	NW
23.40	Household Unit	1,047	S
23.41	Garage/Barn	1,315	S
23.41	Garage/Barn	1,219	S
24.38	Garage/Barn	183	N
24.43	Household Unit	262	N
25.23	Garage/Barn	542	N
25.25	Garage/Barn	583	N
25.43	Household Unit	493	NE
26.19	Garage/Barn	325	S
26.19	Garage/Barn	614	S
26.21	Household Unit	586	S
26.22	Garage/Barn	312	S
26.25	Garage/Barn	745	S
26.27	Household Unit	351	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 2 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 2 Centerline (feet)	Direction from Alternative Route 2
26.62	Garage/Barn	1,206	S
26.64	Household Unit	1,403	S
26.66	Garage/Barn	1,209	S
27.86	Garage/Barn	1,271	N
27.87	Household Unit	1,202	N
27.88	Garage/Barn	1,019	N
27.89	Garage/Barn	1,183	N
27.90	Garage/Barn	1,151	N
27.90	Garage/Barn	1,254	N
28.26	Garage/Barn	1,623	N
28.26	Garage/Barn	1,706	N
28.27	Garage/Barn	1,651	N
28.27	Garage/Barn	1,392	N
28.30	Household Unit	1,581	N
28.37	Garage/Barn	1,602	N
28.70	Garage/Barn	1,458	SW
28.73	Household Unit	1,458	SW
28.74	Garage/Barn	1,639	SW
28.98	Household Unit	1,758	SW
29.15	Household Unit	1,825	S
29.15	Household Unit	866	SW
29.15	Garage/Barn	836	SW
29.15	Garage/Barn	701	SW
29.15	Garage/Barn	702	SW
29.15	Garage/Barn	1,615	N
29.15	Garage/Barn	1,678	N
29.15	Household Unit	1,742	N
29.15	Garage/Barn	1,835	N
^a Mileposts for Alternative Route 2 are unofficial distances along the centerline from the Green Plains Ethanol Plant and are included here to help describe the location of noise sensitive receptors (NSR).			

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 3 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 3 Centerline (feet)	Direction from Alternative Route 3
0.01	Garage/Barn	1,607	SE
0.01	Garage/Barn	1,383	SE
0.01	Garage/Barn	1,317	SE
0.01	Household Unit	1,491	SE
0.07	Industrial	545	N
0.07	Industrial	752	N
0.08	Industrial	330	N
0.08	Industrial	662	N

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 3 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 3 Centerline (feet)	Direction from Alternative Route 3
0.10	Industrial	475	N
0.15	Business	245	N
0.24	Industrial	672	N
0.28	Garage/Barn	669	NW
0.28	Garage/Barn	734	N
0.28	Garage/Barn	878	N
0.28	Household Unit	800	NW
0.46	Garage/Barn	799	S
0.47	Garage/Barn	710	S
0.47	Garage/Barn	633	S
0.49	Household Unit	571	S
0.68	Garage/Barn	1,050	W
0.68	Garage/Barn	1,803	NW
0.68	Household Unit	1,082	W
0.68	Household Unit	1,726	NW
0.68	Industrial	498	NW
0.68	Industrial	519	N
0.68	Garage/Barn	1,179	W
1.15	Garage/Barn	1,198	SE
1.15	Garage/Barn	1,748	E
1.15	Household Unit	1,779	E
1.18	Garage/Barn	1,341	SE
1.33	Business	1,821	SE
1.74	Garage/Barn	1,206	S
1.74	Garage/Barn	1,174	SE
1.74	Garage/Barn	644	SE
1.74	Household Unit	1,259	SE
2.14	Business	555	SW
2.14	Garage/Barn	1,176	S
2.24	Garage/Barn	367	N
2.26	Garage/Barn	525	S
2.28	Household Unit	491	N
2.28	Garage/Barn	1,186	S
2.32	Garage/Barn	375	N
2.33	Garage/Barn	1,079	S
2.37	Garage/Barn	1,846	N
3.01	Garage/Barn	1,584	NW
3.16	Garage/Barn	791	W
3.35	Garage/Barn	1,244	E
3.35	Garage/Barn	955	SE
3.35	Household Unit	1,120	E
4.81	Industrial	1,801	N
4.85	Business	1,477	N
4.86	Industrial	1,812	N
4.92	Industrial	1,740	N

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 3 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 3 Centerline (feet)	Direction from Alternative Route 3
4.98	Garage/Barn	1,010	S
4.98	Garage/Barn	927	S
4.98	Household Unit	1,193	S
4.98	Industrial	1,413	N
4.99	Garage/Barn	1,109	S
4.99	Garage/Barn	1,051	S
5.49	Garage/Barn	1,234	E
5.49	Household Unit	1,312	E
6.94	Household Unit	229	NE
6.97	Household Unit	179	SW
7.03	Garage/Barn	186	W
13.46	Garage/Barn	1,571	S
13.48	Household Unit	1,147	S
13.49	Garage/Barn	1,392	S
13.51	Garage/Barn	1,270	S
14.25	Garage/Barn	1,126	S
14.27	Garage/Barn	966	S
14.28	Garage/Barn	1,202	S
14.28	Household Unit	1,054	S
18.57	Garage/Barn	2,626	N
18.57	Garage/Barn	2,725	N
18.60	Garage/Barn	2,929	N
18.62	Household Unit	2,574	N
18.70	Household Unit	3,837	N
18.71	Household Unit	1,542	S
18.72	Garage/Barn	3,945	N
18.73	Garage/Barn	1,704	S
18.73	Garage/Barn	1,638	S
18.73	Garage/Barn	4,082	N
19.91	Household Unit	973	NW
19.93	Garage/Barn	1,115	NW
22.35	Household Unit	1,047	S
22.36	Garage/Barn	1,315	S
22.36	Garage/Barn	1,219	S
23.33	Garage/Barn	183	N
23.38	Household Unit	262	N
24.18	Garage/Barn	542	N
24.20	Garage/Barn	583	N
24.38	Household Unit	493	NE
25.14	Garage/Barn	325	S
25.14	Garage/Barn	614	S
25.16	Household Unit	586	S
25.17	Garage/Barn	312	S
25.20	Garage/Barn	745	S
25.22	Household Unit	351	S

Noise Sensitive Receptors Within 1,600 Feet of Alternative Route 3 Route Width			
Approximate Milepost ^a	Description	Distance From Alternative Route 3 Centerline (feet)	Direction from Alternative Route 3
25.57	Garage/Barn	1,206	S
25.59	Household Unit	1,403	S
25.61	Garage/Barn	1,209	S
26.81	Garage/Barn	1,271	N
26.82	Household Unit	1,202	N
26.83	Garage/Barn	1,019	N
26.84	Garage/Barn	1,183	N
26.85	Garage/Barn	1,151	N
26.85	Garage/Barn	1,254	N
27.21	Garage/Barn	1,623	N
27.21	Garage/Barn	1,706	N
27.22	Garage/Barn	1,651	N
27.22	Garage/Barn	1,392	N
27.25	Household Unit	1,581	N
27.32	Garage/Barn	1,602	N
27.65	Garage/Barn	1,458	SW
27.68	Household Unit	1,458	SW
27.69	Garage/Barn	1,639	SW
27.93	Household Unit	1,758	SW
28.10	Garage/Barn	836	SW
28.10	Garage/Barn	701	SW
28.10	Garage/Barn	702	SW
28.10	Garage/Barn	1,615	N
28.10	Garage/Barn	1,678	N
28.10	Garage/Barn	1,835	N
28.10	Household Unit	1,825	S
28.10	Household Unit	866	SW
28.10	Household Unit	1,742	N
^a Mileposts for Alternative Route 3 are unofficial distances along the centerline from the Green Plains Ethanol Plant and are included here to help describe the location of noise sensitive receptors (NSR).			

NOTICE:

In accordance with Minnesota Rules, part 7829.0500 and Minnesota Statutes Chapter 13, Summit Carbon has designated portions of the report titled "Results of 2022-2023 Field Surveys for Listed Butterfly and Plant Species in Minnesota" as NONPUBLIC DATA – NOT FOR PUBLIC DISCLOSURE because it contains natural heritage information. Natural heritage information is nonpublic under Minn. Stat. § 84.0872. The Minnesota Department of Natural Resources also restricts its dissemination by license agreement. Given the need to include nonpublic information, Summit Carbon will prepare both Nonpublic and Public versions of "Results of 2022-2023 Field Surveys for Listed Butterfly and Plant Species in Minnesota."



Results of 2022-2023 Field Surveys for Listed Butterfly and Plant Species in Minnesota

Project Name:

Summit Carbon Solutions Midwest Carbon Express Project

Document Number:

SCS-0700-ENV-02-RPT-048

Date

January 18, 2024

REVISION HISTORY

DATE	REVISION	REVISION DESCRIPTION	PREPARED BY:	REVIEWED BY:	APPROVED BY:
1/18/2024	0	Results of 2022-2023 Field Surveys for Listed Butterfly and Plant Species in Minnesota	SMS	BB	JZ

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Attachment B – MNL-303 Survey Sites and Results

Attachment C – MNL-304 Survey Sites and Results

Attachment D – MNL-305 Survey Sites and Results

Attachment E – MDNR’s Rare Species Survey Reports Memo (2012)

Attachment F – NHIS Documentation and Species Identification Confirmation

Attachment G – MDNR’s Guidance on Documenting and Collecting Rare Plants (2018)

Acronyms and Abbreviations

CO ₂	carbon dioxide
DASK	Dakota skipper
MDNR	Minnesota Department of Natural Resources
Merjent	Merjent, Inc.
MNR	Midwest Natural Resources, Inc.
MBS	Minnesota Biological Survey
NHIS	Natural Heritage Information System
NLCD	National Land Cover Dataset
NPC	Native Plant Community
PBCL	prairie bush clover
POSK	Poweshiek skipperling
Project	Midwest Carbon Express Project
ROW Prairie	Minnesota Railroad Right-of-way Prairies
SCS	Summit Carbon Solutions, LLC
USFWS	U.S. Fish and Wildlife Service
WPFO	western prairie fringed orchid

1 Introduction

Summit Carbon Solutions, LLC (SCS) is proposing to develop the Midwest Carbon Express Project (the Project), a carbon capture, transportation, and sequestration project that will capture and transport carbon dioxide (CO₂) emissions from industrial facilities in Iowa, Minnesota, Nebraska, North Dakota, and South Dakota to a sequestration site in North Dakota, where the CO₂ will be safely and permanently stored. Construction of the Project will involve approximately 2,000 miles of 4-inch to 24-inch pipelines.

SCS is preparing for Project permitting and construction with support from Merjent, Inc. (Merjent) for the Project's environmental review efforts in Minnesota. SCS and Merjent have been coordinating with the Minnesota Department of Natural Resources (MDNR) regarding potential occurrences of sensitive species,¹ including field surveys for certain species in 2022 and 2023. On February 28, 2023, Merjent submitted a report entitled *Results of 2022 Field Surveys for Listed Butterfly and Plant Species in Minnesota*. Merjent then completed additional field surveys in 2023. This current report combines the previously reported results of the 2022 field surveys² with the new results of the 2023 field surveys. The surveys have been conducted along the Project's Minnesota pipeline segments (shown on the map in Figure 1 and listed in Table 1 with their associated counties and year(s) of survey). The 2023 field work was limited to the MNL-304A and MNL-304B laterals.

Table 1: Pipeline Segments in Minnesota and Associated Counties

Pipeline Segment ID	Counties	Year(s) When Survey Locations Were Identified
MNL-321 ^a	Otter Tail, Wilkin	2022
MNL-337	Chippewa, Kandiyohi, Renville	N/A (no survey locations identified)
MNL-303	Chippewa, Redwood, Renville, Yellow Medicine	2022
MNL-304A ^b	Jackson	2022, 2023
MNL-304B	Cottonwood	2022, 2023
MNL-305 ^c	Martin	2022
^a Prior communication with MDNR has referred to this as the "Otter Tail to Wilkin Project."		
^b Prior communication with MDNR has referred to this as the "Jackson County Project."		
^c Prior communication with MDNR has referred to this as the "Martin County Project."		

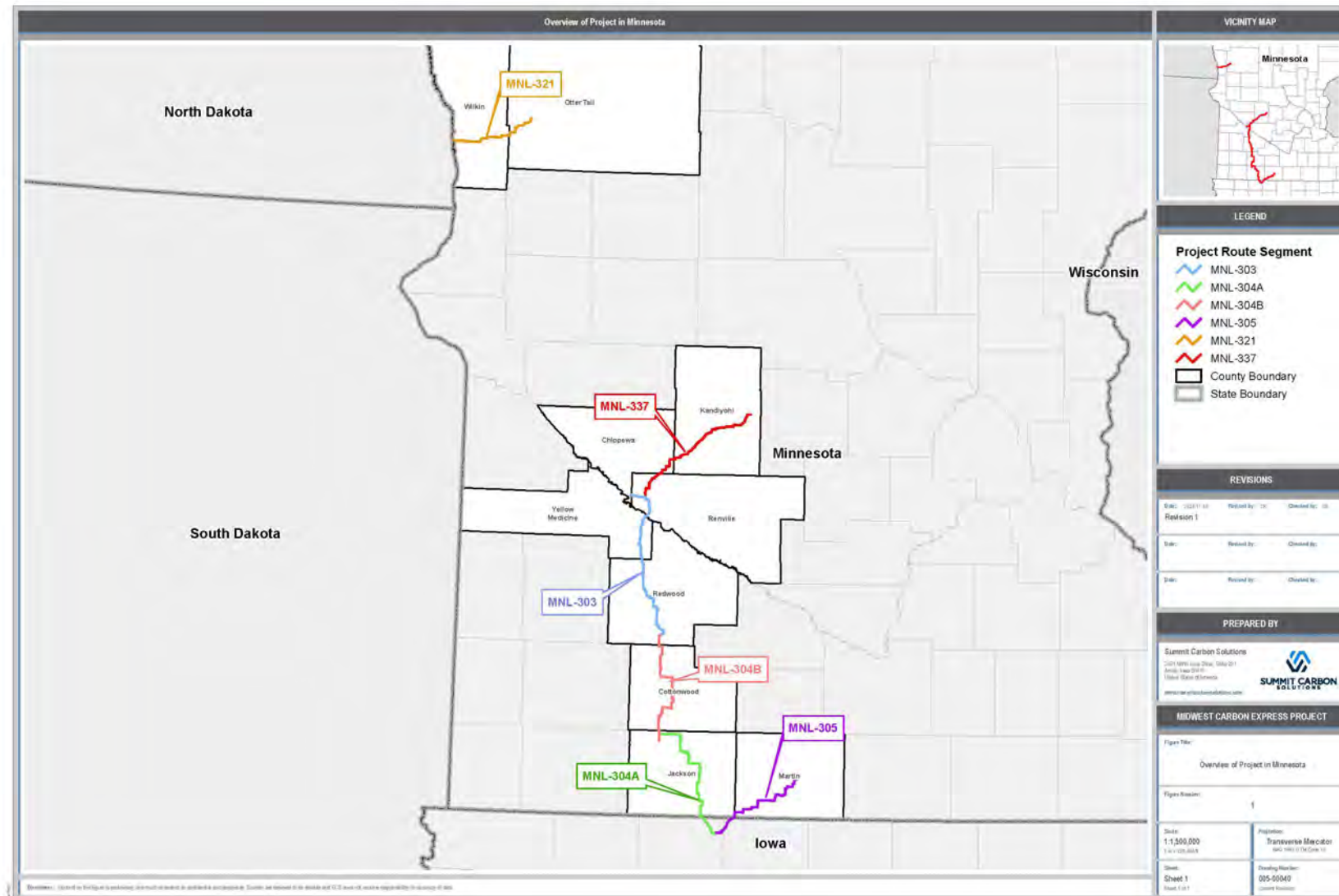
In both 2022 and 2023, plant surveys targeted species that are state-listed in Minnesota as special concern, threatened, or endangered and for which suitable habitat may occur in or near the environmental survey area. Plant species on the MDNR watch list according to MNTaxa³ were also to be documented if observed.

¹ SCS submitted a letter to MDNR on April 5, 2022, requesting consultation regarding sensitive species in Minnesota's Natural Heritage Information System database and providing its proposed survey protocol for sensitive plant species in the vicinity of the Project. MDNR responded on May 13, 2022, with approval of SCS's protocol, which was followed to obtain the results reported here. SCS submitted a protocol again on May 17, 2023, with the same content as in 2022 except for revised locations of the sites to be surveyed. The plant survey methodology was the same in both years.

² Sites that were surveyed in 2022 and included in the 2022 report but are no longer within the Project's environmental survey area are not included here except as footnotes in Attachments A-D.

³ MDNR watch-list status was obtained from http://www.dnr.state.mn.us/eco/mcbs/plant_lists.html.

Figure 1: Overview of Project in Minnesota



Additionally, through a parallel coordination process with the U.S. Fish and Wildlife Service (USFWS), four federally listed species were determined to warrant field habitat assessments (Table 2).⁴

Table 2: Federally Listed Species Targeted for Survey in Minnesota

Species	Federal Status	Minnesota Status	Survey Year(s)
Dakota Skipper (<i>Hesperia dacotae</i>)	Threatened	Endangered	2022
Poweshiek Skipperling (<i>Oarisma poweshiek</i>)	Endangered	Endangered	2022
Prairie Bush Clover (<i>Lespedeza leptostachya</i>)	Threatened	Threatened	2022, 2023
Western Prairie Fringed Orchid (<i>Platanthera praeclara</i>)	Threatened	Endangered	2022, 2023

All four species in Table 2 are also state-listed in Minnesota. Although the butterfly species were not targeted as part of SCS's 2022 correspondence with MDNR regarding survey protocols, results of 2022 butterfly habitat assessments are reported here due to the species' state status. In 2023, surveys for three additional state-listed butterfly species at one site were added to the scope of field work: Ottoe Skipper (*Hesperia ottoe*), state-listed endangered; Iowa skipper (*Atrytone arogos iowa*), state-listed special concern; and regal fritillary (*Argynnis idalia*), state-listed special concern. These three species are not federally listed.

2 Butterfly Survey Methods

Merjent worked with qualified biologists at Midwest Natural Resources, Inc. (MNR) to identify and assess habitat within the Project's environmental survey area in Minnesota for the Dakota skipper and Poweshiek skipperling (in 2022) and for the Ottoe skipper, Iowa skipper, and regal fritillary (in 2023). All of the Lepidoptera species targeted for field survey are inhabitants of native prairie remnants.

In 2022, MNR conducted a desktop assessment to identify areas of potentially suitable habitat for the Dakota skipper and Poweshiek skipperling within the Project footprint and then completed on-the-ground surveys to evaluate those areas further. Where suitable habitat was present as determined by the field surveys, MNR conducted occupancy surveys during the appropriate flight period. Methods for the desktop assessment and field surveys are described further below. MNR's biologists conducting the surveys, Otto Gockman and Jake Walden, are both MDNR-approved Prairie Skipper Surveyors and hold a Federal Recovery Permit for the Dakota skipper.

MNR did not conduct an additional desktop assessment in 2023, but Merjent identified relevant occurrences of the Ottoe skipper, Iowa skipper, and regal fritillary (one occurrence per species) in MDNR's Natural Heritage Information System (NHIS) dataset in a single location. The polygons representing the occurrences crossed or were near a portion of the Project footprint that was new to 2023. Given the overlap of the three NHIS occurrences in one area, Merjent determined that the area warranted a field survey to assess the potential for suitable habitat for the three species. Jake Walden of MNR conducted the field surveys.

⁴ USFWS did not specifically request field surveys for the Dakota skipper, but SCS included this species in the desktop and field effort because of its status as endangered in Minnesota and the similarity of its habitat requirements to the Poweshiek skipperling.

2.1 Desktop Assessment

For the 2022 surveys, MNR evaluated areas of potentially uncultivated grassland within the Project footprint in Minnesota by using the following publicly available data.

- Recent and historic aerial imagery from the National Agricultural Imagery Program and Google Earth
- National Land Cover Dataset (NLCD)
- Lidar elevation
- Natural Resources Conservation Service Soil Survey Geographic Database
- MDNR Native Plant Communities (NPCs), typically located within Minnesota Biological Survey (MBS) Sites of Biodiversity Significance
- Minnesota Railroad Right-of-way Prairies (ROW Prairies)

For 2023, Merjent determined that no further desktop assessment using the 2022 approach was needed.

2.2 Field Surveys

Between May 31 and June 15, 2022, MNR conducted field surveys for suitable habitat at the areas identified in the desktop assessment. The pedestrian surveys involved evaluating the quality of each habitat polygon based on the presence of larval-host species as well as nectar plants. Habitat documentation included: estimating cover of native graminoids, native forbs, non-native species (both graminoids and forbs), and trees and shrubs; documenting presence/absence of requisite prairie species and cover, where applicable; and taking representative photographs at each location.

MNR conducted occupancy surveys for the Dakota skipper and Poweshiek skipperling, where indicated by the June field habitat assessments, on July 3, 6, and 9, 2022. Occupancy survey methods were based on the Dakota Skipper North Dakota Survey Protocol, prepared by the USFWS Mountain-Prairie Region in 2018 and used at the request of USFWS. MNR's methodology followed the specifications in that document for survey frequency and duration, timing and environmental conditions, phenological indicators, and other aspects. MNR consulted with MDNR and USFWS about the appropriate window for the species' flight periods, based on 2022 phenology in the relevant portion of the state (late June through mid-July, accordingly).

Using the same field methods as in 2022, MNR conducted an initial field habitat assessment for the Ottoe skipper, Iowa skipper, and regal fritillary on June 2, 2023, where the Project footprint intersected NHIS occurrence data. MNR then conducted occupancy surveys at suitable habitat identified within the Project footprint on July 15, 17, and 20, 2023.

3 Plant Survey Methods

Similar to the approach taken for butterflies, in 2022 and 2023 Merjent conducted a desktop assessment to identify areas of potentially suitable habitat for state-listed plants within the Project footprint. The assessment considered all state-listed plant species, including the two federally listed species in Table 2. Merjent's Andy Kranz, a MDNR-approved botanist, then carried out field surveys. Methods for the desktop assessment and field surveys are described further below.

3.1 Desktop Assessment

In 2022 and 2023, Merjent identified the areas to be surveyed in the field by reviewing NHIS data and public data sources. Where features from the sources listed below overlapped the Project environmental survey area (or were within 1 mile, for NHIS occurrences), Merjent considered the location to have potentially suitable habitat for the two federally listed plant species and/or for other state-listed species that may occur in the Project vicinity.

- NHIS Element Occurrences of rare plants within a 1-mile radius, where potentially suitable habitats were visible within the environmental survey area on aerial imagery⁵
- Other potentially suitable habitats visible on aerial imagery, such as potential fens, sites with aquatic features, or other aerial signatures that were unique relative to the surrounding area
- MBS sites (with a biodiversity significance ranking of moderate, high, or outstanding)⁶
- NPCs⁷
- ROW Prairies⁸

Western prairie fringed orchids and prairie bush clovers both inhabit native prairie remnants, with the orchid preferring wet-mesic prairie types and the clover preferring dry-mesic prairie types. Sites with the potential for any native prairie types were flagged for field survey. Wooded NPCs were mostly absent in the Project environmental survey area.

3.2 Field Surveys

The field surveys had three objectives: (1) to determine whether any state-listed plants were present within the Project environmental survey area; (2) to assess, regardless of survey timing, the habitat suitability for the western prairie fringed orchid and/or prairie bush clover at each site; and (3) if possible, depending on survey timing, to document whether any western prairie fringed orchid and/or prairie bush clover individuals were present. According to MDNR, the optimal identification window for the western prairie fringed orchid is between late June and late July (when they are flowering), and the optimal window for the prairie bush clover is mid-August through September (when they are producing fruit).

Surveys in 2022 were conducted on June 6, 7, and 8; on July 9; and on September 1, 2, 22, 23, and 24. Surveys in 2023 were conducted on June 12, June 13, and August 7.

Where western prairie fringed orchid habitat was present, it was rated according to the following criteria. The criteria were developed in coordination with USFWS and used in field habitat assessments for the same species in the Nebraska, North Dakota, and South Dakota portions of the Project footprint.⁹

- Western prairie fringed orchid habitat criteria:
 - Excellent (A) - completely native tall-grass/lowland/mesic prairie, appears to be mowed or lightly grazed every year or two. Suitable hydrology present.
 - Good (B) - primarily native tall-grass/lowland/mesic prairie and non-native vegetation, appears to be hayed or lightly grazed every year or two. Suitable hydrology present.
 - Fair (C) - mix of native tall-grass/lowland/mesic prairie and non-native vegetation, appears to be hayed or lightly grazed approximately every year or two. Suitable hydrology present.
 - Poor (D) - primarily non-native vegetation with a minor native tall-grass/lowland/mesic prairie component, appears to be hayed or lightly grazed every year or two, or is a mix of native and non-native plant species but heavily grazed and/or sprayed to reduce broadleaf species. Suitable hydrology present.

⁵ Merjent used NHIS data dated 2/15/2022 through MDNR license agreement 1066.

⁶ Merjent used MBS data (obtained from MN Geospatial Commons) with a content date of 2/16/2023.

⁷ Merjent used NPC data (obtained from MN Geospatial Commons) with a content date of 2/10/2023.

⁸ Merjent used ROW Prairie data (obtained from MN Geospatial Commons) with a content date of 7/27/2017.

⁹ The field habitat assessments outside of Minnesota are not reported here. A USFWS-approved set of western prairie fringed orchid habitat criteria is described in the 2022 Western Prairie Fringed Orchid Study Plan, prepared by WESTECH Environmental Services, Inc., on March 4, 2022, for Perennial Environmental Services, which is providing support to SCS for the Project's environmental review in Nebraska, North Dakota, and South Dakota.

4 Results

The field results are provided in Attachments A, B, C, and D, with each attachment containing: (a) a table that summarizes the presence or absence of findings for surveyed areas along each pipeline segment; (b) an overview map that shows the survey sites for that pipeline segment; and (c) site-specific maps where habitats and/or individuals were documented (all as outlined below). There were no locations along the MNL-337 segment that warranted survey.

- MNL-321 (Attachment A): Table A, Figures A-1 (overview map) and A-2 (site-specific map)
- MNL-303 (Attachment B): Table B, Figure B-1 (overview map)
- MNL-304 (Attachment C):
 - MNL-304A: Table C1, Figures C-1 (overview map) and C-2 through C-5 (site-specific maps)
 - MNL-304B: Table C2, Figure C-6 (overview map)
- MNL-305 (Attachment D): Table D, Figures D-1 (overview map) and D-2 (site-specific map)

The following abbreviations are used in the attachments.

- Dakota skipper (DASK)
- Poweshiek skipperling (POSK)
- Prairie bush clover (PBCL)
- Western prairie fringed orchid (WPFO)

5 Reporting

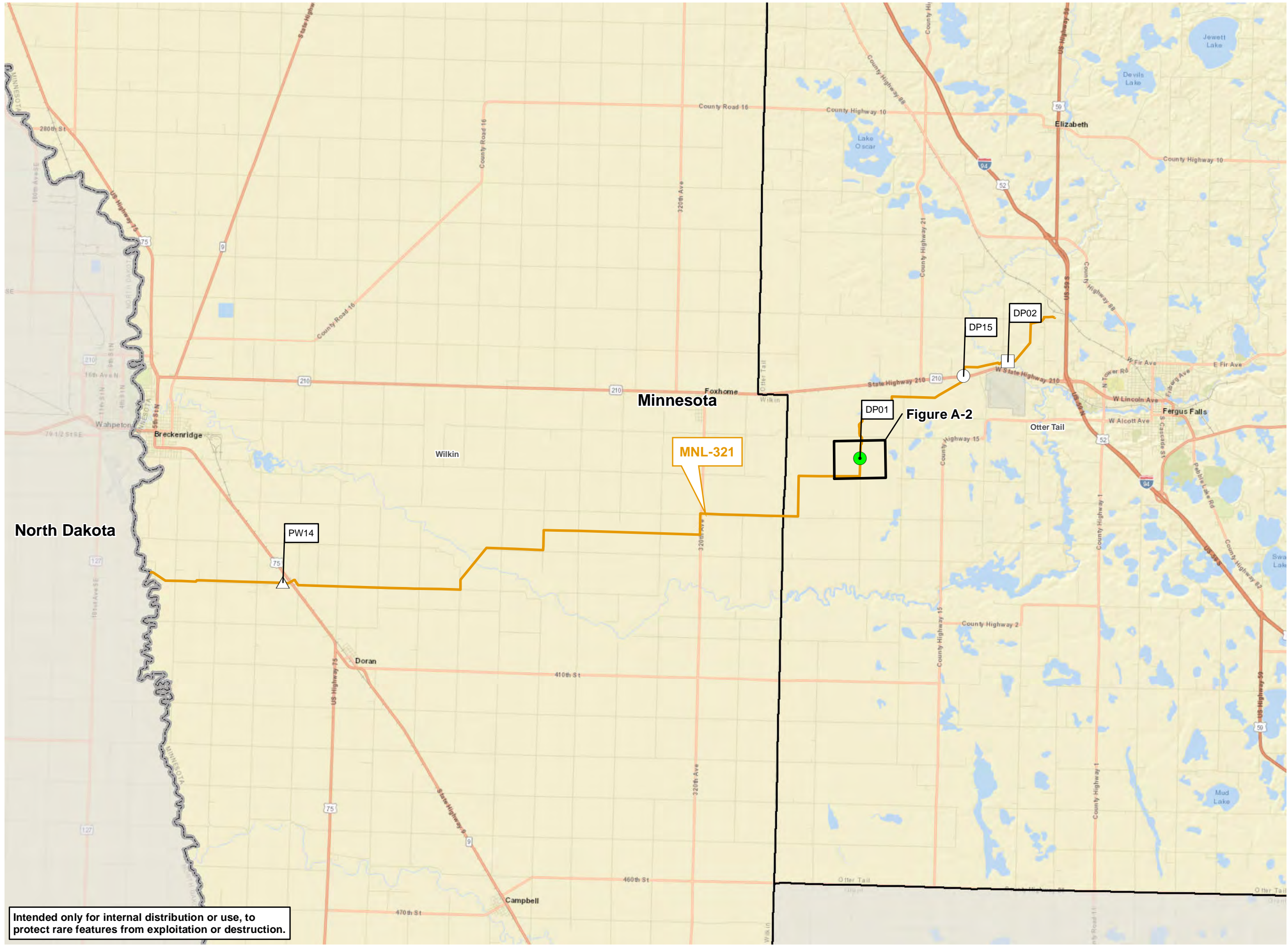
Per MDNR's Rare Species Survey Reports Memo (2012) (Attachment E), Merjent's botanist completed an electronic submission of the 2022 survey findings that must be reported for NHIS purposes (i.e., documented occurrences of state-listed species) on February 22, 2023. Welby Smith at MDNR confirmed the identification of the state-listed species reported in 2022. Despite additional survey locations being identified in 2023, there were no findings of state-listed species to report in 2023. The NHIS documentation and the species identification confirmation from 2022 are in Attachment F. The plant survey methods used to obtain the results reported here are consistent with MDNR's Guidance on Documenting and Collecting Rare Plants (2018) (Attachment G).

Attachment A – MNL-321 Survey Sites and Results

Table A: Survey Sites and Outcomes for MNL-321, Listed East to West (Figure A-1)

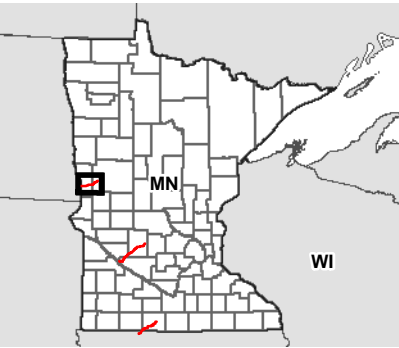
Site ID	Targeted for Listed Butterfly Surveys? (Year)	Butterfly Survey Outcome	Targeted for Listed Plant Surveys? (Year)	Plant Survey Outcome	Site-specific Map
DP02	Yes (2022)	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
DP15	Yes (2022)	No habitat/no individuals.	Yes (2022)	No habitat/no individuals.	N/A
DP01 ^a	Yes (2022)	Suitable DASK/POSK habitat was present. No DASK or POSK individuals were observed during occupancy surveys.	Yes (2022)	Suitable WPFO habitat was present (rank C/D). Small white lady's-slipper (<i>Cypripedium candidum</i> ; state-listed special concern) was present. Merjent's botanist documented 17 individuals within the environmental survey area.	Figure A-2
PW14	No	N/A (surveyed only for plants)	Yes (2022)	No habitat/no individuals.	N/A

^a DP01 did not warrant survey again in 2023 but is within the May 2023 ESA as shown on Figure A-2.



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VICINITY MAP



LEGEND

Project Route Segment

- MNL-321
- Survey Site for DASK/POSK and Flora (finding: DASK/POSK habitat, WPFO habitat, and individuals of state-listed plant species*)
- Survey Site for DASK/POSK and Flora (no habitat/no individuals)
- Survey Site for DASK/POSK (no habitat/no individuals)
- Survey Site for Flora (no habitat/no individuals)
- County Boundary
- State Boundary
- Site-Specific Map

*See Figure A-2

REVISIONS

Date: 2023-12-05 Revised by: TR Checked by: SS
Revision 1

Date: Revised by: Checked by:

Date: Revised by: Checked by:

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MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Survey Sites: MNL-321
Overview Map

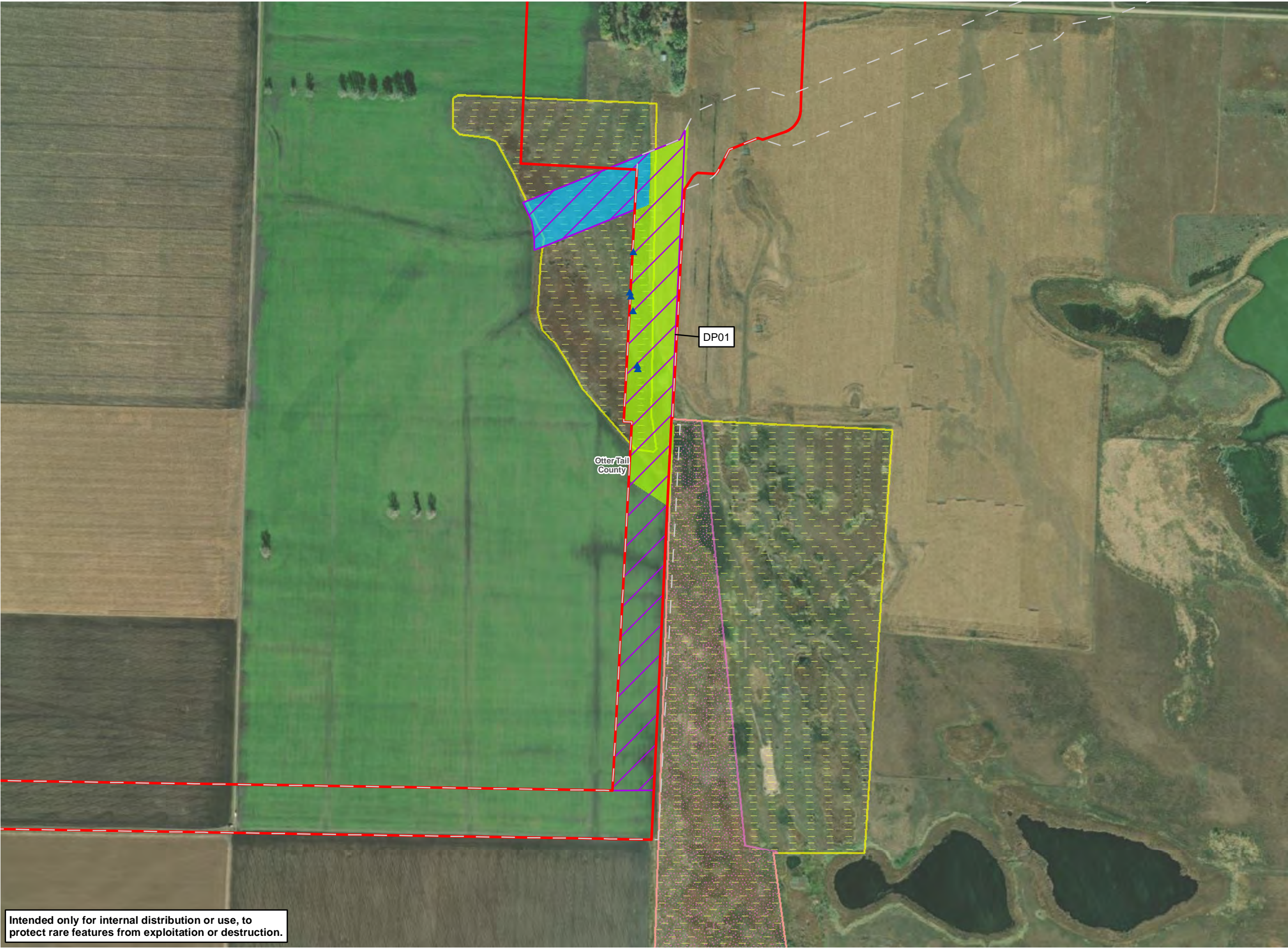
Figure Number:
A-1

Scale:
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1 in = 12,500 ft

Projection:
Transverse Mercator
NAD 1983 UTM Zone 14

Sheet:
Sheet 1
Sheet 1 of 2

Drawing Number:
005-00040
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VICINITY MAP



LEGEND

- Environmental Survey Area (5/25/23)
- Environmental Survey Area (5/24/22)
- Native Plant Communities
- Site of Biodiversity Significance
- Small White Lady's-Slipper (Cypripedium candidum)
- Survey Site for DASK/POSK and Flora
- DASK/POSK Habitat
- WPFO Habitat (Rank C/D)

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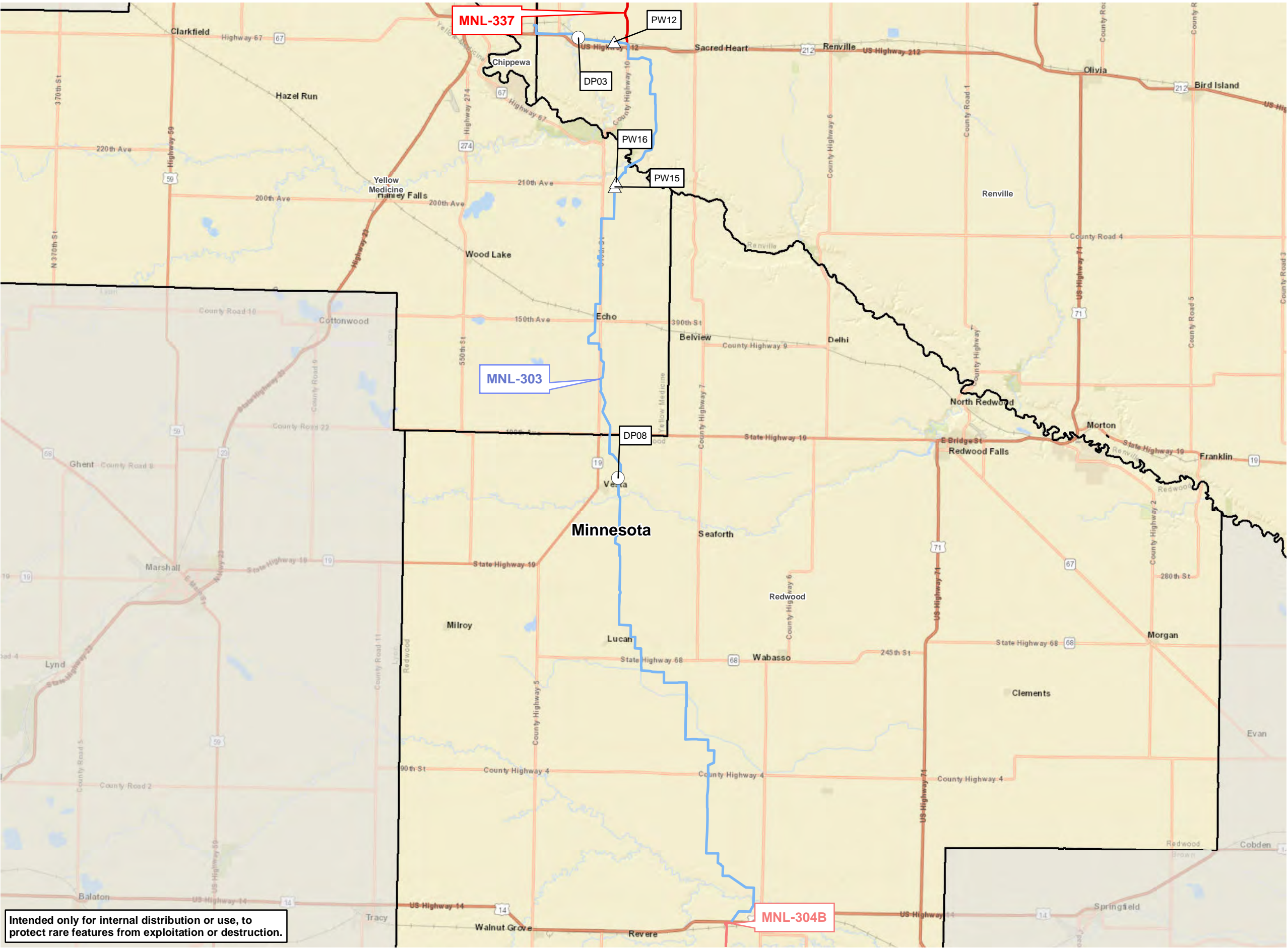
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Figure Number: A-2	
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Sheet: Sheet 2 Sheet 2 of 2	Drawing Number: 005-00040 Current Revision

Attachment B – MNL-303 Survey Sites and Results

Table B: Survey Sites and Outcomes for MNL-303, Listed North to South (Figure B-1)¹⁰

Site ID	Targeted for Listed Butterfly Surveys? (Year)	Butterfly Survey Outcome	Targeted for Listed Plant Surveys? (Year)	Plant Survey Outcome	Site-specific Map
DP03	Yes (2022)	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
PW12	No	N/A (surveyed only for plants)	Yes (2022)	No habitat/no individuals.	N/A
PW16	No	N/A (surveyed only for plants)	Yes (2022)	No habitat/no individuals.	N/A
PW15	No	N/A (surveyed only for plants)	Yes (2022)	No habitat/no individuals.	N/A
DP08	Yes (2022)	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A

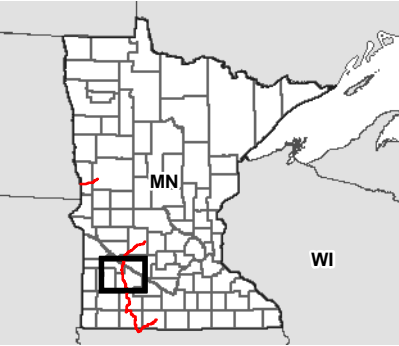
¹⁰ The following ten sites were included in the 2022 report but are not listed in the table here, because they are no longer within the Project environmental survey area: DP04, DP05, DP06, PW13, DP19, PW18, DP07, PW17, DP18, and DP10. All sites with a DP prefix were surveyed for DASK/POSK habitat, with none found. All sites with a PW prefix, plus DP19, DP07, and DP18, were surveyed for PBCL/WPFO habitat and state-listed plants. The finding at PW13, DP19, PW18, PW17, and DP18 was no habitat/no individuals. At DP07, suitable PBCL and WPFO habitat was present (rank D for WPFO), but Merjent's botanist did not find individuals of PBCL, WPFO, or any other state-listed plants within the environmental survey area. Four sites (PW19, PW20, PW21, and DP08) were newly identified in 2023 but could not be accessed for survey.



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Disclaimer: Content on this figure is preliminary, and must be treated as confidential and proprietary. Sources are believed to be reliable and SCS does not assume responsibility for accuracy of data.

VICINITY MAP



LEGEND

Project Route Segment

- MNL-303
- MNL-304B
- MNL-337
- Survey Site for DASK/POSK and Flora (no habitat/no individuals)
- Survey Site for Flora (no habitat/no individuals)
- County Boundary
- State Boundary

*See Figure B-2

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Figure Title:
Survey Sites: MNL-303
Overview Map

Figure Number:
B-1

Scale:
1:270,000
1 in = 22,500 ft

Projection:
Transverse Mercator
NAD 1983 UTM Zone 15

Sheet:
Sheet 1
Sheet 1 of 2

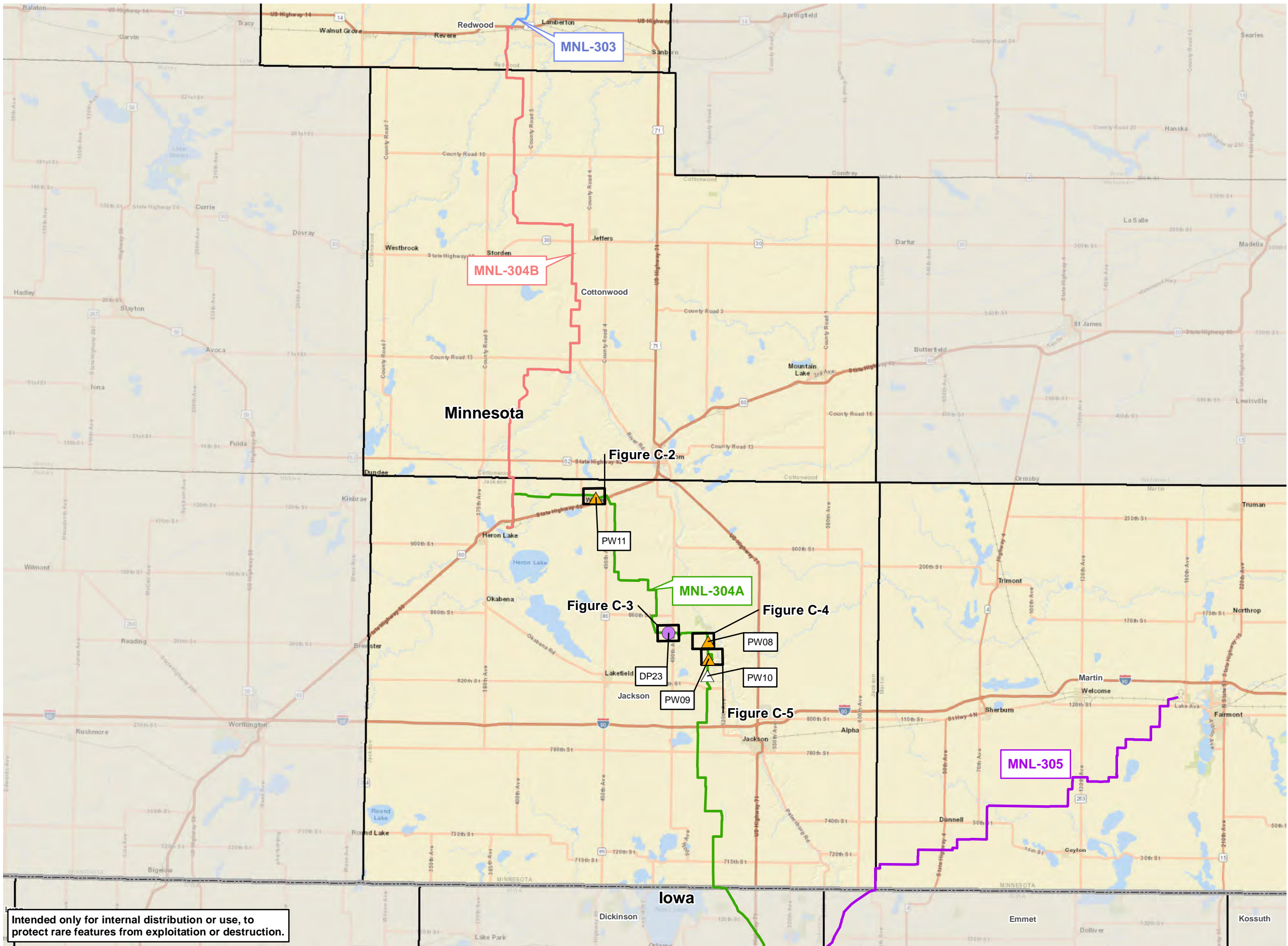
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Attachment C – MNL-304 Survey Sites and Results

Table C1: Survey Sites and Outcomes for MNL-304A, Listed North to South (Figure C-1)¹¹

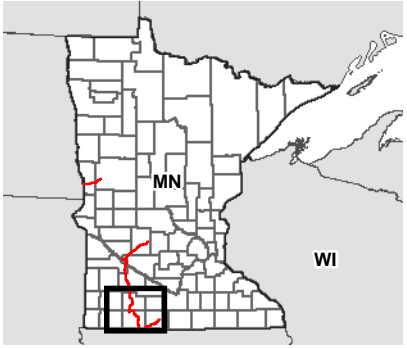
Site ID	Targeted for Listed Butterfly Surveys? (Year)	Butterfly Survey Outcome	Targeted for Listed Plant Surveys? (Year)	Plant Survey Outcome	Site-specific Map
PW11	No	N/A (surveyed only for plants)	Yes (2022, 2023)	Suitable PBCL habitat was present. Merjent's botanist did not find individuals of PBCL or any other listed species within the environmental survey area.	Figure C-2
DP23	Yes (2023)	Suitable habitat for state-listed butterfly species was present. No state-listed butterfly individuals were observed during occupancy surveys.	Yes (2023)	No habitat/no individuals.	Figure C-3
PW08	No	N/A (surveyed only for plants)	Yes (2022, 2023)	Suitable PBCL habitat was present. Merjent's botanist did not find individuals of PBCL or any other listed species within the environmental survey area.	Figure C-4
PW09	No	N/A (surveyed only for plants)	Yes (2022, 2023)	Suitable PBCL habitat was present. Merjent's botanist did not find individuals of PBCL or any other listed species within the environmental survey area.	Figure C-5
PW10	No	N/A (surveyed only for plants)	Yes (2022, 2023)	No habitat/no individuals.	N/A

¹¹ One site, DP16, was included in the 2022 report but is not listed in the table here, because it is no longer within the Project environmental survey area. There was no suitable habitat present for DASK/POSK. Suitable PBCL/WPFO habitat was present (rank D for WPFO), but Merjent's botanist did not find individuals of PBCL, WPFO, or any other state-listed species within the environmental survey area.



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VICINITY MAP



LEGEND

Project Route Segment

- MNL-303
- MNL-304A
- MNL-304B
- MNL-305

- Survey Site for State-listed Butterflies and Flora (finding: state-listed butterfly habitat* and no habitat/no individuals for flora)
- Survey Site for Flora (finding: PBCL habitat*)
- Survey Site for Flora (no habitat/no individuals)
- County Boundary
- State Boundary
- Site-Specific Map

*See Figures C-2, C-3, C-4, C-5

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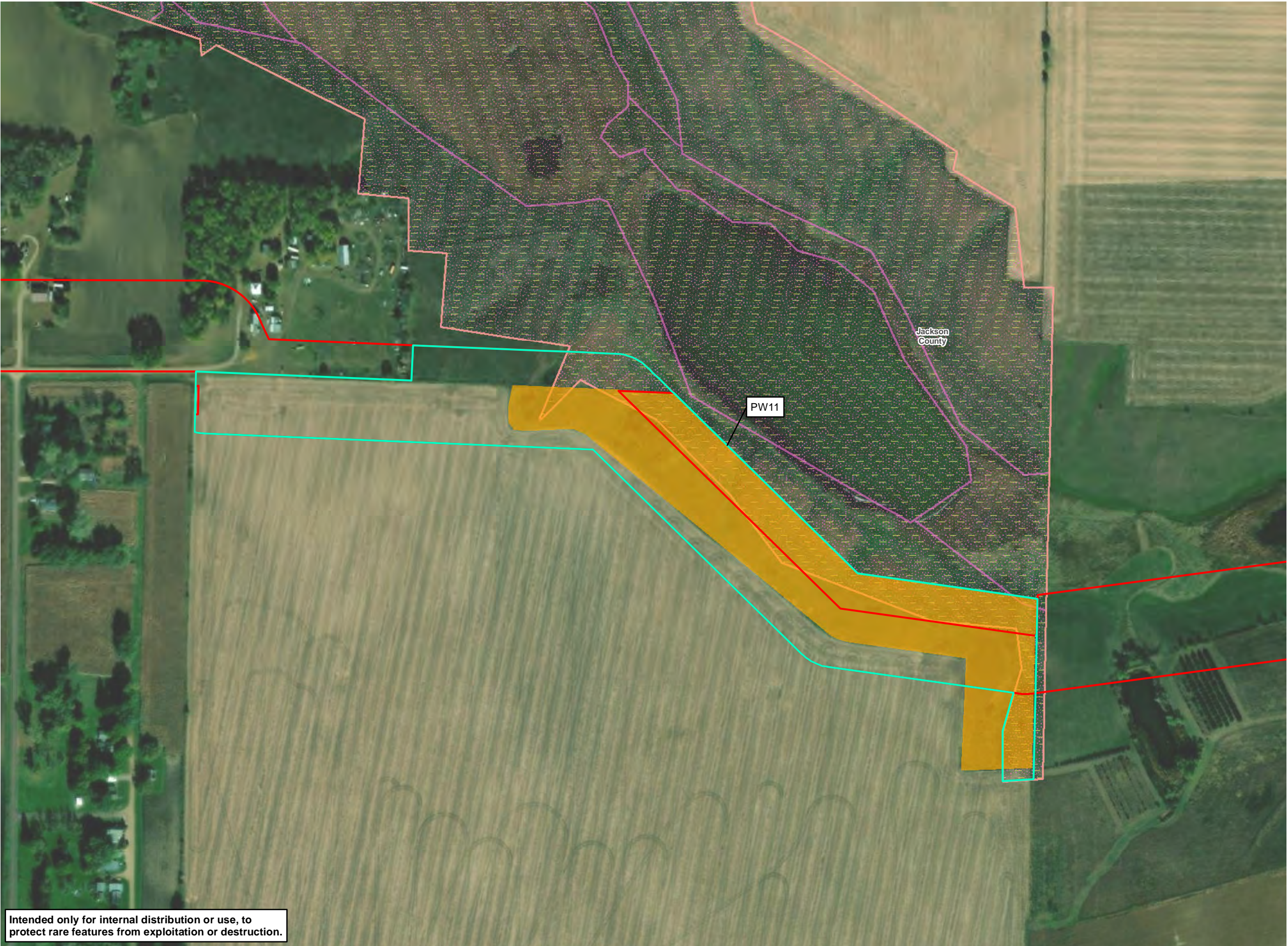


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Figure Title:
Survey Sites: MNL-304A
Overview Map

Figure Number:
C-1

Scale: 1:360,000 1 in = 30,000 ft	Projection: Transverse Mercator NAD 1983 UTM Zone 15
Sheet: Sheet 1 Sheet 1 of 5	Drawing Number: 005-00040 Current Revision



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VICINITY MAP



LEGEND

- Environmental Survey Area (5/25/23)
- Native Plant Communities
- Site of Biodiversity Significance
- Survey Site for Flora
- Prairie Bush-Clover Habitat

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Figure Title: Survey Results: MNL-304A/B Site-Specific Map	
Figure Number: C-2	
Scale: 1:3,600 1 in = 300 ft	Projection: Transverse Mercator NAD 1983 UTM Zone 15
Sheet: Sheet 1 Sheet 1 of 5	Drawing Number: 005-00040 Current Revision



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VICINITY MAP



LEGEND

- Environmental Survey Area (5/25/23)
- Native Plant Communities
- Site of Biodiversity Significance
- Survey Site for State-listed Butterflies and Flora
- State-Listed Butterfly Habitat

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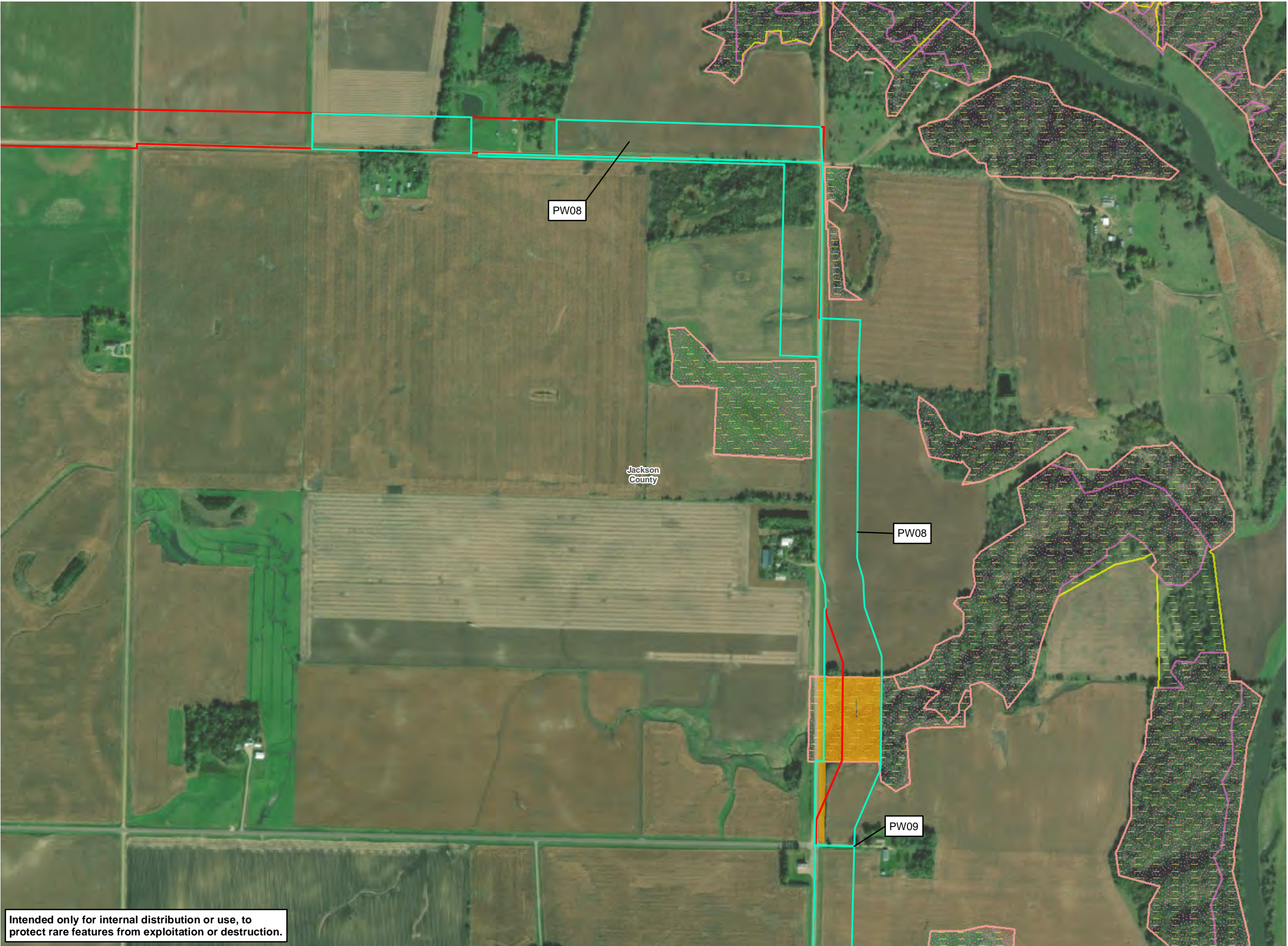
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Figure Title: Survey Results: MNL-304A/B Site-Specific Map	
Figure Number: C-3	
Scale: 1:7,200 1 in = 600 ft	Projection: Transverse Mercator NAD 1983 UTM Zone 15
Sheet: Sheet 2 Sheet 2 of 5	Drawing Number: 005-00040 Current Revision



VICINITY MAP



LEGEND

- Environmental Survey Area (5/25/23)
- Native Plant Communities
- Site of Biodiversity Significance
- Survey Site for Flora
- Prairie Bush-Clover Habitat

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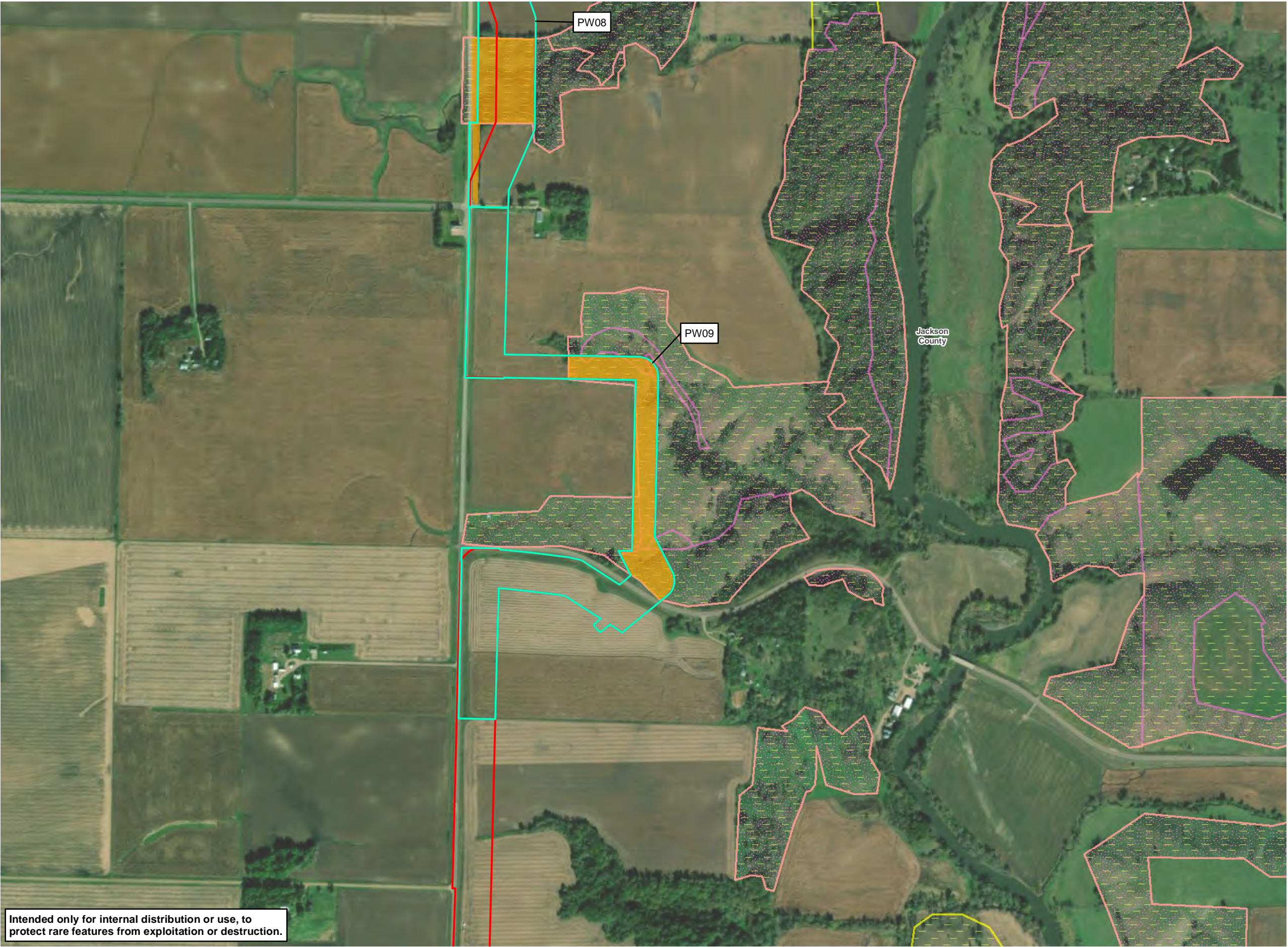


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Figure Title: Survey Results: MNL-304A/B Site-Specific Map	
Figure Number: C-4	
Scale: 1:9,000 1 in = 750 ft	Projection: Transverse Mercator NAD 1983 UTM Zone 15
Sheet: Sheet 3 Sheet 3 of 5	Drawing Number: 005-00040 Current Revision

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VICINITY MAP



LEGEND

- Environmental Survey Area (5/25/23)
- Native Plant Communities
- Site of Biodiversity Significance
- Survey Site for Flora
- Prairie Bush-Clover Habitat

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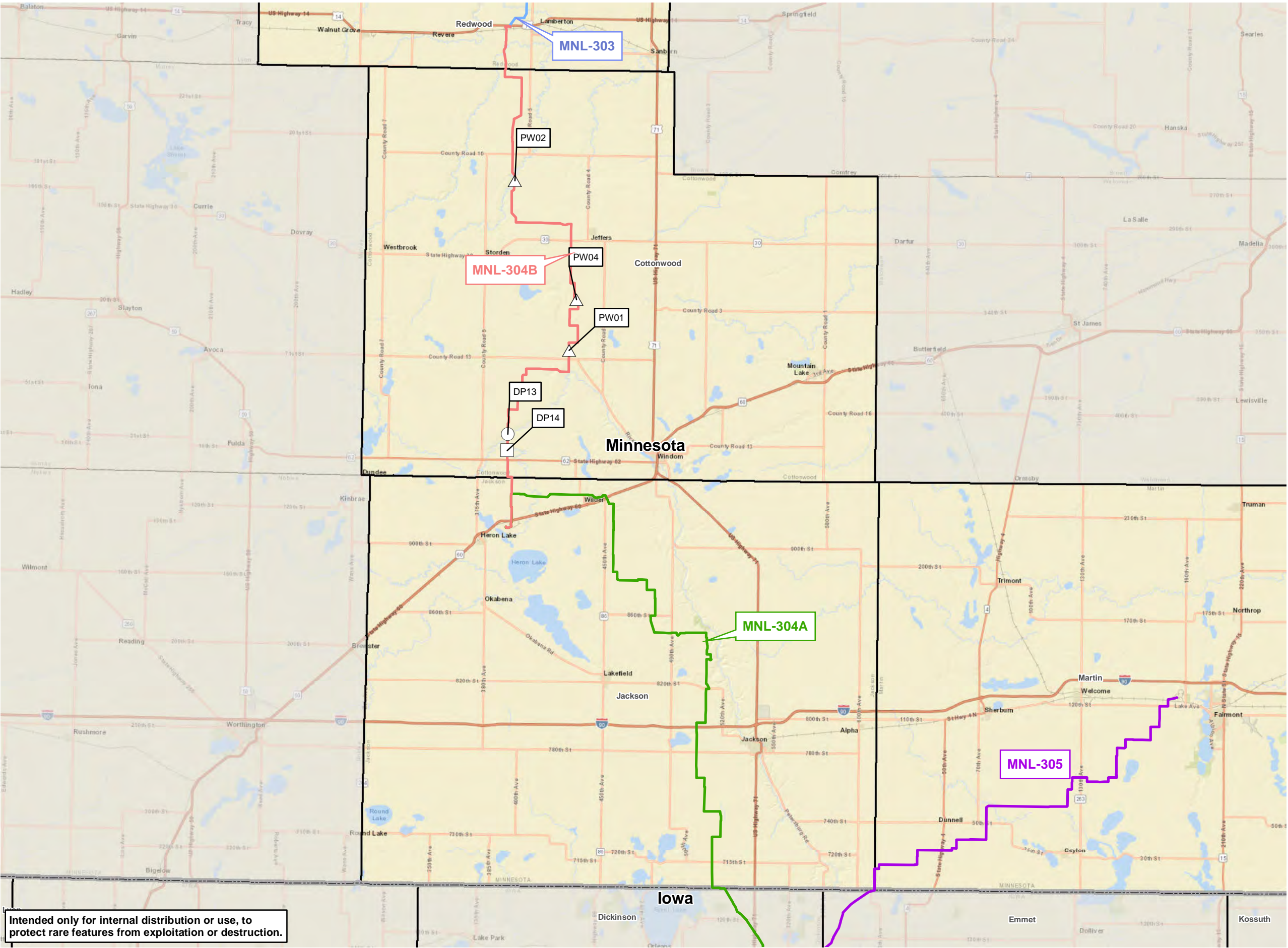
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Figure Title: Survey Results: MNL-304A/B Site-Specific Map	
Figure Number: C-5	
Scale: 1:9,000 1 in = 750 ft	Projection: Transverse Mercator NAD 1983 UTM Zone 15
Sheet: Sheet 4 Sheet 4 of 5	Drawing Number: 005-00040 Current Revision

Table C2: Survey Sites and Outcomes for MNL-304B, Listed North to South (Figure C-6)¹²

Site ID	Targeted for Listed Butterfly Surveys? (Year)	Butterfly Survey Outcome	Targeted for Listed Plant Surveys? (Year)	Plant Survey Outcome	Site-specific Map
PW02	No	N/A (surveyed only for plants)	Yes (2022, 2023)	No habitat/no individuals.	N/A
PW04	No	N/A (surveyed only for plants)	Yes (2022, 2023)	No habitat/no individuals.	N/A
PW01	No	N/A (surveyed only for plants)	Yes (2022, 2023)	No habitat/no individuals.	N/A
DP13	Yes (2022)	No habitat/no individuals.	Yes (2023)	No habitat/no individuals.	N/A
DP14	Yes (2022)	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A

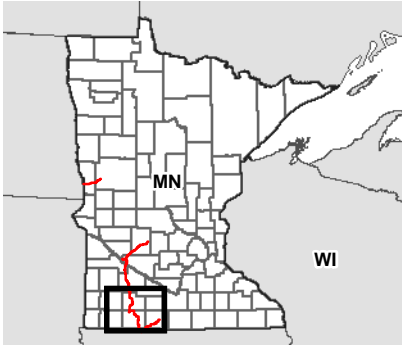
¹² The following five sites were included in the 2022 report but are not listed in the table here, because they are no longer within the Project environmental survey area: PW03, DP11, DP12, PW06, and PW07. DP11 and DP12 were surveyed for DASK/POSK habitat, with none found. PW03, PW06, and PW07 were surveyed for PBCL/WPFO habitat and state-listed plants. The finding at PW03 and PW07 was no habitat/no individuals. At PW06, suitable PBCL habitat was present, but Merjent's botanist did not find suitable WPFO habitat or individuals of PBCL, WPFO, or any other state-listed plants within the environmental survey area.



Intended only for internal distribution or use, to protect rare features from exploitation or destruction.

Disclaimer: Content on this figure is preliminary, and must be treated as confidential and proprietary. Sources are believed to be reliable and SCS does not assume responsibility for accuracy of data.

VICINITY MAP



LEGEND

Project Route Segment

- MNL-303
- MNL-304A
- MNL-304B
- MNL-305
- Survey Site for DASK/POSK and Flora (no habitat/no individuals)
- Survey Site for DASK/POSK (no habitat/no individuals)
- Survey Site for Flora (no habitat/no individuals)
- County Boundary
- State Boundary

REVISIONS

Date: 2023-12-05 Revised by: TR Checked by: SS
Revision 1

Date: Revised by: Checked by:

Date: Revised by: Checked by:

PREPARED BY

Summit Carbon Solutions
2321 North Loop Drive, Suite 221
Ames, Iowa 50010
United States of America
www.summitcarbonsolutions.com



MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Survey Sites: MNL-304B
Overview Map

Figure Number:
C-6

Scale:
1:360,000
1 in = 30,000 ft

Projection:
Transverse Mercator
NAD 1983 UTM Zone 15

Sheet:
Sheet 1
Sheet 1 of 5

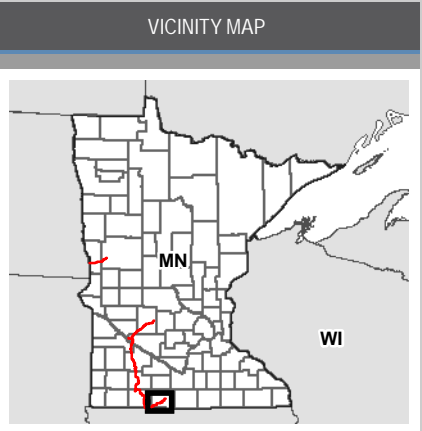
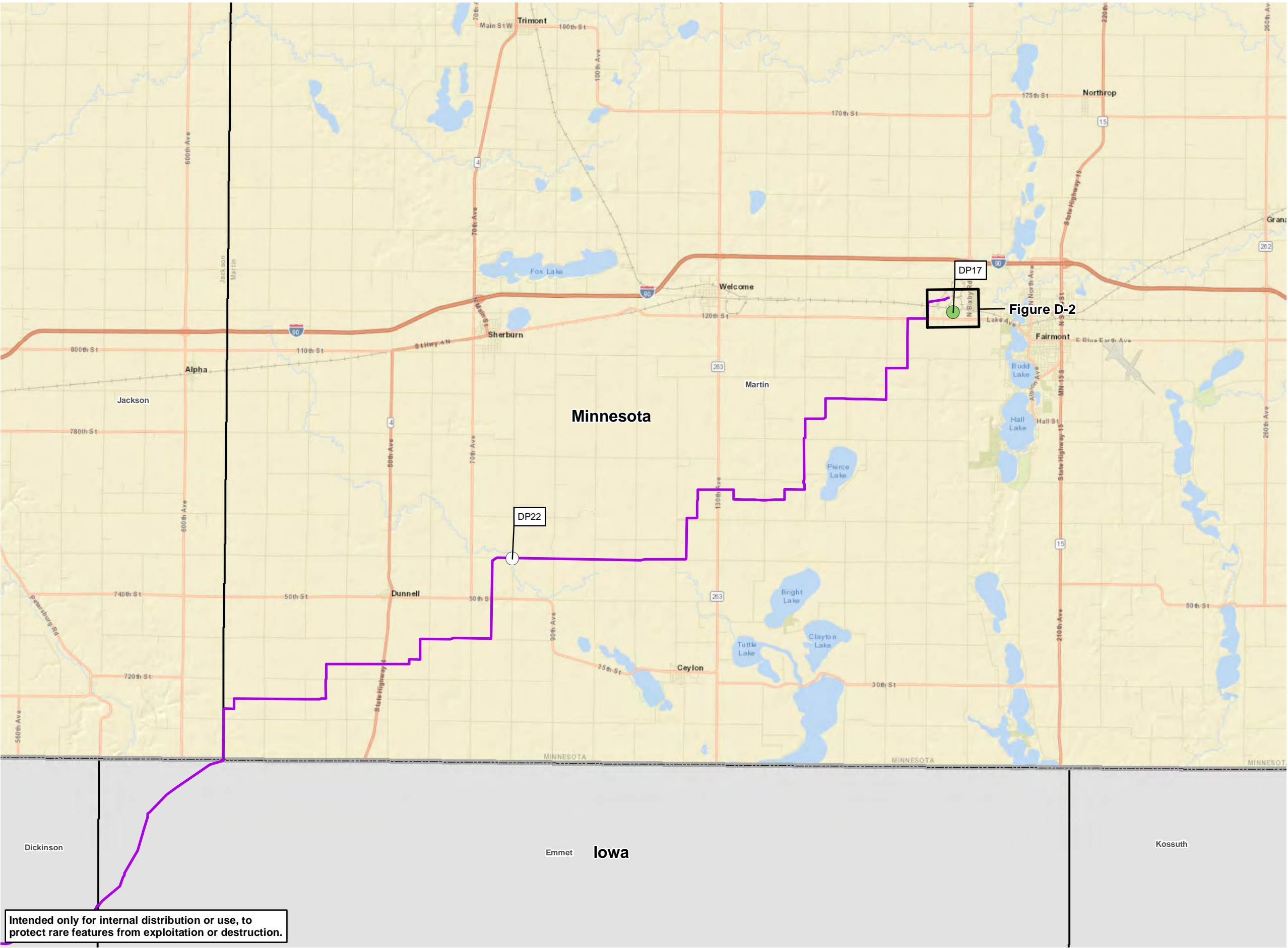
Drawing Number:
005-00040
Current Revision

Attachment D – MNL-305 Survey Sites and Results

Table D: Survey Sites and Outcomes for MNL-305, Listed East to West (Figure D-1)

Site ID	Targeted for Listed Butterfly Surveys? (Year)	Butterfly Survey Outcome	Targeted for Listed Plant Surveys? (Year)	Plant Survey Outcome	Site-specific Map
DP17 ^a	Yes (2022)	No habitat/no individuals.	Yes (2022)	Suitable WPFO habitat was present (rank C). Tuberous Indian-plantain (<i>Arnoglossum plantagineum</i> ; state-listed threatened) was present approximately 1,750 feet west of the environmental survey area at the time of survey. Merjent's botanist documented 7 individuals. Sullivant's milkweed (<i>Asclepias sullivantii</i> ; state-listed threatened) was present approximately 1,770 feet east of the environmental survey area at the time of survey. Merjent's botanist documented 8 individuals.	Figure D-2
DP22	Yes (2022)	No habitat/no individuals.	Yes (2022)	No habitat/no individuals.	N/A

^a DP17 is no longer within the Project environmental survey area, but it is included here in the table and on Figure D-2 due to the presence of state-listed plants that require reporting (see Attachment F).



LEGEND

Project Route Segment

- MNL-305
- Survey Site for DASK/POSK and Flora (finding: WPFO habitat and individuals of state-listed plant species* and no habitat/no individuals for DASK/POSK)
- Survey Site for DASK/POSK and Flora (no habitat/no individuals)
- County Boundary
- State Boundary
- Site-Specific Map

*See Figure D-2

REVISIONS			
Date:	2023-12-05	Revised by:	TR
Revision 1			
Date:		Revised by:	
Date:		Revised by:	

PREPARED BY

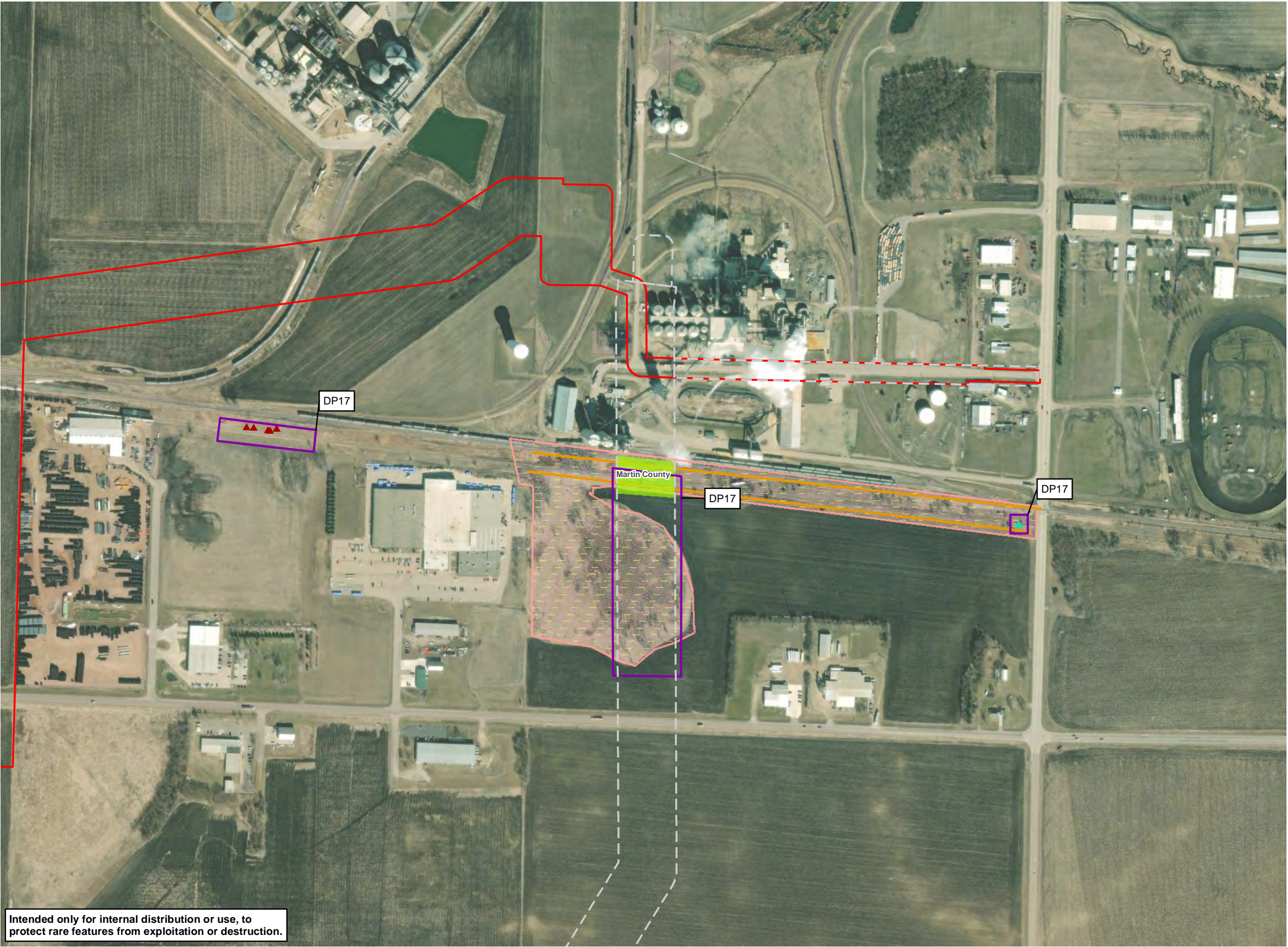
Summit Carbon Solutions
2321 North Loop Drive, Suite 221
Ames, Iowa 50010
United States of America
www.summitcarbonsolutions.com

MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Survey Sites: MNL-305
Overview Map

Figure Number:
D-1

Scale: 1:150,000 1 in = 12,500 ft	Projection: Transverse Mercator NAD 1983 UTM Zone 15
Sheet: Sheet 1 Sheet 1 of 2	Drawing Number: 005-00040 Current Revision



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VICINITY MAP



LEGEND

- Environmental Survey Area (5/25/23)
- Environmental Survey Area (5/24/22)
- Native Plant Communities
- Site of Biodiversity Significance
- Railroad Rights of Way Prairies
- Tuberous Indian-Plantain (Amoglossum plantagineum)
- Sullivant's Milkweed (Asclepias sullivantii)
- Survey Site for DASK/POSK and Flora
- WPFO Habitat (Rank C)

REVISIONS

Date:	2023-12-05	Revised by:	TR	Checked by:	SS
Revision 1					
Date:		Revised by:		Checked by:	
Date:		Revised by:		Checked by:	

PREPARED BY

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Ames, Iowa 50010
United States of America
www.summitcarbonsolutions.com



SUMMIT CARBON
SOLUTIONS

MIDWEST CARBON EXPRESS PROJECT

Figure Title: Survey Results: MNL-305 Site-Specific Map	
Figure Number: D-2	
Scale: 1:6,000 1 in = 500 ft	Projection: Transverse Mercator NAD 1983 UTM Zone 15
Sheet: Sheet 2 Sheet 2 of 2	Drawing Number: 005-00040 Current Revision

Attachment E – MDNR's Rare Species Survey Reports Memo (2012)



Division of Ecological and Water Resources

TO: Endangered and Threatened Species Surveyors

FROM: Lisa Joyal, Endangered Species Review Coordinator

Phone: (651) 259-5109

e-mail: lisa.joyal@state.mn.us

RE: Rare Species Survey Reports

The Minnesota Department of Natural Resources' Division of Ecological and Water Resources (DNR) relies upon the results of endangered and threatened species surveys to conserve these species through its conservation, management, environmental review, and permitting responsibilities. When surveys for rare species are requested as part of the environmental review process, the DNR makes every effort to coordinate closely with surveyors to ensure that survey results are reliable. High quality survey data enables the DNR's to uphold Minnesota's endangered species law (*Minnesota Statutes*, section 84.0895) and associated rules (*Minnesota Rules*, part 6212.1800 to 6212.2300 and 6134).

As such, for projects associated with environmental review, we request that survey proposals be submitted to the DNR before any survey work is initiated. This process is an attempt to avoid any potential delays or other problems due to incomplete list of target species or inappropriate survey protocol. Surveys should primarily target the species mentioned in the Natural Heritage letter, but should also target any other state-listed species that are likely to be found in the habitat in question. Please refer to the DNR Rare Species Guide (<http://www.dnr.state.mn.us/rsg/index.html>) for further information on the rare species that can be found in a particular habitat, and for the habitat and phenology of each targeted species. The DNR Rare Species Guide is the state's authoritative reference for Minnesota's endangered, threatened, and special concern species. It is a dynamic, interactive source that can be queried by county, ECS subsection, watershed, or habitat. Final survey results should also be submitted to the DNR.

Please include the following information in the Rare Species Survey Proposals and Survey Results:

- Purpose of the survey
- List of the targeted species
- Qualifications of the surveyor(s) and his or her experience working with the targeted species
- If applicable, a copy of the collection permit issued by the DNR.
- Survey date(s) and methodology
- Map (and GIS shapefile if large project area) of areas (to be) surveyed or assessed for habitat suitability
- Locations and number of individuals for any state-listed species
- State type of documentation for each listed species (e.g., photograph or collected specimen)
- A completed Rare Feature Reporting Form for each state-listed or tracked species, or a statement that the data has been submitted electronically
- Any associated specimens and electronic data should be submitted with the Survey Results

Survey Proposals and Survey Results may be sent electronically to the email address listed above or mailed to the following address:

Lisa Joyal
DNR Division of Ecological and Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155

Thank you for your interest in conducting rare species surveys in Minnesota.

Attachment F – NHIS Documentation and Species Identification Confirmation



MEMO

Date:

February 22, 2023

To:

Data Manager, Natural Heritage Information System, Minnesota Department of Natural Resources

From:

Andy Kranz, Merjent

CC:

Sarah Stai, Merjent

Subject:

NHIS Rare Plant Observation Data, Summit Carbon Solutions, LLC Projects

Attachments:

- NHIS Rare Plant Observation Data_ARK 2022.xlsx
- NHIS Rare Plant Observation Data_ARK 2022_UTM14.zip
- NHIS Rare Plant Observation Data_ARK 2022_UTM15.zip
- NHIS Species ID Confirmation SCS.pdf

I am submitting data for observations of three rare plant populations in Minnesota documented during field surveys in 2022. The surveys were conducted to assess habitat for federally threatened plants. The surveys also documented plants that are state-listed in Minnesota as special concern, threatened, or endangered.

I observed one population each of *Arnoglossum plantagineum*, on June 6, 2022, and *Asclepias sullivantii*, on July 9, 2022, in the City of Fairmont, Martin County, Minnesota. These populations were observed during surveys as part of the Summit Carbon Solutions, LLC Martin County Project. The populations were located within the same parcel, owned by Fairmont Economic Development Authority.

I also observed one population of *Cypripedium candidum* on June 8, 2022, in Orwell Township, Otter Tail County. This population was observed during surveys as part of the Summit Carbon Solutions, LLC Otter Tail to Wilkin Project and is located on the property of Ethel Maack.

Please see the attached rare plant observation data spreadsheet and shapefiles for details.

Specimens of *A. plantagineum* and *A. sullivantii* were collected under DNR Special Permit #23226. This permit is assigned to Otto Gockman who was also conducting field work on the project. Correct identification was confirmed by Welby Smith and the specimens will be submitted to the University of Minnesota Herbarium.

Please contact me with any questions or concerns.

Respectfully submitted,



Andy Kranz
Environmental Consultant/Botanist
Merjent
507-459-3150
andy.kranz@merjent.com

Nun	Shapefile Name	Shape_ID	Shape_Detail	Species_Name	Alternate_Species	urce	Observer	Affiliation	Additional_Observers	Contact	Contact_Info	Project	Survey	Observation_Date	Fuzzy_Date	Observation_Remarks	Act_Num_Ind	Est_Num_Ind	Population_Size	Phenology	Phenology_Comments	Native_Plant_Community	Habitat	Population_Extent	Viability_Comments	Management_Comments	Directions	County	TWP	RGE	RGE_Dir	SEC	QQ_SEC	Area_Name	Ownership	ID_Type	ID_Confirmed	ID_Conf_By	Col_No	Repository
1	NHIS Rare Plant Observation Data_ARK 2022_UTM15	1	Point locations of Arnoglossum plantagineum individuals or groups of individuals (number indicated in attribute data)	Arnoglossum plantagineum		FNA	Andrew R. Kranz	Merjent, Inc.		Andy Kranz 507-459-3150; andrew.r.kranz@gmail.com	Summit Carbon Solutions, LLC Martin County Project	Flora	2022-06-06			Population near but outside survey area. Herbarium label: Northwestern Fairmont; 0.8 mile west of County Hwy. 39; 0.3 mile north of 120th St.; 80 feet south of primary railroad, 20 feet north of side-track. Rosette ~2 feet in diameter; 7 plants, possibly more north of surveyed area to railroad; 1 plant in bloom on return July 9, 2022, fls. ~80, white. In small patch of degraded mesic prairie in railroad right-of-way dominated by ruderal vegetation with intermittent prairie flora. Associated with Bromus inermis, Hesperostipa spartea, Poa pratensis, Helianthus pauciflorus, Zizia aptera, Asclepias syriaca, Ratibida pinnata, Lithospermum canescens, Veronicastrum virginicum, Anemone canadensis, Helopsis helianthoides, Rhamnus cathartica.	7	7+	3000 sq ft; did not have permission to survey all the way north to rail; possibly larger population	Emerging (forb)	Rosettes mature at time of collection; upon return on July 9, 2022, 1 individual was in bloom (~50% of inf)	UPs23 - Southern Mesic Prairie	Degradated UPs23; dominated by Bromus inermis, Hesperostipa spartea, Poa pratensis, Helianthus pauciflorus, Dichanthelium oligosanthes; patches of NPC in matrix of ruderal vegetation, all within a railroad right-of-way.	? - Uncertain whether full extent of Observation is known	Aggressive ruderal vegetation present; potential for mowing and herbicide	Mowing apparent at southern limit of observed population	Northwestern Fairmont; 0.8 mile west of County Hwy. 39; 0.3 mile north of 120th St.; 80 feet south of primary railroad; 20 feet north of side-track.	Martin		Fairmont Economic Development Authority	S	Yes	Smith, Welby R.	1001	University of Minnesota Herbarium					
2	NHIS Rare Plant Observation Data_ARK 2022_UTM15	2	Point location of Asclepias sullivantii colony center	Asclepias sullivantii			Gleason and Cronquist 1991	Andrew R. Kranz	Merjent, Inc.		Andy Kranz 507-459-3150; andrew.r.kranz@gmail.com	Summit Carbon Solutions, LLC Martin County Project	Flora	2022-07-09		Population near but well outside survey area. Herbarium label: Northwestern Fairmont; 90 feet west of County Hwy. 39; 0.2 mile north of 120th St.; 95 feet south of railroad. Infl. axillary and terminal umbels; fls. 6-9 per umbel, pink; 8 stems, 0.5 to 3 feet between stems. In railroad right-of-way dominated by cool season grasses, trees and shrubs sparse to patchy. Directly associated with Bromus inermis, Acer negundo, Spartina pectinata, Solidago altissima; patches of mesic prairie flora nearby include Andropogon gerardi, Apocynum cannabinum, Symphyotrichum lanceolatum, Zizia aurea, Anemone cylindrica, Solidago rigida, Symphyotrichum ericoides, Ratibida pinnata, Helopsis helianthoides, Comandra umbellata, Taraxacum officinale, Rhamnus cathartica, Helianthus grosseserratus.	8	8	300 sq ft stems/ramets	Flowering	1 individual in bloom, 2 umbels	In ruderal vegetation; dominated by Bromus inermis, partly shaded by Acer negundo; UPs23 flora nearby; all within a railroad right-of-way.	? - Uncertain whether full extent of Observation is known	Aggressive ruderal vegetation present; potential for mowing and herbicide		Northwestern Fairmont; 90 feet west of County Hwy. 39; 0.2 mile north of 120th St.; 95 feet south of railroad.	Martin		Fairmont Economic Development Authority	S	Yes	Smith, Welby R.	1002	University of Minnesota Herbarium						
3	NHIS Rare Plant Observation Data_ARK 2022_UTM14	3	Point locations of Cypripedium candidum individuals or groups of	Cypripedium candidum		FNA	Andrew R. Kranz	Merjent, Inc.		Andy Kranz 507-459-3150; andrew.r.kranz@gmail.com	Summit Carbon Solutions, LLC Otter Tail to Wilkin Project	Flora	2022-06-08			Population within and extending beyond survey area. 17 individuals observed within survey area, all in bloom; population continues to the west outside survey area, perhaps dozens or hundreds in total; specimens were not collected; photographs available upon request.	17 dozens to hundreds		18,000 sq ft (portion of population within survey area)	Flowering	All observed individuals were in bloom	WPN53 - Northern Wet Prairie	Degradated/grazed wet prairie, occurring as an ecotone between mesic prairie and sedge meadow.	N - Confident full extent of Observation is NOT known	Ruderal vegetation abundant; possibly grazing pressure	Uncertain if recently grazed or retired pasture	Northern Orwell Township; 1.1 miles west of County Hwy. 124; 0.3 miles south of County Hwy. 1	Otter Tail		Ethel Maack	P	n/c								

From: [Andy Kranz](#)
To: Reports.NHIS@state.mn.us
Cc: [Joyal, Lisa \(DNR\)](#); [Sarah Stai](#); [MCE Archive](#)
Subject: Rare Plant Observations 2022
Date: Wednesday, February 22, 2023 2:37:05 PM
Attachments: [image001.png](#)
[NHIS Rare Plant Observation Data Memo - 02-22-23.pdf](#)
[NHIS Rare Plant Observation Data ARK 2022.xlsx](#)
[NHIS Rare Plant Observation Data ARK 2022 UTM14.zip](#)
[NHIS Rare Plant Observation Data ARK 2022 UTM15.zip](#)
[NHIS Species ID Confirmation SCS.pdf](#)

To whom it may concern:

Please see the attached memo and rare plant observation data. Let me know if you have any questions or concerns.

Thank you,

Andy Kranz

612.924.3998 direct

507.459.3150 mobile

andy.kranz@merjent.com



1 Main Street SE, Suite 300

Minneapolis, MN 55414

612.746.3660 main

www.merjent.com

From: [Andy Kranz](#)
To: [Sarah Stai](#)
Subject: Fwd: EXTERNAL: Re: Rare plant specimens
Date: Monday, February 20, 2023 8:23:50 PM
Attachments: [image001.png](#)

See Welby's confirmation below.

Andy Kranz
Merjent
507-459-3150

From: Smith, Welby R (DNR) <welby.smith@state.mn.us>
Sent: Friday, February 17, 2023 10:43:22 AM
To: Andy Kranz <andy.kranz@merjent.com>
Subject: Re: EXTERNAL: Re: Rare plant specimens

The specimens look, and correctly identified. I will bring them to the Bell herbarium today and get them accessioned into the collections right away.

welby

From: Andy Kranz <andy.kranz@merjent.com>
Sent: Tuesday, February 14, 2023 8:14 PM
To: Smith, Welby R (DNR) <welby.smith@state.mn.us>
Subject: Re: EXTERNAL: Re: Rare plant specimens

No problem. Nathan Dahlgren met me in the lobby and said he would set them in your cubicle.

Andy Kranz
Merjent
507-459-3150

From: Smith, Welby R (DNR) <welby.smith@state.mn.us>
Sent: Tuesday, February 14, 2023, 7:27 PM
To: Andy Kranz <andy.kranz@merjent.com>
Subject: Re: EXTERNAL: Re: Rare plant specimens

I wasn't there (you know that now), but I will return to my cube tomorrow afternoon.

welby

From: Andy Kranz <andy.kranz@merjent.com>
Sent: Tuesday, February 14, 2023 12:13 PM
To: Smith, Welby R (DNR) <welby.smith@state.mn.us>
Subject: RE: EXTERNAL: Re: Rare plant specimens

Welby,

I'll drop the specimens off this afternoon, probably between 3:00 and 4:00.

Andy Kranz

612.924.3998 direct

507.459.3150 mobile

andy.kranz@merjent.com



1 Main Street SE, Suite 300

Minneapolis, MN 55414

612.746.3660 main

www.merjent.com

From: Smith, Welby R (DNR) <welby.smith@state.mn.us>

Sent: Monday, February 13, 2023 6:31 PM

To: Andy Kranz <andy.kranz@merjent.com>

Subject: EXTERNAL: Re: Rare plant specimens

CAUTION: This email originated from outside of Merjent.

Hi Andy,

Sure, bring them in, or get them to me whatever way is most convenient for you. If I'm not there, they can be left in my cubicle.

welby

From: Andy Kranz <andy.kranz@merjent.com>

Sent: Monday, February 13, 2023 6:24 PM

To: Smith, Welby R (DNR) <welby.smith@state.mn.us>

Subject: Rare plant specimens

This message may be from an external email source.

Do not select links or open attachments unless verified. Report all suspicious emails to Minnesota IT Services Security Operations Center.

Hi Welby,

I have two specimens to submit, *Arnoglossum plantagineum* and *Asclepias sullivantii*, from the same railroad ROW in Martin County. These were collected in the course of 2022 Merjent work. I made collections at Otto's suggestion, under his permit number (he was working on the same project). Can

I bring these to you to verify ID?

I've attached some photos as well as herbarium labels and the NHIS data sheet.

Andy Kranz

612.924.3998 direct

507.459.3150 mobile

andy.kranz@merjent.com



1 Main Street SE, Suite 300

Minneapolis, MN 55414

612.746.3660 main

www.merjent.com

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Attachment G – MDNR’s Guidance on Documenting and Collecting Rare Plants (2018)

Guidance on Documenting and Collecting Rare Plants

DNR Division of Ecological and Water Resources

February 2018

Please refer to the following guidance if you will be submitting records for entry into the DNR's Natural Heritage Information System (NHIS). All botanical surveys conducted for environmental review or permitting purposes should follow this guidance.

Before Going in the Field

- Review the [current list of state-listed species](#) so you will know which species are rare.
- Check the Rare Features Database (see [How to Obtain Natural Heritage Data](#)) and, if applicable, the records of other public land managers to see if there are known occurrences of rare plants within your work or study area.
- Familiarize yourself with critical identifying features of species likely to be collected. This might include a visit to a herbarium to review previous collections of a plant species.
- Obtain the plant spreadsheet template for data entry purposes. Review this spreadsheet to familiarize yourself with the type of information that should be collected. The Rare Plant Observations spreadsheet template is available under "Submitting Data" on the [NHIS Website](#).
- Obtain a permit if you plan to collect specimen vouchers of state-listed endangered or threatened species. Minnesota's endangered species law (*Minnesota Statutes*, section 84.0895) and associated rules (*Minnesota Rules*, part 6212.1800 to 6212.2300 and 6134) prohibit the taking of threatened or endangered species without a permit. Please contact Richard Baker, Endangered Species Coordinator, at Richard.Baker@state.mn.us to request a permit.
- When required, obtain permits for collecting on public lands such as Scientific and Natural Areas, State Parks, and National Forests.
- Respect property owners' rights. Obtain permission from the private landowner or public land manager to 1) go on the land and 2) to collect plants.
- **Any surveys required through the DNR environmental review process must follow the standards contained in this Guidance.** Before initiating any such survey, the surveyor must receive approval of a project-specific survey plan from Lisa Joyal, Endangered Species Review Coordinator. Any proposed departure from the standards in the *Guidance* must be identified in the project-specific plan.

Specimen Collection

Most rare plant records in the DNR's Rare Features Database are documented with collected specimens deposited in credible herbaria. Records documented by standard herbarium collections in museums are strongly preferred over all other forms of documentation. A specimen of a rare plant often is sufficient if it includes a portion of the plant that allows positive identification of the species.

Under what circumstances should I collect a herbarium specimen?

- Collect state-listed endangered or threatened plants only if you have a permit. If you have unintentionally collected an endangered or threatened plant without a permit, the specimen should be submitted to the DNR as soon as is practical following the procedures described below, with a brief note attached that explains the circumstances.
- For new locations of a species, collect a specimen; in general, make no more than one collection of a particular species per 40 acres of habitat.
- For previously known populations of an endangered or threatened plant, consider collecting a new voucher if the DNR's Rare Features Database indicates that it has been more than thirty years since the last voucher was collected from the population.
- For any given species, collect only when distinguishing characters are present (usually flowers and/or fruits are necessary); if key characters are not present, mark the location and return at the appropriate time for collecting a specimen with distinguishing characteristics.
- For endangered or threatened vascular plants, collect a complete specimen (which includes roots) only when the population has more than 100 individuals.

- For populations of endangered or threatened vascular plants with fewer than 100 individuals, collect only the distinguishing portion of the plant (e.g., a portion of the inflorescence that has one or more flowers or a portion of the stem that has one or more leaves). A partial specimen might be inadequate to confirm the identification. In this case, supplement the partial collection with a close-up photograph that clearly shows the diagnostic features. Please note that in many cases photographs are not sufficient to confirm identification.
- For aquatic plants, collect a portion of the stem with leaves and fruits or flowers. Do not collect the roots. If you are unsure whether you have found a rare species, collect several specimens. Please note that in most cases photographs are not sufficient to confirm the identification of aquatic species. If your target search area is aquatic, please contact Welby Smith, DNR Botanist, at Welby.Smith@state.mn.us for additional guidance.
- For *Botrychium* spp., always collect a specimen of the above-ground portion of the plant, regardless of the apparent population size or the state status of the species.
- For mosses, liverworts, fungi and lichens, collect such that the viability of the population is maintained.

How do I make a proper collection? See General Guidelines for Collecting Vascular Plant Specimens on page 3.

Specimen Submission

- For quality control purposes, the identification of the specimen must be confirmed by a qualified second party before a record can be entered into the Rare Features Database.
- Send specimen(s) of state-listed species or suspected state-listed species directly to Welby Smith, DNR Botanist, for verification. Each specimen must have a label that meets the Bell Museum standards (see page 3). Do not submit unknown specimens unless you suspect that it is a state-listed species. If you are unsure of the species' identification, you can leave the space for the scientific name blank. Send specimens to:
 Welby Smith
 Minnesota Department of Natural Resources
 Division of Ecological Resources
 500 Lafayette Road, Box 25
 St. Paul, MN 55155
- DNR staff will complete verification or submit the specimen to an outside expert for annotation. Following verification, the DNR will donate specimens to the University of Minnesota Herbarium, a division of the [Bell Museum of Natural History](#). Save response from the DNR and submit with data.

Data Submission

- Follow the directions and templates under "Submitting Data" on the [NHIS Website](#).
- Document *all* state-listed endangered, threatened, or special concern species encountered. Include type of documentation for each record (e.g., photograph or specimen).
- Submit data electronically as a spreadsheet with an accompanying shapefile. Use the Rare Plant Observations spreadsheet template available under "Submitting Data" at [NHIS Website](#).
- **Important!** *Ensure that the unique identifier for each record is the same in the shapefile, the spreadsheet, the report's tables and figures, and the information submitted with the specimens.*
- Submit cover sheet, survey report, GIS shapefile, spreadsheet, and email verifying specimen identification to Reports.NHIS@state.mn.us.

How will my records be used to protect rare plants?

- Conservation planning at local, state and regional levels.
- Environmental review of development projects.
- Research about life history.
- Revisions to the state list of endangered, threatened and special concern species.
- Legal challenges related to protected species locations are possible. Properly vouchered specimens are often critical in the protection of rare plant populations in these cases.

Questions?

- **Regarding permits:** Contact Rich Baker at Richard.Baker@state.mn.us or 651-259-5073.
- **Regarding specimens:** Contact Welby Smith at Welby.Smith@state.mn.us or 651-259-5142.
 or Hannah Texler at Hannah.Texler@state.mn.us or 651-259-5048.
- **Regarding data submittal:** Contact Karen Cieminski at Karen.Cieminski@state.mn.us or 651-259-5081.
- **Regarding environmental review process:** Contact Lisa Joyal at Lisa.Joyal@state.mn.us or 651-259-5109.

General Guidelines for Collecting Vascular Plant Specimens*

*For mosses, liverworts, algae, fungi and lichens, please contact the [University of Minnesota Herbarium](#) for collection guidelines.

1. **Equipment:** Plant press, straps (2), felt blotters, ventilators (corrugated boards), and newspaper. Also, a knife or other tool for cutting and digging and a notebook of standardized form for recording field data. The press can be made from $\frac{3}{4}$ " plywood cut 12" x 18" (2 pieces); the ventilators can be cut from discarded "cardboard" boxes, also 12" x 18" (the corrugations should run the short direction). The blotters can be obtained from a stationery store.
2. **Preparation:** Once the specimen is found, it is necessary to determine what portion of the plant will be collected. A complete collection includes the entire plant with roots, but for purposes of conservation, the roots of rare species should not be collected if the population consists of fewer than 100 individuals. For most species, such as orchids, a single flower is enough for purposes of identification. Other species, e.g., sedges, usually require the complete aboveground stem with mature fruit. Specimens of trees and shrubs should include a twig with mature leaves and flowers and/or fruit. Specimens that do not show diagnostic features cannot be identified and are worthless. If only a portion of the plant is collected, it is important to record a description of the entire plant.

Before collecting plants, it is a good idea to check with the curator of the herbarium where the specimen will be deposited. Some herbaria may not accept a partial specimen unless it has special significance (e.g., a new location for an endangered species).

3. **Pressing and processing specimens:** The freshly collected specimen is placed within the sheet of folded newspaper with the leaves, flowers, etc. in a natural position, but clearly showing the diagnostic features. The paper is placed between two sheets of felt blotters, which are themselves placed between two corrugated ventilators. It is then put within the press, which is tightened with the straps (or ropes). Several specimens can be put in a single press by layering the blotters and ventilators. Commercial plant presses are slightly larger than herbarium paper so the specimens should not fill the plant press side to side. Also, be sure to leave room for a label in the lower right portion. The press must then be put in a warm dry place until the plants are dry. A simple plant drier that uses heat rising from a light bulb works well, but is not essential. The blotters should be changed every day until the specimen is dry. If a specimen does not dry within 4-5 days, it will likely begin to decompose. When the specimen is dry, it should be taken from the press, but kept within the folded newspaper for protection.

A label (see example below) must be prepared before the specimen can be sent to a herbarium. The label should be on acid-free, archival quality paper. We suggest that you use labels that are 2 $\frac{3}{4}$ x 4 $\frac{1}{4}$ inches in size, but other labels not to exceed 3 x 5 inches will be acceptable. At a bare minimum, the label must contain the name of the species, location of collection, description of habitat, name of collector, and date of collection. The label should also include latitude and longitude coordinates and/or UTM coordinates, and, if a permit was required, the permit number. Providing a label is the responsibility of the collector, not the herbarium or the DNR. A specimen without a label will not be accepted by a herbarium.

After the label is prepared, it should be put with the specimen inside the folded newspaper, which may be held between two corrugated ventilators for rigidity. The herbarium will mount the specimen and label on a stiff sheet of paper and accession it into their collection.

The University of Minnesota Herbarium, a division of the Bell Museum of Natural History, houses the largest collection documenting Minnesota's plant diversity and is the primary repository for the DNR's Minnesota Biological Survey. Additional [guidance on collecting rare plants for museum specimens](#) can be found on the University of Minnesota Herbarium website.

Plants of Scott County, Minnesota, USA

Silphium integrifolium Michx. var. *integrifolium*

3 miles west of Jordan in north half of quarter-quarter section.

Approximately 100 plants in wet to wet-mesic prairie on terrace within the Minnesota River Valley. In heavily grazed pasture dominated mostly by *Spartina pectinata* and *Agrostis stolonifera*. Soils range from black muck with marl concretions to silt loam. Site has been compacted by grazing. Glacial erratics common. Associated with *Carex stricta*, *Pycnanthemum virginianum*, *Lobelia siphilitica*, *Lysimachia quadriflora*, *Aster puniceus*.

T 114N R 24W NW $\frac{1}{4}$ of SE $\frac{1}{4}$ of Sec 27

MNDNR Permit # 1996

Fred S. Harris

96235

September 3, 1996

MINNESOTA BIOLOGICAL SURVEY
MINNESOTA DEPARTMENT OF NATURAL RESOURCES

NOTICE:

In accordance with Minnesota Rules, part 7829.0500 and Minnesota Statutes Chapter 13, Summit Carbon has designated portions of the report titled "Results of 2022 Field Surveys for Listed Butterfly and Plant Species in Minnesota" as NONPUBLIC DATA – NOT FOR PUBLIC DISCLOSURE because it contains natural heritage information. Natural heritage information is nonpublic under Minn. Stat. § 84.0872. The Minnesota Department of Natural Resources also restricts its dissemination by license agreement. Given the need to include nonpublic information, Summit Carbon will prepare both Nonpublic and Public versions of "Results of 2022 Field Surveys for Listed Butterfly and Plant Species in Minnesota."



Results of 2022 Field Surveys for Listed Butterfly and Plant Species in Minnesota

Project Name:

Summit Carbon Solutions Midwest Carbon Express Project

Document Number:

SCS-0700-ENV-02-RPT-040

Date

February 28, 2023

REVISION HISTORY

DATE	REVISION	REVISION DESCRIPTION	PREPARED BY:	REVIEWED BY:	APPROVED BY:
02/28/23	0	Results of 2022 Field Surveys for Listed Butterfly and Plant Species in Minnesota	SMS	BAB	JZ

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Attachment B – MNL-303 Survey Sites and Results

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Attachment D – MNL-305 Survey Sites and Results

Attachment E – MDNR’s Rare Species Survey Reports Memo (2012)

Attachment F – NHIS Documentation and Species Identification Confirmation

Attachment G – MDNR’s Guidance on Documenting and Collecting Rare Plants (2018)

Acronyms and Abbreviations

CO ₂	carbon dioxide
DASK	Dakota skipper
MDNR	Minnesota Department of Natural Resources
Merjent	Merjent, Inc.
MNR	Midwest Natural Resources, Inc.
NHIS	Natural Heritage Information System
NLCD	National Land Cover Dataset
NPC	Native Plant Community
PBCL	prairie bush clover
POSK	Poweshiek skipperling
Project	Midwest Carbon Express Project
ROW Prairie	Minnesota Railroad Right-of-way Prairies
SCS	Summit Carbon Solutions, LLC
SOBS	Sites of Biodiversity Significance
USFWS	U.S. Fish and Wildlife Service
WPFO	western prairie fringed orchid

1 Introduction

Summit Carbon Solutions, LLC (SCS) is proposing to develop the Midwest Carbon Express Project (the Project), a carbon capture, transportation, and sequestration project that will capture and transport carbon dioxide (CO₂) emissions from industrial facilities in Iowa, Minnesota, Nebraska, North Dakota, and South Dakota to a sequestration site in North Dakota, where the CO₂ will be safely and permanently stored. Construction of the Project will involve approximately 2,000 miles of 4-inch to 24-inch pipelines.

SCS is preparing for Project permitting and construction with support from Merjent, Inc. (Merjent) for the Project's environmental review efforts in Minnesota. SCS and Merjent have been coordinating with the Minnesota Department of Natural Resources (MDNR) regarding potential occurrences of sensitive species.¹ This report describes field surveys conducted in 2022 along the Project's five Minnesota pipeline segments (shown on the map in Figure 1 and listed in Table 1 with their associated counties).

Table 1: Pipeline Segments in Minnesota and Associated Counties

Pipeline Segment ID	Counties
MNL-321	Otter Tail, Wilkin
MNL-337	Chippewa, Kandiyohi, Renville
MNL-303	Chippewa, Redwood, Renville, Yellow Medicine
MNL-304	Cottonwood, Jackson, Redwood
MNL-305	Martin

The surveys targeted plants that are state-listed in Minnesota as special concern, threatened, or endangered and for which suitable habitat may occur in or near the environmental survey area. Species on the MDNR watch list according to MNTAXA² were also documented when observed. Additionally, through a parallel coordination process with the U.S. Fish and Wildlife Service (USFWS), four federally listed species were determined to warrant field surveys (Table 2).³ All four species, two butterflies and two plants, are also state-listed in Minnesota. Although the butterfly species were not targeted as part of SCS's correspondence with the MDNR regarding survey protocols, results of butterfly habitat assessments are reported here due to the species' state status.

Table 2: Federally Listed Species Targeted for Survey

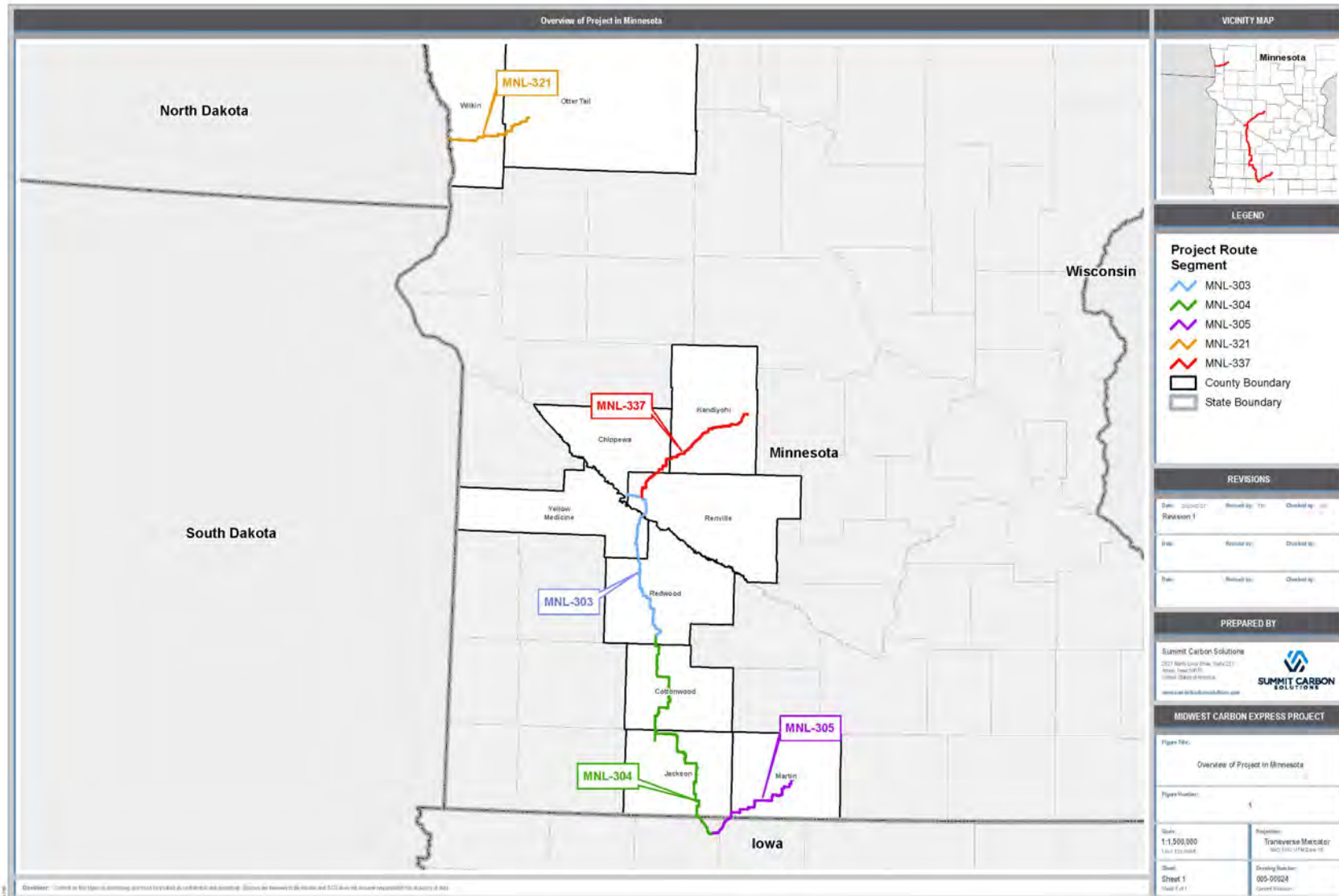
Species	Federal Status	Minnesota Status
Dakota Skipper (<i>Hesperia dacotae</i>)	Threatened	Endangered
Poweshiek Skipperling (<i>Oarisma poweshiek</i>)	Endangered	Endangered
Prairie Bush Clover (<i>Lespedeza leptostachya</i>)	Threatened	Threatened
Western Prairie Fringed Orchid (<i>Platanthera praeclara</i>)	Threatened	Endangered

¹ SCS submitted a letter to MDNR on April 5, 2022, requesting consultation regarding sensitive species in Minnesota's Natural Heritage Information System database and providing its proposed survey protocol for sensitive flora species in the vicinity of the Project. MDNR responded on May 13, 2022, with approval of SCS's protocol, which was followed to obtain the results reported here.

² MDNR watch-list status was obtained from http://www.dnr.state.mn.us/eco/mcbs/plant_lists.html.

³ USFWS did not specifically request field surveys for the Dakota skipper, but SCS included this species in the desktop and field effort because of its status as endangered in Minnesota and the similarity of its habitat requirements to the Poweshiek skipperling.

Figure 1: Overview of Project in Minnesota



2 Butterfly Survey Methods

Merjent worked with qualified biologists at Midwest Natural Resources, Inc. (MNR) to identify and assess habitat for the Dakota skipper and Poweshiek skipperling within the Project's environmental survey area in Minnesota. Both Lepidoptera species inhabit native prairie remnants. MNR conducted a desktop assessment to identify areas of potentially suitable habitat within the Project footprint and then completed on-the-ground surveys to evaluate those areas further. Where suitable habitat was present as determined by the field surveys, MNR conducted occupancy surveys during the 2022 flight period. Methods for the desktop assessment and field surveys are described further below. MNR's biologists conducting the surveys, Otto Gockman and Jake Walden, are both MDNR-approved Prairie Skipper Surveyors and hold a Federal Recovery Permit for the Dakota skipper.

2.1 Desktop Assessment

MNR evaluated areas of potentially uncultivated grassland within the Project footprint in Minnesota by using the following publicly available data.

- Recent and historic aerial imagery from the National Agricultural Imagery Program and Google Earth
- National Land Cover Dataset (NLCD)
- Lidar elevation
- Natural Resources Conservation Service Soil Survey Geographic Database
- MDNR Native Plant Communities (NPCs), typically located within Sites of Biodiversity Significance (SOBS)
- Minnesota Railroad Right-of-way Prairies (ROW Prairies)

2.2 Field Surveys

Between May 31 and June 15, 2022, MNR conducted field surveys for the areas identified in the desktop assessment. The pedestrian surveys involved evaluating the quality of each habitat polygon based on the presence of larval-host species as well as nectar plants. Habitat documentation included: estimating cover of native graminoids, native forbs, non-native species (both graminoids and forbs), and trees and shrubs; documenting presence/absence of requisite prairie species and cover, where applicable; and taking representative photographs at each location.

MNR then conducted occupancy surveys, where indicated by the June field habitat assessments, on July 3, 6, and 9, 2022. Occupancy survey methods were based on the Dakota Skipper North Dakota Survey Protocol, prepared by the USFWS Mountain-Prairie Region in 2018 and used at the request of USFWS. MNR's methodology followed the specifications in this document for survey frequency and duration, timing and environmental conditions, phenological indicators, and other aspects. MNR consulted with MDNR and USFWS about the appropriate window to target for the species' flight periods in Otter Tail County, based on this year's phenology (late June through mid-July, accordingly).

3 Plant Survey Methods

Similar to the approach taken for butterflies, Merjent conducted a desktop assessment to identify areas of potentially suitable habitat for state-listed plants within the Project footprint. The assessment considered all state-listed species, including the two that are also federally listed (see Table 2). Merjent's Andy Kranz, a MDNR-approved botanist, then carried out field surveys. Methods for the desktop assessment and field surveys are described further below.

3.1 Desktop Assessment

Merjent identified the areas to be surveyed in the field by reviewing MDNR's Natural Heritage Information System (NHIS) and public data sources. Where resources from the sources listed below overlapped the Project

environmental survey area (or based on the criteria given below for certain data sources), Merjent considered the location to have potentially suitable habitat for the two federally listed plant species and/or for other state-listed species that may occur in the Project vicinity.

- NHIS⁴ Element Occurrences of state-listed plants within a 1-mile radius, where potentially suitable habitats are visible within the environmental survey area on aerial imagery
- Other potentially suitable habitats visible on aerial imagery, such as potential fens, sites with aquatic features, or other aerial signatures that are unique relative to the surrounding area
- SOBS (with a biodiversity significance ranking of moderate, high, or outstanding)⁵
- NPCs⁶
- ROW Prairies⁷

Western prairie fringed orchids and prairie bush clovers both inhabit native prairie remnants, with the orchid preferring wet-mesic prairie types and the clover preferring dry-mesic prairie types. Sites with the potential for any native prairie types were flagged for field survey. Wooded NPCs were mostly absent in the Project environmental survey area.

3.2 Field Surveys

The field surveys had three objectives: (1) to determine whether any state-listed plants were present within the Project environmental survey area; (2) to assess, regardless of survey timing, the habitat suitability for the western prairie fringed orchid and/or prairie bush clover at each site; and (3) if possible, depending on survey timing, to document whether any western prairie fringed orchid and/or prairie bush clover individuals were present. According to MDNR, the optimal identification window for the western prairie fringed orchid is between late June and late July (when they are flowering), and the optimal window for the prairie bush clover is mid-August through September (when they are producing fruit).

Surveys in 2022 were conducted between June 6 and June 8, on July 9, and during the time frame of September 1-2 and September 22-24.

Where western prairie fringed orchid habitat was present, it was rated according to the following criteria. The criteria were developed in coordination with USFWS and used in field habitat assessments for the same species in the Nebraska, North Dakota, and South Dakota portions of the Project footprint.⁸

- Western prairie fringed orchid habitat criteria:
 - Excellent (A) - completely native tall-grass/lowland/mesic prairie, appears to be mowed or lightly grazed every year or two. Suitable hydrology present.
 - Good (B) - primarily native tall-grass/lowland/mesic prairie and non-native vegetation, appears to be hayed or lightly grazed every year or two. Suitable hydrology present.
 - Fair (C) - mix of native tall-grass/lowland/mesic prairie and non-native vegetation, appears to be hayed or lightly grazed approximately every year or two. Suitable hydrology present.

⁴ Merjent used data dated 2/15/2022 through MDNR license agreement 1066.

⁵ Merjent used SOBS data (obtained from MN Geospatial Commons) with a content date of 2/24/2022.

⁶ Merjent used NPC data (obtained from MN Geospatial Commons) with a content date of 3/2/2022.

⁷ Merjent used ROW Prairie data (obtained from MN Geospatial Commons) with a content date of 7/27/2017.

⁸ The field habitat assessments outside of Minnesota are not reported here. A USFWS-approved set of western prairie fringed orchid habitat criteria is described in the 2022 Western Prairie Fringed Orchid Study Plan, prepared by WESTECH Environmental Services, Inc., on March 4, 2022, for Perennial Environmental Services, which is providing support to SCS for the Project's environmental review in Nebraska, North Dakota, and South Dakota.

- Poor (D) - primarily non-native vegetation with a minor native tall-grass/lowland/mesic prairie component, appears to be hayed or lightly grazed every year or two, or is a mix of native and non-native plant species but heavily grazed and/or sprayed to reduce broadleaf species. Suitable hydrology present.

4 Results

Through the desktop assessments, sites with potentially suitable habitat for Dakota skippers, Poweshiek skipperlings, western prairie fringed orchids, prairie bush clovers, and/or other state-listed plant species were identified along four of the five Project segments in Minnesota. All sites were at least partially accessible in the field. The field results are provided in Attachments A, B, C, and D, with each attachment containing a table that summarizes the findings for each line segment, an overview map that shows the survey sites for that segment, and site-specific maps where habitats and/or individuals were documented (all as outlined below). There were no targeted survey locations along the MNL-337 segment.

- MNL-321 (Attachment A): Table A, Figures A-1 (overview map) and A-2 (site-specific map)
- MNL-303 (Attachment B): Table B, Figures B-1 (overview map) and B-2 (site-specific map)
- MNL-304 (Attachment C): Table C, Figures C-1 (overview map) and C-2 through C-5 (site-specific maps)
- MNL-305 (Attachment D): Table D, Figures D-1 (overview map) and D-2 (site-specific map)

The following abbreviations are used in the attachments.

- Dakota skipper (DASK)
- Poweshiek skipperling (POSK)
- Prairie bush clover (PBCL)
- Western prairie fringed orchid (WPFO)

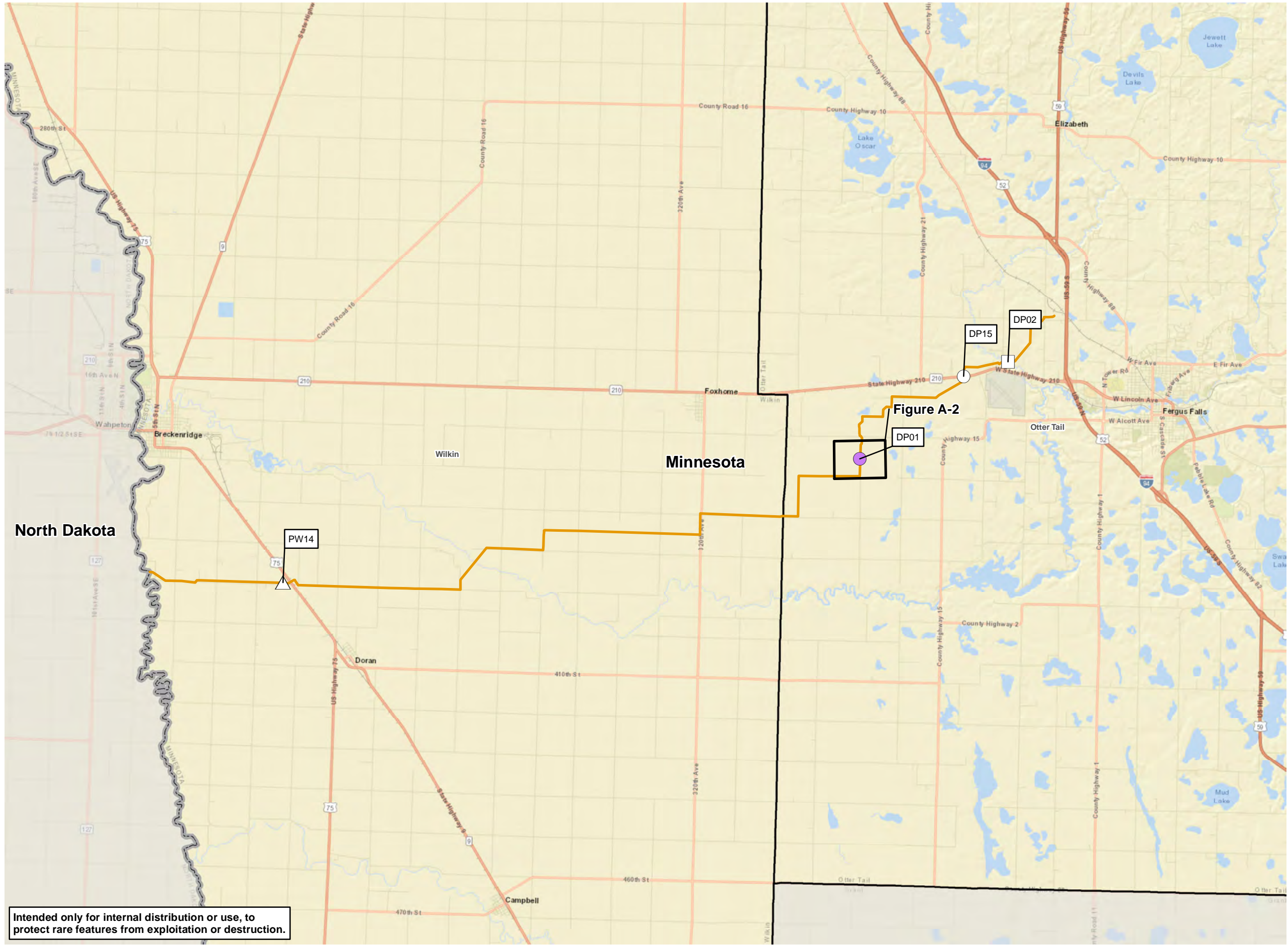
5 Reporting

Per MDNR's Rare Species Survey Reports Memo (2012) (Attachment E), Merjent's botanist submitted the required NHIS documentation electronically on February 22, 2023. Welby Smith at MDNR confirmed the identification of the two state-threatened species that were documented. The NHIS documentation and the species identification confirmation are in Attachment F. The plant survey methods used to obtain the results reported here are consistent with MDNR's Guidance on Documenting and Collecting Rare Plants (2018) (Attachment G).

Attachment A – MNL-321 Survey Sites and Results

Table A: Survey Sites and Outcomes for MNL-321, Listed East to West (Figure A-1)

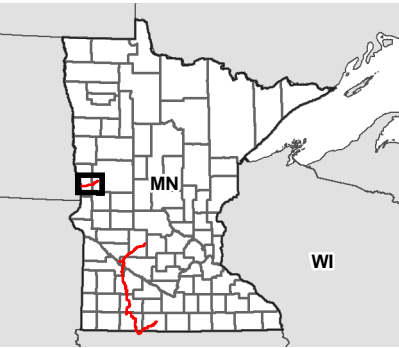
Site ID	Targeted for Listed Butterfly Surveys?	Butterfly Survey Outcome	Targeted for Listed Plant Surveys?	Plant Survey Outcome	Site-specific Map
DP02	Yes	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
DP15	Yes	No habitat/no individuals.	Yes	No habitat/no individuals.	N/A
DP01	Yes	Suitable DASK/POSK habitat was present. No DASK or POSK individuals were observed during occupancy surveys.	Yes	Suitable WPFO habitat was present (rank C/D). Small white lady's-slipper (<i>Cypripedium candidum</i> ; state-listed special concern) was present. Merjent's botanist documented 17 individuals within the environmental survey area.	Figure A-2
PW14	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A



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Disclaimer: Content on this figure is preliminary, and must be treated as confidential and proprietary. Sources are believed to be reliable and SCS does not assume responsibility for accuracy of data.

VICINITY MAP



LEGEND

Project Route Segment

- MNL-321
- Site Surveyed for Listed Flora - No Habitat
- Site Surveyed for Listed Butterflies - No Habitat
- Site Surveyed for Both Flora and Butterflies - Habitat Found*
- Site Surveyed for Both Flora and Butterflies - No Habitat
- County Boundary
- State Boundary
- Site-Specific Map

*See Figure A-2

REVISIONS

Date:	2023-02-27	Revised by:	TR	Checked by:	SS
Revision 1					
Date:		Revised by:		Checked by:	
Date:		Revised by:		Checked by:	

PREPARED BY

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MIDWEST CARBON EXPRESS PROJECT

Figure Title:
 Survey Sites: MNL-321
 Overview Map

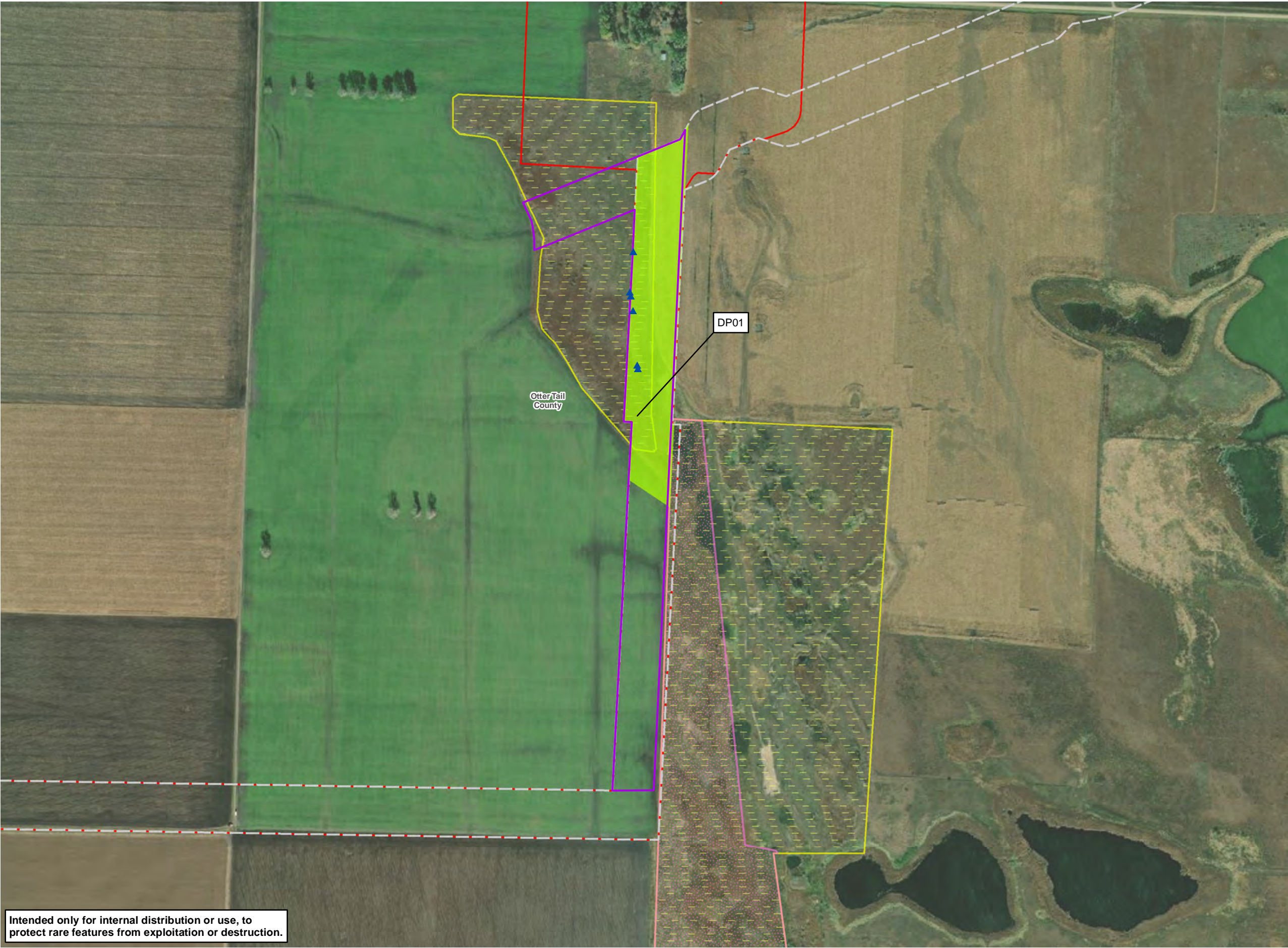
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Scale:
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Projection:
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 NAD 1983 UTM Zone 14

Sheet:
 Sheet 1
 Sheet 1 of 2

Drawing Number:
 005-00025
 Current Revision



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VICINITY MAP



LEGEND

- Environmental Survey Area (February 2023)
- Environmental Survey Area (June 2022)
- Native Plant Communities
- Site of Biodiversity Significance
- Listed Flora and Butterfly Survey Site
- Small White Lady's-Slipper (Cypripedium candidum)
- Western Prairie Fringed Orchid Habitat (Rank C/D)

REVISIONS

Date: 2023-02-27 Revised by: TR Checked by: SS
Revision 1

Date: Revised by: Checked by:

Date: Revised by: Checked by:

PREPARED BY

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MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Survey Results: MNL-321
Site-Specific Map

Figure Number:
A-2

Scale:
1:7,200
1 in = 600 ft

Projection:
Transverse Mercator
NAD 1983 UTM Zone 14

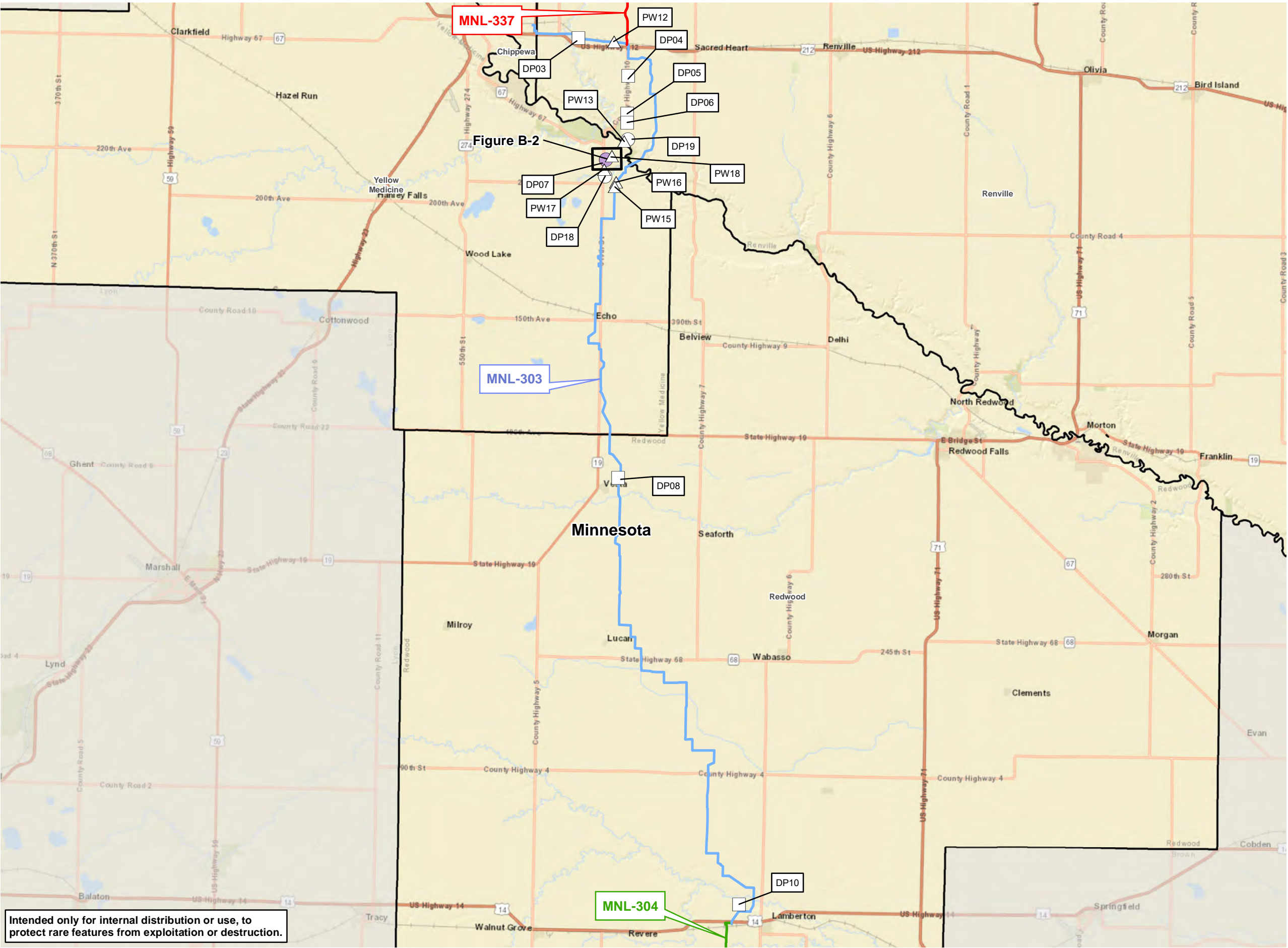
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Sheet 2
Sheet 2 of 2

Drawing Number:
005-00025
Current Revision

Attachment B – MNL-303 Survey Sites and Results

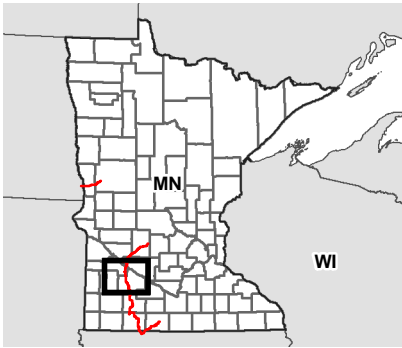
Table B: Survey Sites and Outcomes for MNL-303, Listed North to South (Figure B-1)

Site ID	Targeted for Listed Butterfly Surveys?	Butterfly Survey Outcome	Targeted for Listed Plant Surveys?	Plant Survey Outcome	Site-specific Map
DP03	Yes	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
PW12	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
DP04	Yes	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
DP05	Yes	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
DP06	Yes	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
PW13	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
DP19	Yes	No habitat/no individuals.	Yes	No habitat/no individuals.	N/A
PW18	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
PW16	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
PW15	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
DP07	Yes	No habitat/no individuals.	Yes	Suitable PBCL and WPFO habitat was present (rank D for WPFO). Merjent's botanist did not find individuals of PBCL, WPFO, or any other listed species within the environmental survey area.	Figure B-2
PW17	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
DP18	Yes	No habitat/no individuals.	Yes	No habitat/no individuals.	N/A
DP08	Yes	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
DP10	Yes	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A



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VICINITY MAP



LEGEND

Project Route Segment

- MNL-303
- MNL-304
- MNL-337

- Site Surveyed for Listed Flora - No Habitat
- Site Surveyed for Listed Butterflies - No Habitat
- Site Surveyed for Both Flora and Butterflies - Habitat Found*
- Site Surveyed for Both Flora and Butterflies - No Habitat
- County Boundary
- State Boundary
- Site-Specific Map

*See Figure B-2

REVISIONS

Date: 2023-02-27 Revised by: TR Checked by: SS
Revision 1

Date: Revised by: Checked by:

Date: Revised by: Checked by:

PREPARED BY

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MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Survey Sites: MNL-303
Overview Map

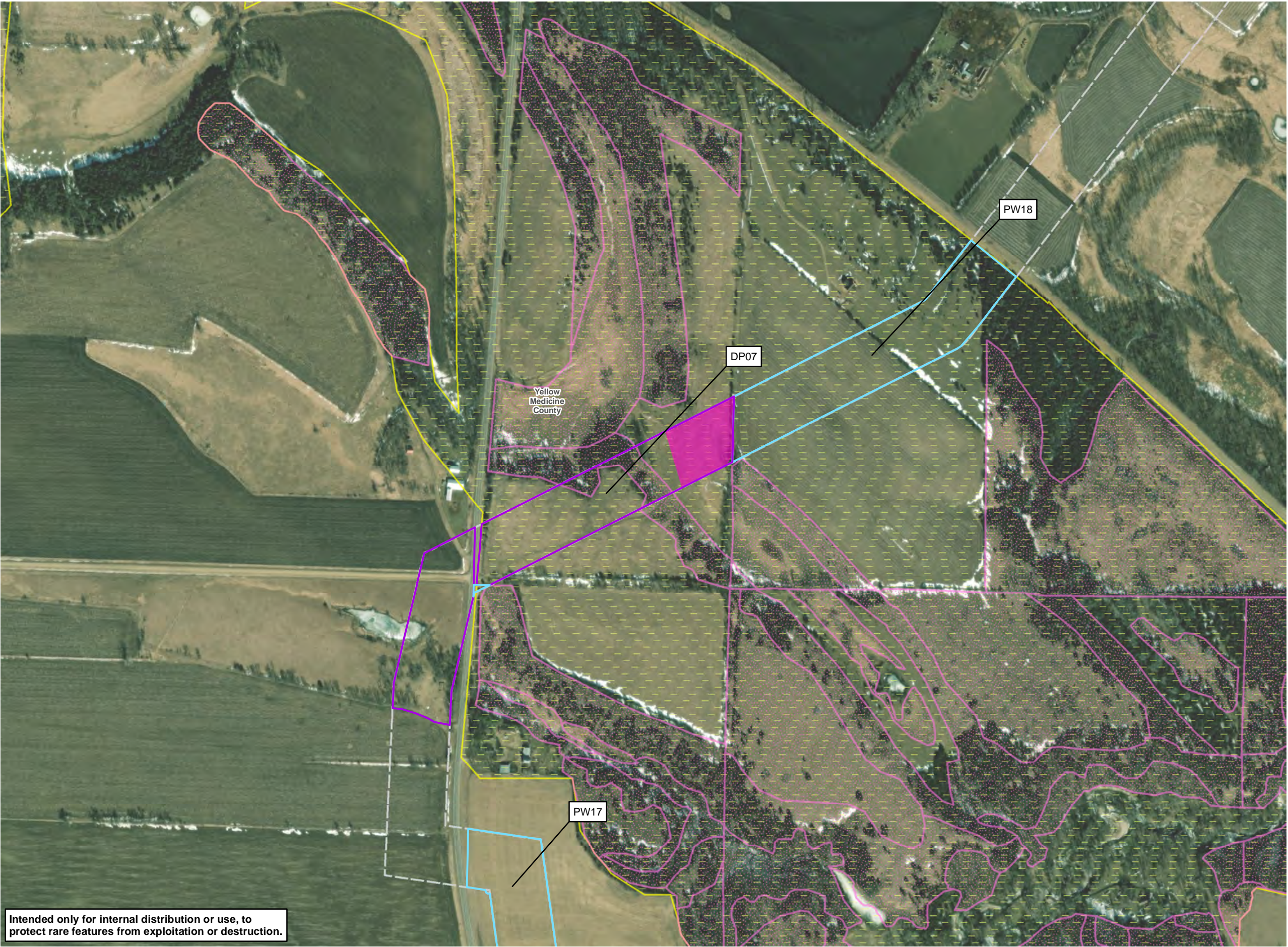
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Transverse Mercator
NAD 1983 UTM Zone 15

Sheet:
Sheet 1
Sheet 1 of 2

Drawing Number:
005-00025
Current Revision



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VICINITY MAP



LEGEND

- Environmental Survey Area (June 2022)
- Native Plant Communities
- Site of Biodiversity Significance
- Listed Flora Survey Site
- Listed Flora and Butterfly Survey Site
- Habitat for Both Listed Flora Species (WPFO Rank D)

REVISIONS

Date: 2023-02-27 Revised by: TR Checked by: SS
Revision 1

Date: Revised by: Checked by:

Date: Revised by: Checked by:

PREPARED BY

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MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Survey Results: MNL-303
Site-Specific Map

Figure Number:
B-2

Scale:
1:6,000
1 in = 500 ft

Projection:
Transverse Mercator
NAD 1983 UTM Zone 15

Sheet:
Sheet 2
Sheet 2 of 2

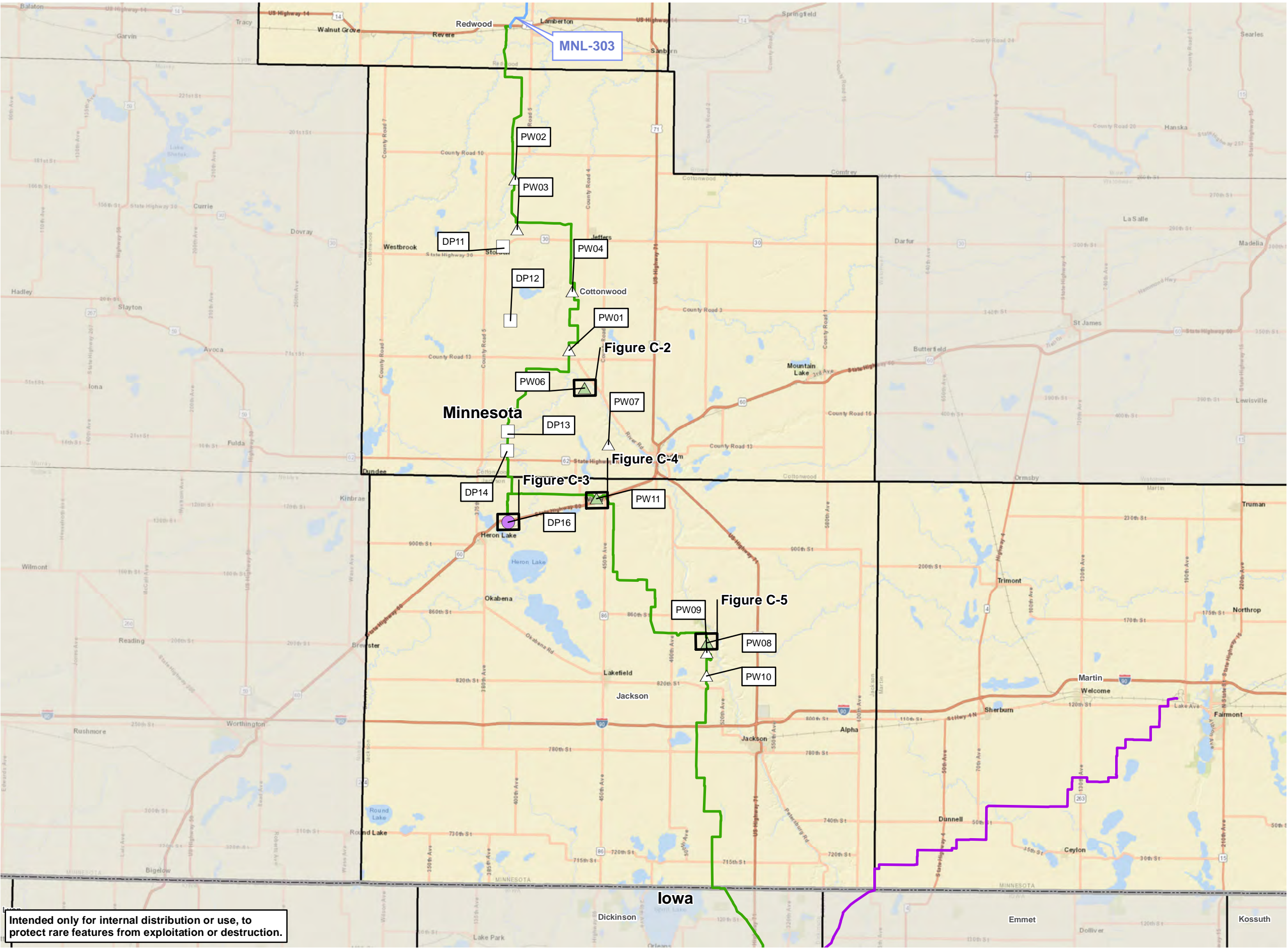
Drawing Number:
005-00025
Current Revision

Attachment C – MNL-304 Survey Sites and Results

Table C: Survey Sites and Outcomes for MNL-304, Listed North to South (Figure C-1)

Site ID	Targeted for Listed Butterfly Surveys?	Butterfly Survey Outcome	Targeted for Listed Plant Surveys?	Plant Survey Outcome	Site-specific Map
PW02	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
PW03	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
DP11	Yes	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
PW04	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
DP12	Yes	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
PW01	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
DP13	Yes	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
DP14	Yes	No habitat/no individuals.	No	N/A (surveyed only for DASK/POSK)	N/A
PW06	No	N/A (surveyed only for plants)	Yes	Suitable PBCL habitat was present. Merjent's botanist did not find individuals of PBCL or any other listed species within the environmental survey area.	Figure C-2
DP16	Yes	No habitat/no individuals.	Yes	Suitable PBCL and WPFO habitat was present (rank D for WPFO). Merjent's botanist did not find individuals of PBCL, WPFO, or any other listed species within the environmental survey area.	Figure C-3
PW07	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
PW11	No	N/A (surveyed only for plants)	Yes	Suitable PBCL habitat was present. Merjent's botanist did not find individuals of PBCL or any other listed species within the environmental survey area.	Figure C-4

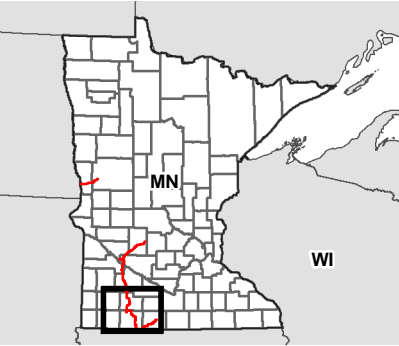
Site ID	Targeted for Listed Butterfly Surveys?	Butterfly Survey Outcome	Targeted for Listed Plant Surveys?	Plant Survey Outcome	Site-specific Map
PW08	No	N/A (surveyed only for plants)	Yes	Suitable PBCL habitat was present. Merjent's botanist did not find individuals of PBCL or any other listed species within the environmental survey area.	Figure C-5
PW09	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A
PW10	No	N/A (surveyed only for plants)	Yes	No habitat/no individuals.	N/A



Intended only for internal distribution or use, to protect rare features from exploitation or destruction.

Disclaimer: Content on this figure is preliminary, and must be treated as confidential and proprietary. Sources are believed to be reliable and SCS does not assume responsibility for accuracy of data.

VICINITY MAP



LEGEND

Project Route Segment

- MNL-303
- MNL-304
- MNL-305
- Site Surveyed for Listed Flora - Habitat Found*
- Site Surveyed for Listed Flora - No Habitat
- Site Surveyed for Listed Butterflies - No Habitat
- Site Surveyed for Both Flora and Butterflies - Habitat Found*
- County Boundary
- State Boundary
- Site-Specific Map

*See Figures C-2, C-3, C-4, C-5

REVISIONS

Date: 2023-02-27 Revised by: TR Checked by: SS
Revision 1

Date: Revised by: Checked by:

Date: Revised by: Checked by:

PREPARED BY

Summit Carbon Solutions
2321 North Loop Drive, Suite 221
Ames, Iowa 50010
United States of America
www.summitcarbonsolutions.com



MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Survey Sites: MNL-304
Overview Map

Figure Number:
C-1

Scale:
1:360,000
1 in = 30,000 ft

Projection:
Transverse Mercator
NAD 1983 UTM Zone 15

Sheet:
Sheet 1
Sheet 1 of 5

Drawing Number:
005-00025
Current Revision



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VICINITY MAP



LEGEND

- Environmental Survey Area (August 2022)
- Native Plant Communities
- Site of Biodiversity Significance
- Listed Flora Survey Site
- Prairie Bush-Clover Habitat

REVISIONS

Date: 2023-02-27 Revised by: TR Checked by: SS
Revision 1

Date: Revised by: Checked by:

Date: Revised by: Checked by:

PREPARED BY

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2321 North Loop Drive, Suite 221
Ames, Iowa 50010
United States of America
www.summitcarbonsolutions.com



MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Survey Results: MNL-304
Site-Specific Map

Figure Number:
C-2

Scale:
1:6,000
1 in = 500 ft

Projection:
Transverse Mercator
NAD 1983 UTM Zone 15

Sheet:
Sheet 2
Sheet 2 of 5

Drawing Number:
005-00025
Current Revision



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VICINITY MAP



LEGEND

- Environmental Survey Area (February 2023)
- Environmental Survey Area (August 2022)
- Native Plant Communities
- Site of Biodiversity Significance
- Railroad Rights of Way Prairies
- Listed Flora and Butterfly Survey Site
- Habitat for Both Listed Flora Species (WPFO Rank D)

REVISIONS

Date: 2023-02-27 Revised by: TR Checked by: SS
Revision 1

Date: Revised by: Checked by:

Date: Revised by: Checked by:

PREPARED BY

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Ames, Iowa 50010
United States of America
www.summitcarbonsolutions.com



MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Survey Results: MNL-304
Site-Specific Map

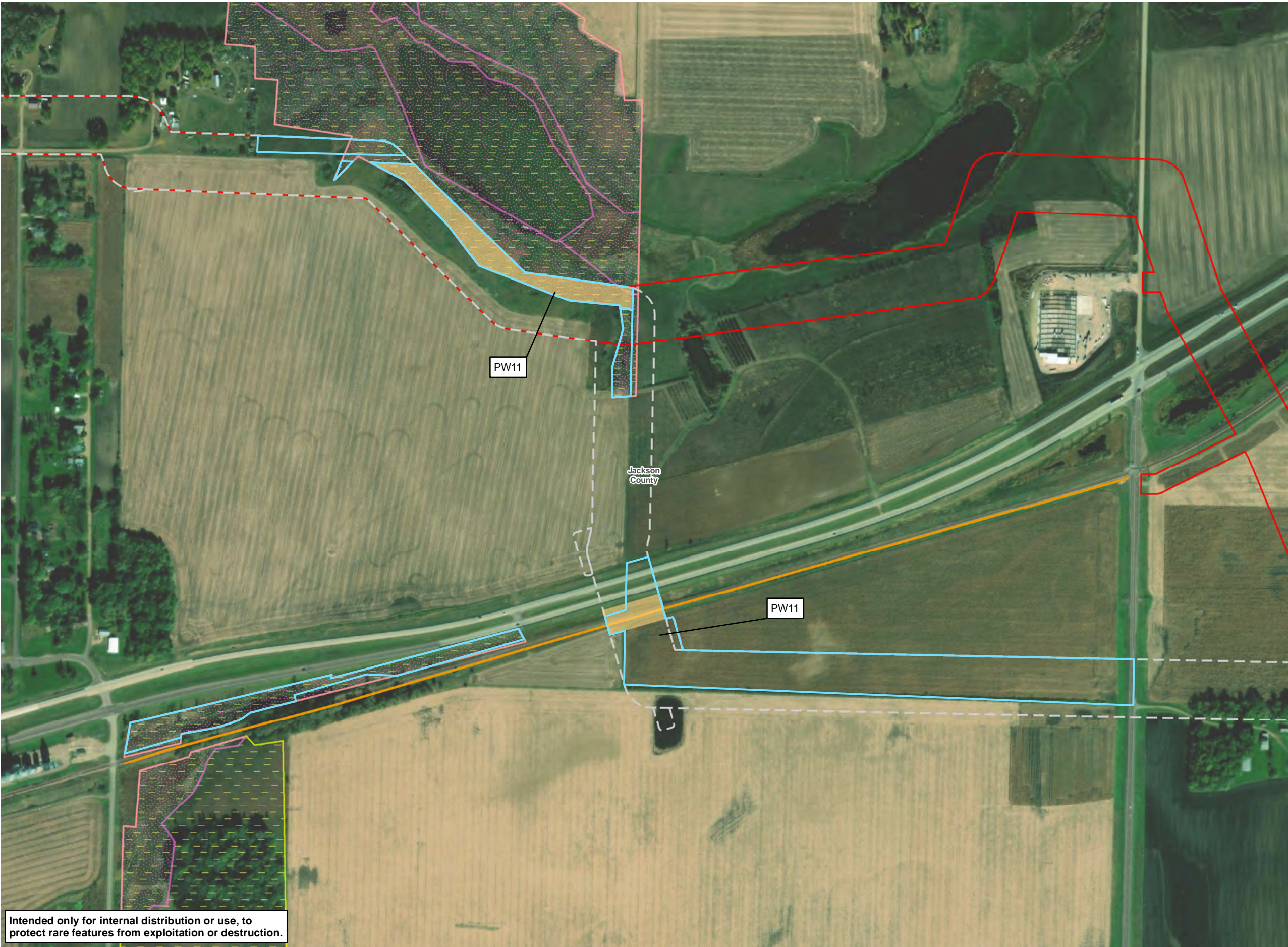
Figure Number:
C-3

Scale:
1:6,000
1 in = 500 ft

Projection:
Transverse Mercator
NAD 1983 UTM Zone 15

Sheet:
Sheet 3
Sheet 3 of 5

Drawing Number:
005-00025
Current Revision



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VICINITY MAP



LEGEND

- Environmental Survey Area (February 2023)
- Environmental Survey Area (August 2022)
- Native Plant Communities
- Site of Biodiversity Significance
- Railroad Rights of Way Prairies
- Listed Flora Survey Site
- Prairie Bush-Clover Habitat

REVISIONS

Date:	2023-02-27	Revised by:	TR	Checked by:	SS
Revision 1					
Date:		Revised by:		Checked by:	
Date:		Revised by:		Checked by:	

PREPARED BY

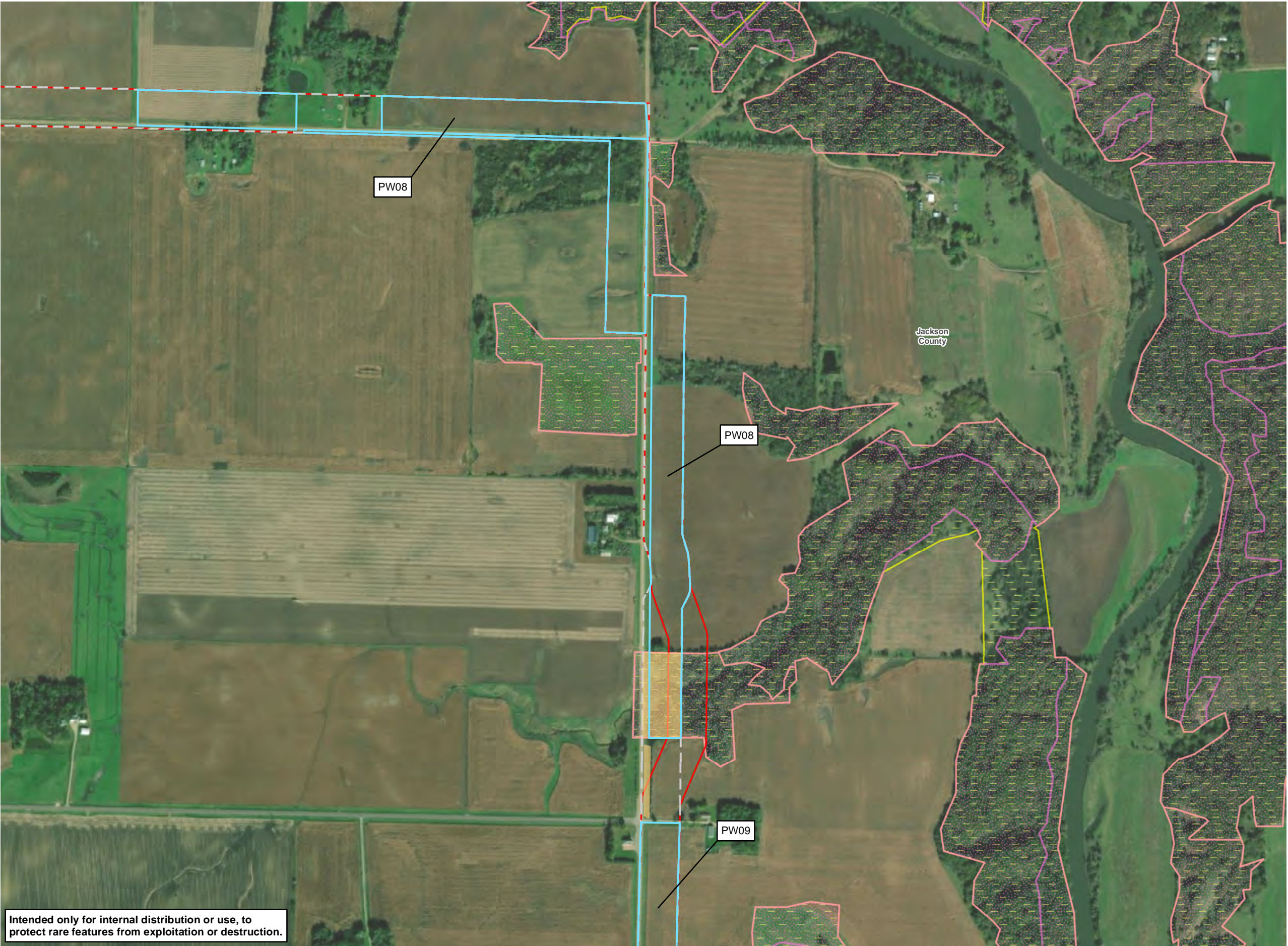
Summit Carbon Solutions
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Ames, Iowa 50010
United States of America
www.summitcarbonsolutions.com



SUMMIT CARBON
SOLUTIONS

MIDWEST CARBON EXPRESS PROJECT

Figure Title: Survey Results: MNL-304 Site-Specific Map	
Figure Number: C-4	
Scale: 1:6,000 1 in = 500 ft	Projection: Transverse Mercator NAD 1983 UTM Zone 15
Sheet: Sheet 4 Sheet 4 of 5	Drawing Number: 005-00025 Current Revision



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VICINITY MAP



LEGEND

- Environmental Survey Area (February 2023)
- Environmental Survey Area (August 2022)
- Native Plant Communities
- Site of Biodiversity Significance
- Listed Flora Survey Site
- Prairie Bush-Clover Habitat

REVISIONS

Date: 2023-02-27 Revised by: TR Checked by: SS
Revision 1

Date: Revised by: Checked by:

Date: Revised by: Checked by:

PREPARED BY

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Ames, Iowa 50010
United States of America
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MIDWEST CARBON EXPRESS PROJECT

Figure Title:
Survey Results: MNL-304
Site-Specific Map

Figure Number:
C-5

Scale:
1:9,000
1 in = 750 ft

Projection:
Transverse Mercator
NAD 1983 UTM Zone 15

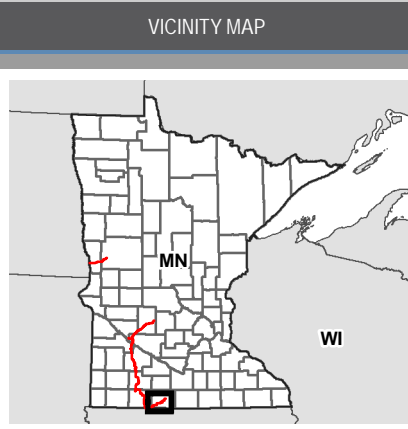
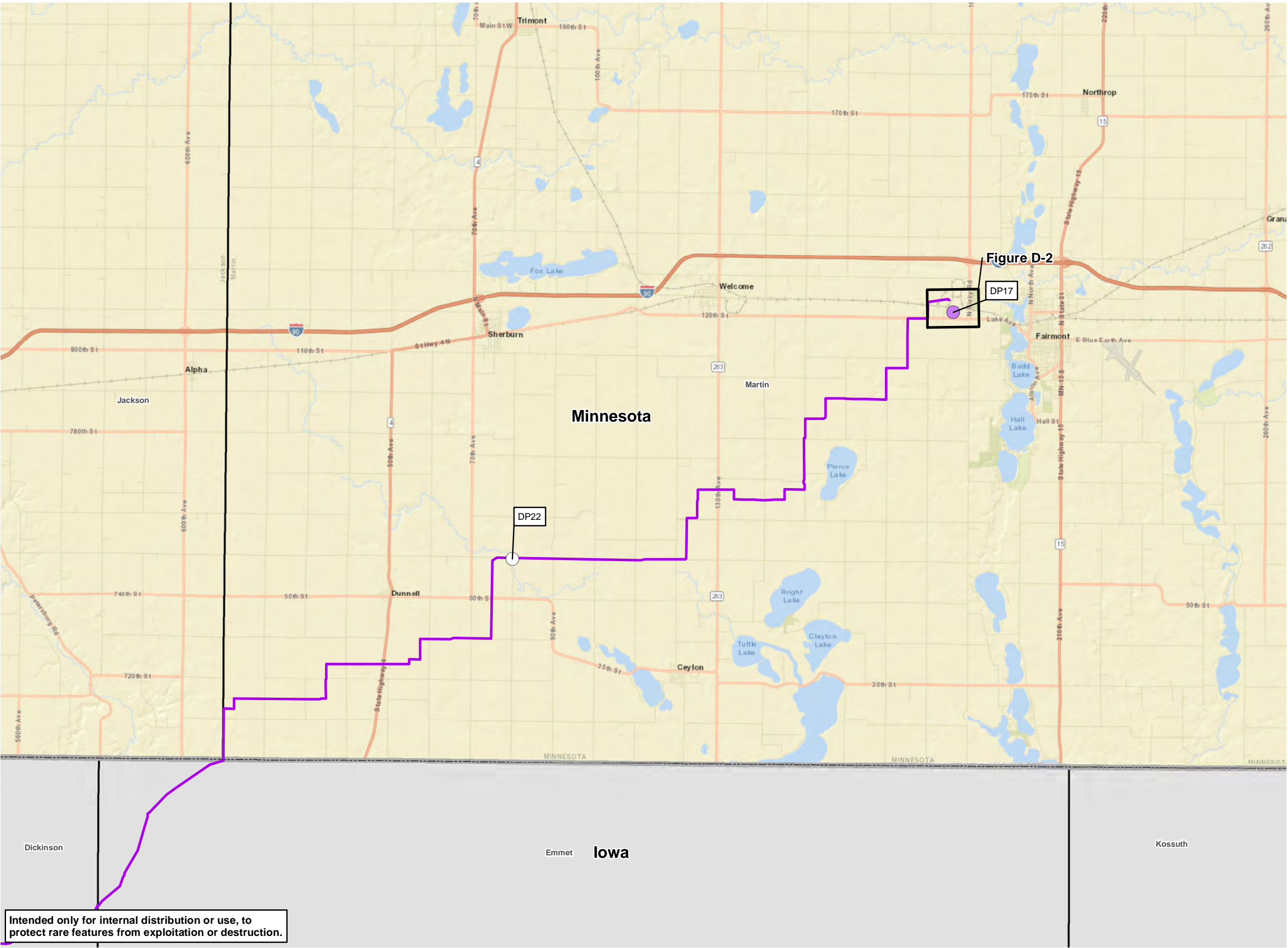
Sheet:
Sheet 5
Sheet 5 of 5

Drawing Number:
005-00025
Current Revision

Attachment D – MNL-305 Survey Sites and Results

Table D: Survey Sites and Outcomes for MNL-305, Listed East to West (Figure D-1)

Site ID	Targeted for Listed Butterfly Surveys?	Butterfly Survey Outcome	Targeted for Listed Plant Surveys?	Plant Survey Outcome	Site-specific Map
DP17	Yes	No habitat/no individuals.	Yes	<p>Suitable WPFO habitat was present (rank C).</p> <p>Tuberous Indian-plantain (<i>Arnoglossum plantagineum</i>; state-listed threatened) was present approximately 1,750 feet west of the environmental survey area at the time of survey. Merjent's botanist documented 7 individuals.</p> <p>Sullivant's Milkweed (<i>Asclepias sullivantii</i>; state-listed threatened) was present approximately 1,770 feet east of the environmental survey area at the time of survey. Merjent's botanist documented 8 individuals.</p>	Figure D-2
DP22	Yes	No habitat/no individuals.	Yes	No habitat/no individuals.	N/A



LEGEND

Project Route Segment

- MNL-305
- Site Surveyed for Both Flora and Butterflies - Habitat Found*
- Site Surveyed for Both Flora and Butterflies - No Habitat
- County Boundary
- State Boundary
- Site-Specific Map

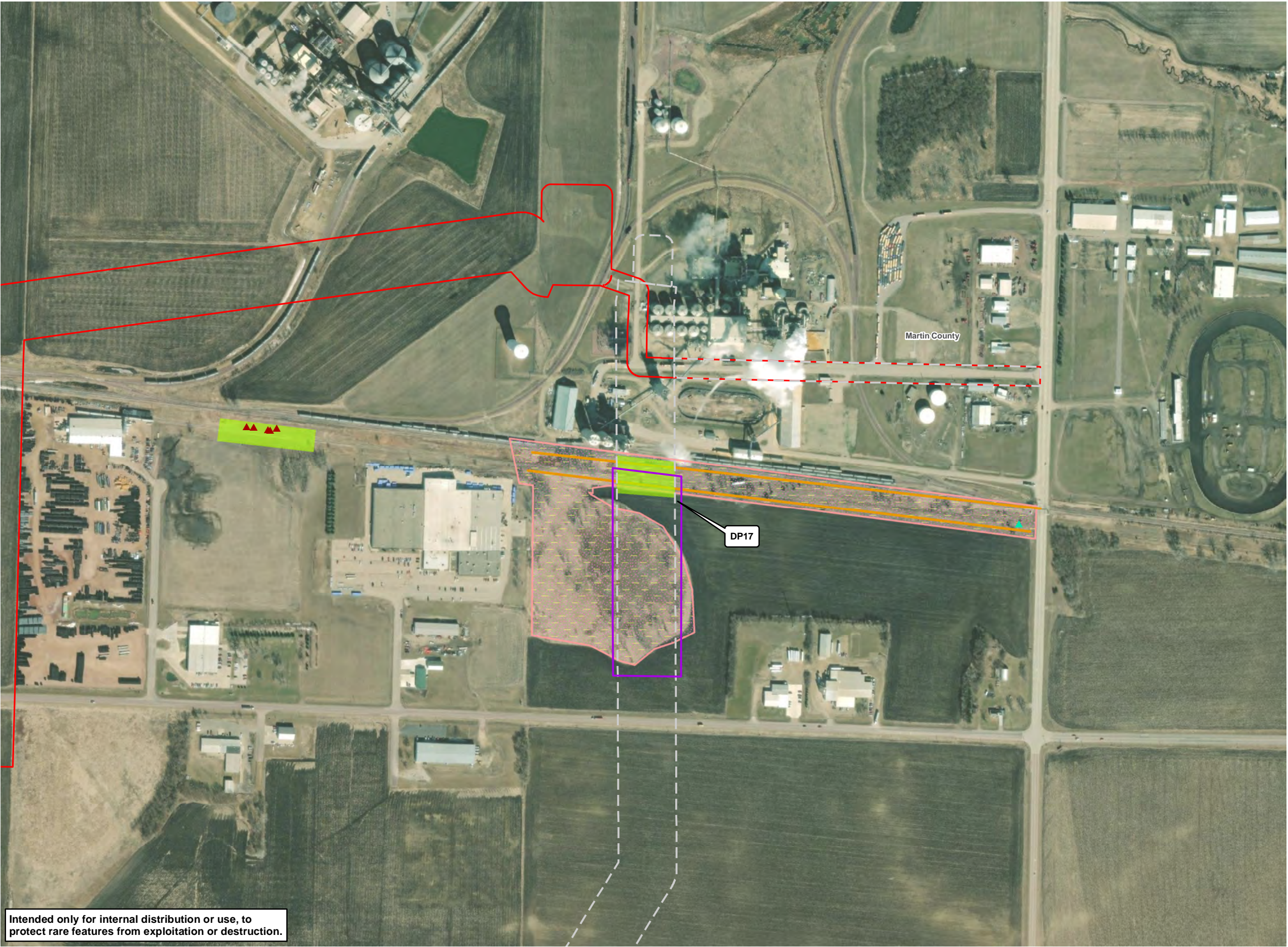
*See Figure D-2

REVISIONS			
Date:	2023-02-27	Revised by:	TR
Revision 1			
Date:		Revised by:	
Date:		Revised by:	

PREPARED BY

Summit Carbon Solutions
2321 North Loop Drive, Suite 221
Ames, Iowa 50010
United States of America
www.summitcarbonsolutions.com

MIDWEST CARBON EXPRESS PROJECT	
Figure Title:	Survey Sites: MNL-305 Overview Map
Figure Number:	D-1
Scale:	Projection:
1:150,000 1 in = 12,500 ft	Transverse Mercator NAD 1983 UTM Zone 15
Sheet:	Drawing Number:
Sheet 1 Sheet 1 of 2	005-00025 Current Revision



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VICINITY MAP



LEGEND

- Environmental Survey Area (February 2023)
- Environmental Survey Area (June 2022)
- Native Plant Communities
- Site of Biodiversity Significance
- Railroad Rights of Way
- Listed Flora and Butterfly Survey Site
- Tuberous Indian-Plantain (Amorpha canescens)
- Sullivan's Milkweed (Asclepias sullivantii)
- Western Prairie Fringed Orchid Habitat (Rank C)

REVISIONS

Date:	2023-02-27	Revised by:	TR	Checked by:	SS
Revision 1					
Date:		Revised by:		Checked by:	
Date:		Revised by:		Checked by:	

PREPARED BY

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Ames, Iowa 50010
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MIDWEST CARBON EXPRESS PROJECT

Figure Title: Survey Results: MNL-305 Site-Specific Map	
Figure Number: D-2	
Scale: 1:6,000 1 in = 500 ft	Projection: Transverse Mercator NAD 1983 UTM Zone 15
Sheet: Sheet 2 Sheet 2 of 2	Drawing Number: 005-00025 Current Revision

Attachment E – MDNR's Rare Species Survey Reports Memo (2012)



Division of Ecological and Water Resources

TO: Endangered and Threatened Species Surveyors

FROM: Lisa Joyal, Endangered Species Review Coordinator

Phone: (651) 259-5109

e-mail: lisa.joyal@state.mn.us

RE: Rare Species Survey Reports

The Minnesota Department of Natural Resources' Division of Ecological and Water Resources (DNR) relies upon the results of endangered and threatened species surveys to conserve these species through its conservation, management, environmental review, and permitting responsibilities. When surveys for rare species are requested as part of the environmental review process, the DNR makes every effort to coordinate closely with surveyors to ensure that survey results are reliable. High quality survey data enables the DNR's to uphold Minnesota's endangered species law (*Minnesota Statutes*, section 84.0895) and associated rules (*Minnesota Rules*, part 6212.1800 to 6212.2300 and 6134).

As such, for projects associated with environmental review, we request that survey proposals be submitted to the DNR before any survey work is initiated. This process is an attempt to avoid any potential delays or other problems due to incomplete list of target species or inappropriate survey protocol. Surveys should primarily target the species mentioned in the Natural Heritage letter, but should also target any other state-listed species that are likely to be found in the habitat in question. Please refer to the DNR Rare Species Guide (<http://www.dnr.state.mn.us/rsg/index.html>) for further information on the rare species that can be found in a particular habitat, and for the habitat and phenology of each targeted species. The DNR Rare Species Guide is the state's authoritative reference for Minnesota's endangered, threatened, and special concern species. It is a dynamic, interactive source that can be queried by county, ECS subsection, watershed, or habitat. Final survey results should also be submitted to the DNR.

Please include the following information in the Rare Species Survey Proposals and Survey Results:

- Purpose of the survey
- List of the targeted species
- Qualifications of the surveyor(s) and his or her experience working with the targeted species
- If applicable, a copy of the collection permit issued by the DNR.
- Survey date(s) and methodology
- Map (and GIS shapefile if large project area) of areas (to be) surveyed or assessed for habitat suitability
- Locations and number of individuals for any state-listed species
- State type of documentation for each listed species (e.g., photograph or collected specimen)
- A completed Rare Feature Reporting Form for each state-listed or tracked species, or a statement that the data has been submitted electronically
- Any associated specimens and electronic data should be submitted with the Survey Results

Survey Proposals and Survey Results may be sent electronically to the email address listed above or mailed to the following address:

Lisa Joyal
DNR Division of Ecological and Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155

Thank you for your interest in conducting rare species surveys in Minnesota.

Attachment F – NHIS Documentation and Species Identification Confirmation



MEMO

Date:

February 22, 2023

To:

Data Manager, Natural Heritage Information System, Minnesota Department of Natural Resources

From:

Andy Kranz, Merjent

CC:

Sarah Stai, Merjent

Subject:

NHIS Rare Plant Observation Data, Summit Carbon Solutions, LLC Projects

Attachments:

- NHIS Rare Plant Observation Data_ARK 2022.xlsx
- NHIS Rare Plant Observation Data_ARK 2022_UTM14.zip
- NHIS Rare Plant Observation Data_ARK 2022_UTM15.zip
- NHIS Species ID Confirmation SCS.pdf

I am submitting data for observations of three rare plant populations in Minnesota documented during field surveys in 2022. The surveys were conducted to assess habitat for federally threatened plants. The surveys also documented plants that are state-listed in Minnesota as special concern, threatened, or endangered.

I observed one population each of *Arnoglossum plantagineum*, on June 6, 2022, and *Asclepias sullivantii*, on July 9, 2022, in the City of Fairmont, Martin County, Minnesota. These populations were observed during surveys as part of the Summit Carbon Solutions, LLC Martin County Project. The populations were located within the same parcel, owned by Fairmont Economic Development Authority.

I also observed one population of *Cypripedium candidum* on June 8, 2022, in Orwell Township, Otter Tail County. This population was observed during surveys as part of the Summit Carbon Solutions, LLC Otter Tail to Wilkin Project and is located on the property of Ethel Maack.

Please see the attached rare plant observation data spreadsheet and shapefiles for details.

Specimens of *A. plantagineum* and *A. sullivantii* were collected under DNR Special Permit #23226. This permit is assigned to Otto Gockman who was also conducting field work on the project. Correct identification was confirmed by Welby Smith and the specimens will be submitted to the University of Minnesota Herbarium.

Please contact me with any questions or concerns.

Respectfully submitted,



Andy Kranz
Environmental Consultant/Botanist
Merjent
507-459-3150
andy.kranz@merjent.com

Nun	Shapefile Name	Shape_ID	Shape_Detail	Species_Name	Alternate_Species	urce	Observer	Affiliation	Additional_Observers	Contact	Contact_Info	Project	Survey	Observation_Date	Fuzzy_Date	Observation_Remarks	Act_Num_Ind	Est_Num_Ind	Population_Size	Phenology	Phenology_Comments	Native_Plant_Community	Habitat	Population_Extent	Viability_Comments	Management_Comments	Directions	County	TWP	RGE	RGE_Dir	SEC	QQ_SEC	Area_Name	Ownership	ID_Type	ID_Confirmed	ID_Conf_By	Col_No	Repository
1	NHIS Rare Plant Observation Data_ARK 2022_UTM15	1	Point locations of Arnoglossum plantagineum individuals or groups of individuals (number indicated in attribute data)	Arnoglossum plantagineum		FNA	Andrew R. Kranz	Merjent, Inc.		Andy Kranz 507-459-3150; andrew.r.kranz@gmail.com	Summit Carbon Solutions, LLC Martin County Project	Flora	2022-06-06			Population near but outside survey area. Herbarium label: Northwestern Fairmont; 0.8 mile west of County Hwy. 39; 0.3 mile north of 120th St.; 80 feet south of primary railroad; 20 feet north of side-track. Rosette ~2 feet in diameter; 7 plants, possibly more north of surveyed area to railroad; 1 plant in bloom on return July 9, 2022, fls. ~80, white. In small patch of degraded mesic prairie in railroad right-of-way dominated by ruderal vegetation with intermittent prairie flora. Associated with Bromus inermis, Hesperostipa spartea, Poa pratensis, Helianthus pauciflorus, Zizia aptera, Asclepias syriaca, Ratibida pinnata, Lithospermum canescens, Veronicastrum virginicum, Anemone canadensis, Helopsis helianthoides, Rhamnus cathartica.	7	7+	3000 sq ft; did not have permission to survey all the way north to rail; possibly larger population	Emerging (forb)	Rosettes mature at time of collection; upon return on July 9, 2022, 1 individual was in bloom (~50% of inf)	UPs23 - Southern Mesic Prairie	Degradated UPs23; dominated by Bromus inermis, Hesperostipa spartea, Poa pratensis, Helianthus pauciflorus, Dichanthelium oligosanthes; patches of NPC in matrix of ruderal vegetation, all within a railroad right-of-way.	? - Uncertain whether full extent of Observation is known	Aggressive ruderal vegetation present; potential for mowing and herbicide	Mowing apparent at southern limit of observed population	Northwestern Fairmont; 0.8 mile west of County Hwy. 39; 0.3 mile north of 120th St.; 80 feet south of primary railroad; 20 feet north of side-track.	Martin				Fairmont Economic Development Authority	S	Yes	Smith, Welby R.	1001	University of Minnesota Herbarium			
2	NHIS Rare Plant Observation Data_ARK 2022_UTM15	2	Point location of Asclepias sullivantii colony center	Asclepias sullivantii			Gleason and Cronquist 1991	Andrew R. Kranz	Merjent, Inc.		Andy Kranz 507-459-3150; andrew.r.kranz@gmail.com	Summit Carbon Solutions, LLC Martin County Project	Flora	2022-07-09		Population near but well outside survey area. Herbarium label: Northwestern Fairmont; 90 feet west of County Hwy. 39; 0.2 mile north of 120th St.; 95 feet south of railroad. Infl. axillary and terminal umbels; fls. 6-9 per umbel, pink; 8 stems, 0.5 to 3 feet between stems. In railroad right-of-way dominated by cool season grasses, trees and shrubs sparse to patchy. Directly associated with Bromus inermis, Acer negundo, Spartina pectinata, Solidago altissima; patches of mesic prairie flora nearby include Andropogon gerardi, Apocynum cannabinum, Symphyotrichum lanceolatum, Zizia aurea, Anemone cylindrica, Solidago rigida, Symphyotrichum ericoides, Ratibida pinnata, Helopsis helianthoides, Comandra umbellata, Taraxacum officinale, Rhamnus cathartica, Helianthus grosseserratus.	8	8	300 sq ft stems/ramets	Flowering	1 individual in bloom, 2 umbels	In ruderal vegetation; dominated by Bromus inermis, partly shaded by Acer negundo; UPs23 flora nearby; all within a railroad right-of-way.	? - Uncertain whether full extent of Observation is known	Aggressive ruderal vegetation present; potential for mowing and herbicide		Northwestern Fairmont; 90 feet west of County Hwy. 39; 0.2 mile north of 120th St.; 95 feet south of railroad.	Martin				Fairmont Economic Development Authority	S	Yes	Smith, Welby R.	1002	University of Minnesota Herbarium				
3	NHIS Rare Plant Observation Data_ARK 2022_UTM14	3	Point locations of Cypripedium candidum individuals or groups of	Cypripedium candidum		FNA	Andrew R. Kranz	Merjent, Inc.		Andy Kranz 507-459-3150; andrew.r.kranz@gmail.com	Summit Carbon Solutions, LLC Otter Tail to Wilkin Project	Flora	2022-06-08			Population within and extending beyond survey area. 17 individuals observed within survey area, all in bloom; population continues to the west outside survey area, perhaps dozens or hundreds in total; specimens were not collected; photographs available upon request.	17 dozens to hundreds		18,000 sq ft (portion of population within survey area)	Flowering	All observed individuals were in bloom	WPN53 - Northern Wet Prairie	Degradated/grazed wet prairie, occurring as an ecotone between mesic prairie and sedge meadow.	N - Confident full extent of Observation is NOT known	Ruderal vegetation abundant; possibly grazing pressure	Uncertain if recently grazed or retired pasture	Northern Orwell Township; 1.1 miles west of County Hwy. 124; 0.3 miles south of County Hwy. 1	Otter Tail				Ethel Maack	P	n/c						

From: [Andy Kranz](#)
To: Reports.NHIS@state.mn.us
Cc: [Joyal, Lisa \(DNR\)](#); [Sarah Stai](#); [MCE Archive](#)
Subject: Rare Plant Observations 2022
Date: Wednesday, February 22, 2023 2:37:05 PM
Attachments: [image001.png](#)
[NHIS Rare Plant Observation Data Memo - 02-22-23.pdf](#)
[NHIS Rare Plant Observation Data ARK 2022.xlsx](#)
[NHIS Rare Plant Observation Data ARK 2022 UTM14.zip](#)
[NHIS Rare Plant Observation Data ARK 2022 UTM15.zip](#)
[NHIS Species ID Confirmation SCS.pdf](#)

To whom it may concern:

Please see the attached memo and rare plant observation data. Let me know if you have any questions or concerns.

Thank you,

Andy Kranz

612.924.3998 direct

507.459.3150 mobile

andy.kranz@merjent.com



1 Main Street SE, Suite 300

Minneapolis, MN 55414

612.746.3660 main

www.merjent.com

From: [Andy Kranz](#)
To: [Sarah Stai](#)
Subject: Fwd: EXTERNAL: Re: Rare plant specimens
Date: Monday, February 20, 2023 8:23:50 PM
Attachments: [image001.png](#)

See Welby's confirmation below.

Andy Kranz
Merjent
507-459-3150

From: Smith, Welby R (DNR) <welby.smith@state.mn.us>
Sent: Friday, February 17, 2023 10:43:22 AM
To: Andy Kranz <andy.kranz@merjent.com>
Subject: Re: EXTERNAL: Re: Rare plant specimens

The specimens look, and correctly identified. I will bring them to the Bell herbarium today and get them accessioned into the collections right away.

welby

From: Andy Kranz <andy.kranz@merjent.com>
Sent: Tuesday, February 14, 2023 8:14 PM
To: Smith, Welby R (DNR) <welby.smith@state.mn.us>
Subject: Re: EXTERNAL: Re: Rare plant specimens

No problem. Nathan Dahlgren met me in the lobby and said he would set them in your cubicle.

Andy Kranz
Merjent
507-459-3150

From: Smith, Welby R (DNR) <welby.smith@state.mn.us>
Sent: Tuesday, February 14, 2023, 7:27 PM
To: Andy Kranz <andy.kranz@merjent.com>
Subject: Re: EXTERNAL: Re: Rare plant specimens

I wasn't there (you know that now), but I will return to my cube tomorrow afternoon.

welby

From: Andy Kranz <andy.kranz@merjent.com>
Sent: Tuesday, February 14, 2023 12:13 PM
To: Smith, Welby R (DNR) <welby.smith@state.mn.us>
Subject: RE: EXTERNAL: Re: Rare plant specimens

Welby,

I'll drop the specimens off this afternoon, probably between 3:00 and 4:00.

Andy Kranz

612.924.3998 direct

507.459.3150 mobile

andy.kranz@merjent.com



1 Main Street SE, Suite 300

Minneapolis, MN 55414

612.746.3660 main

www.merjent.com

From: Smith, Welby R (DNR) <welby.smith@state.mn.us>

Sent: Monday, February 13, 2023 6:31 PM

To: Andy Kranz <andy.kranz@merjent.com>

Subject: EXTERNAL: Re: Rare plant specimens

CAUTION: This email originated from outside of Merjent.

Hi Andy,

Sure, bring them in, or get them to me whatever way is most convenient for you. If I'm not there, they can be left in my cubicle.

welby

From: Andy Kranz <andy.kranz@merjent.com>

Sent: Monday, February 13, 2023 6:24 PM

To: Smith, Welby R (DNR) <welby.smith@state.mn.us>

Subject: Rare plant specimens

This message may be from an external email source.

Do not select links or open attachments unless verified. Report all suspicious emails to Minnesota IT Services Security Operations Center.

Hi Welby,

I have two specimens to submit, *Arnoglossum plantagineum* and *Asclepias sullivantii*, from the same railroad ROW in Martin County. These were collected in the course of 2022 Merjent work. I made collections at Otto's suggestion, under his permit number (he was working on the same project). Can

I bring these to you to verify ID?

I've attached some photos as well as herbarium labels and the NHIS data sheet.

Andy Kranz

612.924.3998 direct

507.459.3150 mobile

andy.kranz@merjent.com



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Minneapolis, MN 55414

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Attachment G – MDNR’s Guidance on Documenting and Collecting Rare Plants (2018)

Guidance on Documenting and Collecting Rare Plants

DNR Division of Ecological and Water Resources

February 2018

Please refer to the following guidance if you will be submitting records for entry into the DNR's Natural Heritage Information System (NHIS). All botanical surveys conducted for environmental review or permitting purposes should follow this guidance.

Before Going in the Field

- Review the [current list of state-listed species](#) so you will know which species are rare.
- Check the Rare Features Database (see [How to Obtain Natural Heritage Data](#)) and, if applicable, the records of other public land managers to see if there are known occurrences of rare plants within your work or study area.
- Familiarize yourself with critical identifying features of species likely to be collected. This might include a visit to a herbarium to review previous collections of a plant species.
- Obtain the plant spreadsheet template for data entry purposes. Review this spreadsheet to familiarize yourself with the type of information that should be collected. The Rare Plant Observations spreadsheet template is available under "Submitting Data" on the [NHIS Website](#).
- Obtain a permit if you plan to collect specimen vouchers of state-listed endangered or threatened species. Minnesota's endangered species law (*Minnesota Statutes*, section 84.0895) and associated rules (*Minnesota Rules*, part 6212.1800 to 6212.2300 and 6134) prohibit the taking of threatened or endangered species without a permit. Please contact Richard Baker, Endangered Species Coordinator, at Richard.Baker@state.mn.us to request a permit.
- When required, obtain permits for collecting on public lands such as Scientific and Natural Areas, State Parks, and National Forests.
- Respect property owners' rights. Obtain permission from the private landowner or public land manager to 1) go on the land and 2) to collect plants.
- **Any surveys required through the DNR environmental review process must follow the standards contained in this Guidance.** Before initiating any such survey, the surveyor must receive approval of a project-specific survey plan from Lisa Joyal, Endangered Species Review Coordinator. Any proposed departure from the standards in the *Guidance* must be identified in the project-specific plan.

Specimen Collection

Most rare plant records in the DNR's Rare Features Database are documented with collected specimens deposited in credible herbaria. Records documented by standard herbarium collections in museums are strongly preferred over all other forms of documentation. A specimen of a rare plant often is sufficient if it includes a portion of the plant that allows positive identification of the species.

Under what circumstances should I collect a herbarium specimen?

- Collect state-listed endangered or threatened plants only if you have a permit. If you have unintentionally collected an endangered or threatened plant without a permit, the specimen should be submitted to the DNR as soon as is practical following the procedures described below, with a brief note attached that explains the circumstances.
- For new locations of a species, collect a specimen; in general, make no more than one collection of a particular species per 40 acres of habitat.
- For previously known populations of an endangered or threatened plant, consider collecting a new voucher if the DNR's Rare Features Database indicates that it has been more than thirty years since the last voucher was collected from the population.
- For any given species, collect only when distinguishing characters are present (usually flowers and/or fruits are necessary); if key characters are not present, mark the location and return at the appropriate time for collecting a specimen with distinguishing characteristics.
- For endangered or threatened vascular plants, collect a complete specimen (which includes roots) only when the population has more than 100 individuals.

- For populations of endangered or threatened vascular plants with fewer than 100 individuals, collect only the distinguishing portion of the plant (e.g., a portion of the inflorescence that has one or more flowers or a portion of the stem that has one or more leaves). A partial specimen might be inadequate to confirm the identification. In this case, supplement the partial collection with a close-up photograph that clearly shows the diagnostic features. Please note that in many cases photographs are not sufficient to confirm identification.
- For aquatic plants, collect a portion of the stem with leaves and fruits or flowers. Do not collect the roots. If you are unsure whether you have found a rare species, collect several specimens. Please note that in most cases photographs are not sufficient to confirm the identification of aquatic species. If your target search area is aquatic, please contact Welby Smith, DNR Botanist, at Welby.Smith@state.mn.us for additional guidance.
- For *Botrychium* spp., always collect a specimen of the above-ground portion of the plant, regardless of the apparent population size or the state status of the species.
- For mosses, liverworts, fungi and lichens, collect such that the viability of the population is maintained.

How do I make a proper collection? See General Guidelines for Collecting Vascular Plant Specimens on page 3.

Specimen Submission

- For quality control purposes, the identification of the specimen must be confirmed by a qualified second party before a record can be entered into the Rare Features Database.
- Send specimen(s) of state-listed species or suspected state-listed species directly to Welby Smith, DNR Botanist, for verification. Each specimen must have a label that meets the Bell Museum standards (see page 3). Do not submit unknown specimens unless you suspect that it is a state-listed species. If you are unsure of the species' identification, you can leave the space for the scientific name blank. Send specimens to:
 Welby Smith
 Minnesota Department of Natural Resources
 Division of Ecological Resources
 500 Lafayette Road, Box 25
 St. Paul, MN 55155
- DNR staff will complete verification or submit the specimen to an outside expert for annotation. Following verification, the DNR will donate specimens to the University of Minnesota Herbarium, a division of the [Bell Museum of Natural History](#). Save response from the DNR and submit with data.

Data Submission

- Follow the directions and templates under "Submitting Data" on the [NHIS Website](#).
- Document *all* state-listed endangered, threatened, or special concern species encountered. Include type of documentation for each record (e.g., photograph or specimen).
- Submit data electronically as a spreadsheet with an accompanying shapefile. Use the Rare Plant Observations spreadsheet template available under "Submitting Data" at [NHIS Website](#).
- **Important!** *Ensure that the unique identifier for each record is the same in the shapefile, the spreadsheet, the report's tables and figures, and the information submitted with the specimens.*
- Submit cover sheet, survey report, GIS shapefile, spreadsheet, and email verifying specimen identification to Reports.NHIS@state.mn.us.

How will my records be used to protect rare plants?

- Conservation planning at local, state and regional levels.
- Environmental review of development projects.
- Research about life history.
- Revisions to the state list of endangered, threatened and special concern species.
- Legal challenges related to protected species locations are possible. Properly vouchered specimens are often critical in the protection of rare plant populations in these cases.

Questions?

- **Regarding permits:** Contact Rich Baker at Richard.Baker@state.mn.us or 651-259-5073.
- **Regarding specimens:** Contact Welby Smith at Welby.Smith@state.mn.us or 651-259-5142.
or Hannah Texler at Hannah.Texler@state.mn.us or 651-259-5048.
- **Regarding data submittal:** Contact Karen Cieminski at Karen.Cieminski@state.mn.us or 651-259-5081.
- **Regarding environmental review process:** Contact Lisa Joyal at Lisa.Joyal@state.mn.us or 651-259-5109.

General Guidelines for Collecting Vascular Plant Specimens*

*For mosses, liverworts, algae, fungi and lichens, please contact the [University of Minnesota Herbarium](#) for collection guidelines.

1. **Equipment:** Plant press, straps (2), felt blotters, ventilators (corrugated boards), and newspaper. Also, a knife or other tool for cutting and digging and a notebook of standardized form for recording field data. The press can be made from $\frac{3}{4}$ " plywood cut 12" x 18" (2 pieces); the ventilators can be cut from discarded "cardboard" boxes, also 12" x 18" (the corrugations should run the short direction). The blotters can be obtained from a stationery store.
2. **Preparation:** Once the specimen is found, it is necessary to determine what portion of the plant will be collected. A complete collection includes the entire plant with roots, but for purposes of conservation, the roots of rare species should not be collected if the population consists of fewer than 100 individuals. For most species, such as orchids, a single flower is enough for purposes of identification. Other species, e.g., sedges, usually require the complete aboveground stem with mature fruit. Specimens of trees and shrubs should include a twig with mature leaves and flowers and/or fruit. Specimens that do not show diagnostic features cannot be identified and are worthless. If only a portion of the plant is collected, it is important to record a description of the entire plant.

Before collecting plants, it is a good idea to check with the curator of the herbarium where the specimen will be deposited. Some herbaria may not accept a partial specimen unless it has special significance (e.g., a new location for an endangered species).

3. **Pressing and processing specimens:** The freshly collected specimen is placed within the sheet of folded newspaper with the leaves, flowers, etc. in a natural position, but clearly showing the diagnostic features. The paper is placed between two sheets of felt blotters, which are themselves placed between two corrugated ventilators. It is then put within the press, which is tightened with the straps (or ropes). Several specimens can be put in a single press by layering the blotters and ventilators. Commercial plant presses are slightly larger than herbarium paper so the specimens should not fill the plant press side to side. Also, be sure to leave room for a label in the lower right portion. The press must then be put in a warm dry place until the plants are dry. A simple plant drier that uses heat rising from a light bulb works well, but is not essential. The blotters should be changed every day until the specimen is dry. If a specimen does not dry within 4-5 days, it will likely begin to decompose. When the specimen is dry, it should be taken from the press, but kept within the folded newspaper for protection.

A label (see example below) must be prepared before the specimen can be sent to a herbarium. The label should be on acid-free, archival quality paper. We suggest that you use labels that are 2 $\frac{3}{4}$ x 4 $\frac{1}{4}$ inches in size, but other labels not to exceed 3 x 5 inches will be acceptable. At a bare minimum, the label must contain the name of the species, location of collection, description of habitat, name of collector, and date of collection. The label should also include latitude and longitude coordinates and/or UTM coordinates, and, if a permit was required, the permit number. Providing a label is the responsibility of the collector, not the herbarium or the DNR. A specimen without a label will not be accepted by a herbarium.

After the label is prepared, it should be put with the specimen inside the folded newspaper, which may be held between two corrugated ventilators for rigidity. The herbarium will mount the specimen and label on a stiff sheet of paper and accession it into their collection.

The University of Minnesota Herbarium, a division of the Bell Museum of Natural History, houses the largest collection documenting Minnesota's plant diversity and is the primary repository for the DNR's Minnesota Biological Survey. Additional [guidance on collecting rare plants for museum specimens](#) can be found on the University of Minnesota Herbarium website.

Plants of Scott County, Minnesota, USA

Silphium integrifolium Michx. var. *integrifolium*

3 miles west of Jordan in north half of quarter-quarter section.
Approximately 100 plants in wet to wet-mesic prairie on terrace within the Minnesota River Valley. In heavily grazed pasture dominated mostly by *Spartina pectinata* and *Agrostis stolonifera*. Soils range from black muck with marl concretions to silt loam. Site has been compacted by grazing. Glacial erratics common. Associated with *Carex stricta*, *Pycnanthemum virginianum*, *Lobelia siphilitica*, *Lysimachia quadriflora*, *Aster puniceus*.

T 114N R 24W NW $\frac{1}{4}$ of SE $\frac{1}{4}$ of Sec 27

MNDNR Permit # 1996

Fred S. Harris 96235

September 3, 1996

MINNESOTA BIOLOGICAL SURVEY
MINNESOTA DEPARTMENT OF NATURAL RESOURCES



Wetland and Waterbody Delineation Report - Minnesota

Project Name:

Summit Carbon Solutions (SCS) Midwest Carbon Express

Document Number: SCS-0700-ENV-RPT-005

Date

October 3, 2022

REVISION HISTORY

DATE	REVISION	REVISION DESCRIPTION	PREPARED BY:	REVIEWED BY:	APPROVED BY:
7/26/22	A	Draft for review	Tom Errico	Billy VonSee	
10/3/22	0	Issued for Use			

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1 Introduction

Summit Carbon Solutions, LLC (SCS) retained Merjent, Inc. (Merjent) to conduct wetland and waterbody surveys for the Midwest Carbon Express Project (Project) in the State of Minnesota. The Project will capture carbon dioxide (CO₂) from industrial facilities across five states (i.e., Iowa, Minnesota, Nebraska, South Dakota, and North Dakota) and transport the captured CO₂ via pipeline to North Dakota to be permanently sequestered within deep underground geologic formations. The Project aims to reduce the carbon intensity of biofuels produced from ethanol facilities and work towards achieving climate goals while creating jobs and other economic benefits across the Project footprint. The planned pipeline is approximately 2,000 miles, with diameters ranging from 4 to 24 inches.

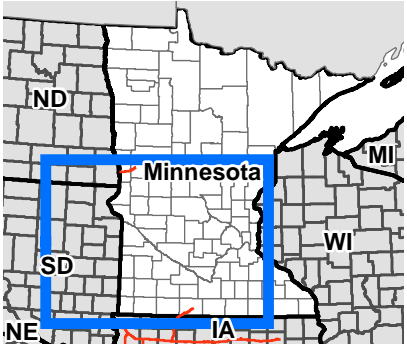
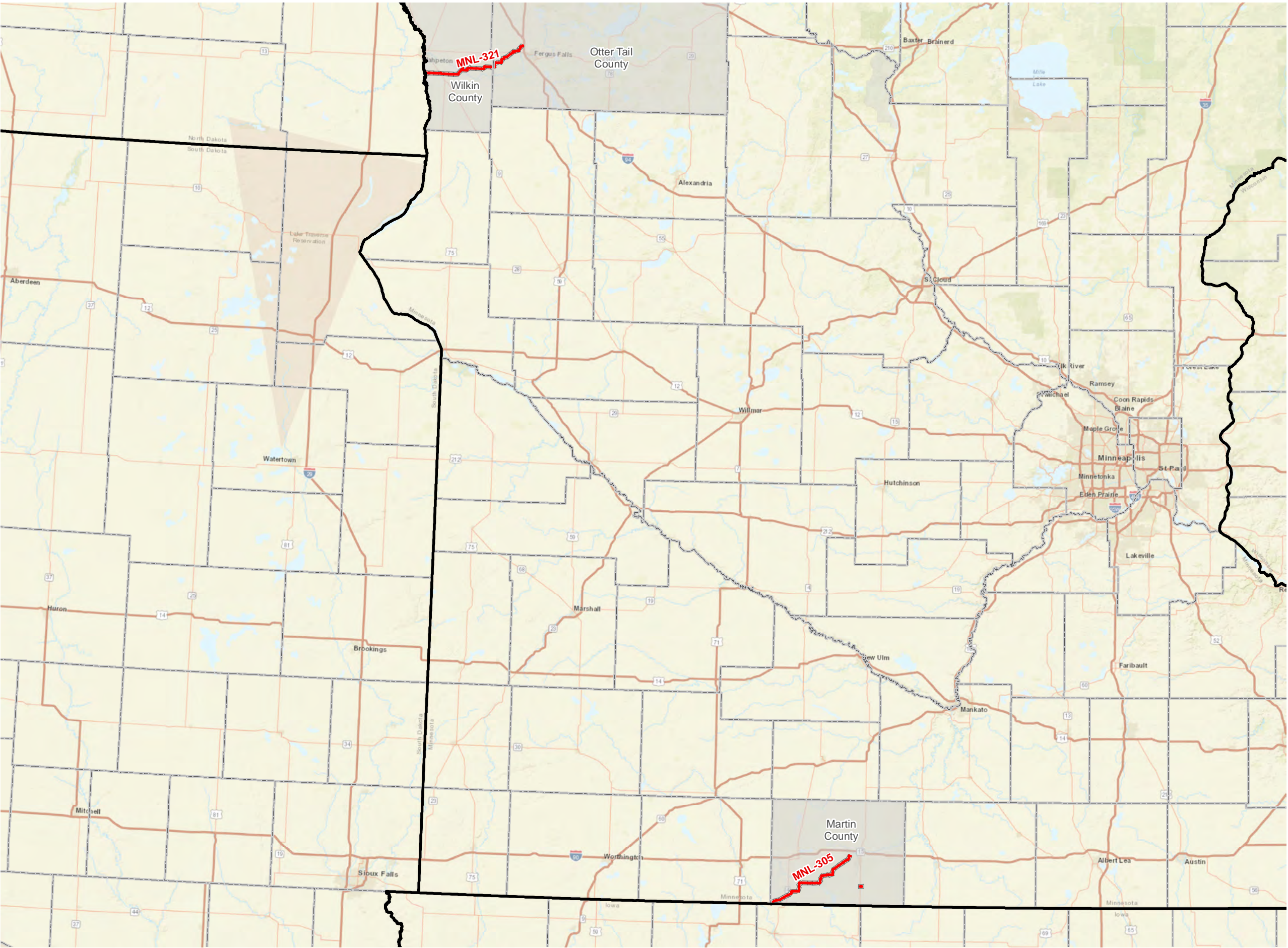
Field crews conducted surveys in accordance with technical guidance from the U.S. Army Corps of Engineers (USACE) and Minnesota Department of Natural Resources (MDNR). The purpose of the wetland and waterbody field surveys was to identify aquatic resources within the environmental survey corridor for use in workspace planning and evaluation, impact analyses, and water resources permitting.

Specific objectives of the surveys were to:

- 1) delineate wetland boundaries;
- 2) categorize wetland community types; and
- 3) locate and characterize waterbodies.

Wetland and waterbody surveys were conducted on two-line segments in three counties in Minnesota (refer to Table 1 and Figure 1).

The wetland delineation performed by Merjent included the identification and recording of physical features that may be considered Waters of the United States (WOTUS) as defined by the USACE. WOTUS include most wetlands, rivers, creeks, streams, lakes, tributaries, etc. This report summarizes the results of the wetland delineation within the Project survey area and will be utilized to determine impacts to potentially jurisdictional WOTUS.



- Environmental Survey Area
- Page Index
- State Boundary
- County Boundary
- Counties Crossed

Date: 2022-08-30	Revised by: JLL	Checked by: THE
Revision 1		
Revision description : Environmental Survey Area using Rev3 Route (8/23/2022)		
Date: N/A	Revised by: N/A	Checked by: N/A
Revision 2		
Revision description		
Date: N/A	Revised by: N/A	Checked by: N/A
Revision 3		
Revision description		

Summit Carbon Solutions

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United States of America

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Figure Title: Location Map	
Figure Number: Figure 1	
Scale: 1:1,400,000 1 in = 116,667 ft	Projection: Transverse Mercator NAD 1983 UTM Zone 15
Sheet: Sheet Sheet of	Drawing Number: 005-00003 Current Revision

Table 1: Line Segments

Line Segment ID	Counties	Total Mileage
MNL-305	Martin	25.4
MNL-321	Wilkin, Otter Tail	28.1
Total Mileage		53.5

2 Methodology

2.1 Identification of Potential Waters of the United States

Merjent completed a resource review of background site information to prepare for the survey effort. Data compiled as part of the resource review included:

- U.S. Geological Survey (USGS) topographic maps;
- U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS) soil survey data;
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data;
- MDNR NWI Data; and
- recent aerial imagery.

Appendix 1 includes the map index of the environmental survey corridor, and Appendix 2 includes the environmental features exhibit used to conduct the field survey and desktop review.

In addition to the Biological Survey Methodology and Protocols for Minnesota ("Biological Survey Protocols;" refer to Appendix 3) a unique naming scheme was used to identify wetlands and waterbody features. This consisted of feature type abbreviation (W for wetland, U for uplands, and S for waterbodies), company/team ID (1002, 1003, 1004, etc.), county code (OT for Otter Tail County), and feature ID number. For example, a wetland location would be labeled W1004OT001, an upland would be U10041OT001, and a waterbody would be S1004OT001. For multitype wetlands, a suffix with the cover type was added to the wetland name, such as Palustrine Forested (PFO), Palustrine Scrub-Shrub (PSS), or Palustrine Emergent (PEM) (e.g., W2001OT001_PEM).

A separate naming scheme was utilized for wetland and waterbody features that were identified via desktop analysis. Wetland features were labeled using a nomenclature that includes a feature type (W for wetlands and S for waterbodies), number code for company identification (1), county code (e.g., WI for Wilkin County), feature number/ID, and "DT" to denote that the feature was generated at a workstation and not surveyed in the field. For example, a desktop wetland location would be labeled W_1_WI_001_DT.

2.1.1 Wetlands

Field crews conducted wetland surveys in accordance with the criteria and methods outlined in:

- the USACE Wetlands Delineation Manual, Technical Report Y-87-1 (Environmental Laboratory, 1987; Manual);
- subsequent guidance documents (USACE, 1991a; 1991b; 1992); and
- applicable Regional Supplements to the 1987 Manual.

Merjent determined antecedent precipitation within each county crossed by the environmental survey corridor using the date when the field survey was conducted. Merjent evaluated antecedent precipitation with the Precipitation Worksheet using Gridded Database (Minnesota Climatology Working Group) for the 3 months prior to the date of field survey. The worksheet, which applies the methodology described in Engineering Field Handbook,

Part 650: Hydrology Tools for Wetland Determination (NRCS, 1997), calculates the multi-month score for the prior 3 months based on precipitation data. Merjent generated a precipitation worksheet for the approximate mid-point of the environmental survey corridor within each county and is summarized in Table 2-1 and Table 2-2 (refer to Appendix 4).

Field crews conducted on-site wetland delineations using the three criteria technical approach (i.e., vegetation, soil, and hydrology) as described in the Biological Survey Protocols and as defined in the Manual and applicable Regional Supplements. According to procedures described in the Manual and applicable Regional Supplements, field crews determined an area to be a wetland if under normal circumstances it reflects a predominance of:

- hydrophytic vegetation;
- hydric soils; and
- wetland hydrology (e.g., inundated or saturated soils).

Field crews located and recorded wetland sample points and boundaries using global positioning system (GPS) technology with sub-meter accuracy. Each wetland feature was given a unique ID as defined in the Biological Survey Protocols. After collection, Merjent reviewed, geospatially corrected, and consolidated the collected data for use in workspace evaluation and impact analyses. Wetlands included PEM, PSS, and PFO vegetative communities.

2.1.2 Waterbodies

Field crews identified, classified, and documented waterbodies according to the methodology outlined in the Biological Survey Protocols and the Classification of Wetlands and Deepwater Habitats (Cowardin, 1979). Field crews located and delineated waterbody boundaries with sub-meter GPS technology. Each waterbody feature was given a unique ID as defined by the Biological Survey Protocols. Field crews collected the following attributes in the field and used them to classify each waterbody:

- top of bank width and height;
- ordinary high-water mark (OHWM) width and height;
- substrate type;
- flow direction;
- estimated water velocity;
- water quality; and
- dominant riparian vegetation.

Field crews identified OHWMs, if present, per USACE Regulatory Guidance Letter 05-05 (USACE, 2005) and took photographs at each waterbody to record general conditions at the time of the field survey. Field crews identified Ephemeral, Intermittent, Perennial, and pond or other open water types of waterbodies.

2.2 Desktop Delineation Review

A desktop delineation review of wetlands and waterbodies was conducted for all Project areas that were not surveyed by field crews during the 2021 or 2022 surveys. Merjent gathered available data and imagery resources to complete a detailed assessment of potential wetland and waterbody locations within the Project environmental survey corridor. Resources utilized for the desktop delineation review included:

- USGS topographic maps;
- NRCS soil survey data;
- USFWS NWI data;
- MDNR NWI Data;

- Google Earth™ historic imagery (multiple years);
- National Agricultural Imagery Program (NAIP) Imagery (multiple years); and
- NAIP imagery color-infrared (multiple years).

Each potential wetland and waterbody feature identified was given a unique feature ID. Each potential wetland community was classified according to the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, 1979), Circular 39 System, and Wetland Plants and Plant Communities of Minnesota and Wisconsin (Eggers and Reed, Ver. 3.2, 2015). Each potential waterbody was classified by flow regime. Field surveys for these areas are anticipated to be completed in the summer and fall of 2022, access and weather permitting.

3 Results

3.1 Survey Completion

Field crews conducted wetland and waterbody surveys of approximately 43.7 miles (1,533.1 acres) of the 53.5-mile (2,061.9-acre) Project environmental survey corridor. A desktop delineation review was completed for the remaining 9.8 miles (528.8.5 acres).

3.2 Wetland & Waterbody Delineation Summary

Field crews identified 20 waterbodies and 60 wetlands containing 62 wetland communities. The desktop delineation review identified 9 waterbodies and 37 wetlands containing 37 wetland communities. Appendix 2 includes maps illustrating wetlands and waterbodies by Cowardin Class. Appendix 5 includes a tabular list of wetland and waterbody features and associated data collected: Table 3 summarizes wetland and waterbody features by Cowardin Class; Table 3-1 provides a summary of wetland features; and Table 3-2 provides a summary of waterbody features. Appendix 6 includes the USACE Wetland Determination Data Forms. Appendix 7 includes photographs of each sampled wetland and waterbody and representative photos of the environmental survey corridor.

4 References

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Appendix 1 – Map Index

Appendix 2 – Environmental Features Exhibit

Appendix 3 – Wetland & Waterbody Field Protocols

Appendix 4 – WETS Precipitation Summary Table

Appendix 5 – Wetland & Waterbody Summary Tables

Appendix 6 – USACE Wetland Determination Data Forms

Appendix 7 – Photos



Wetland and Waterbody Delineation Supplemental Report for MNL-305 and MNL-321 (2022) - Minnesota

Project Name:

Summit Carbon Solutions Midwest Carbon Express Project

Document Number: SCS-0700-ENV-RPT-005

Date

March 31, 2023

REVISION HISTORY

DATE	REVISION	REVISION DESCRIPTION	PREPARED BY:	REVIEWED BY:	APPROVED BY:
10/03/2022	0	Report for MNL-305 and MNL-321 (2022)	TE	AR	
3/31/23	1	Supplemental Report for MNL-305 and MNL-321 (2022)	TE	AR	

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Appendix 7 – Photos	
Appendix 8 – Upland NHD Crossings Table	

1 Introduction

Summit Carbon Solutions, LLC (SCS) retained Merjent, Inc. (Merjent) to conduct wetland and waterbody surveys for the Midwest Carbon Express Project (Project) in the State of Minnesota. The Project will capture carbon dioxide (CO₂) from industrial facilities across five states (i.e., Iowa, Minnesota, Nebraska, South Dakota, and North Dakota) and transport the captured CO₂ via pipeline to a sequestration area in North Dakota, where the CO₂ will be safely and permanently stored deep underground utilizing separately permitted Class VI injection wells. Once operational, the Project will include approximately 2,000 miles of pipelines for transportation of CO₂ from industrial facilities.

Field crews conducted surveys in accordance with technical guidance from the U.S. Army Corps of Engineers (USACE) and Minnesota Department of Natural Resources (MDNR). The purpose of the wetland and waterbody field surveys was to identify aquatic resources within the environmental survey area for use in workspace planning and evaluation, impact analyses, and water resources permitting.

Specific objectives of the surveys were to:

- 1) delineate wetland boundaries;
- 2) categorize wetland community types; and
- 3) locate and characterize waterbodies.

On October 3, 2022, SCS submitted a preliminary report to the USACE that summarized the results of surveys conducted during 2021 and the first half of the 2022 field season through July 1 along the pipeline laterals listed in Table 1. This new report supersedes the October 2022 report by providing field survey results for the full 2021 and 2022 field seasons along the pipeline laterals listed in Table 1. On January 10, 2023, SCS submitted a report to the USACE that summarized the full 2021 and 2022 field survey results conducted along the MNL-303, MNL-304, and MNL-337 pipeline laterals.

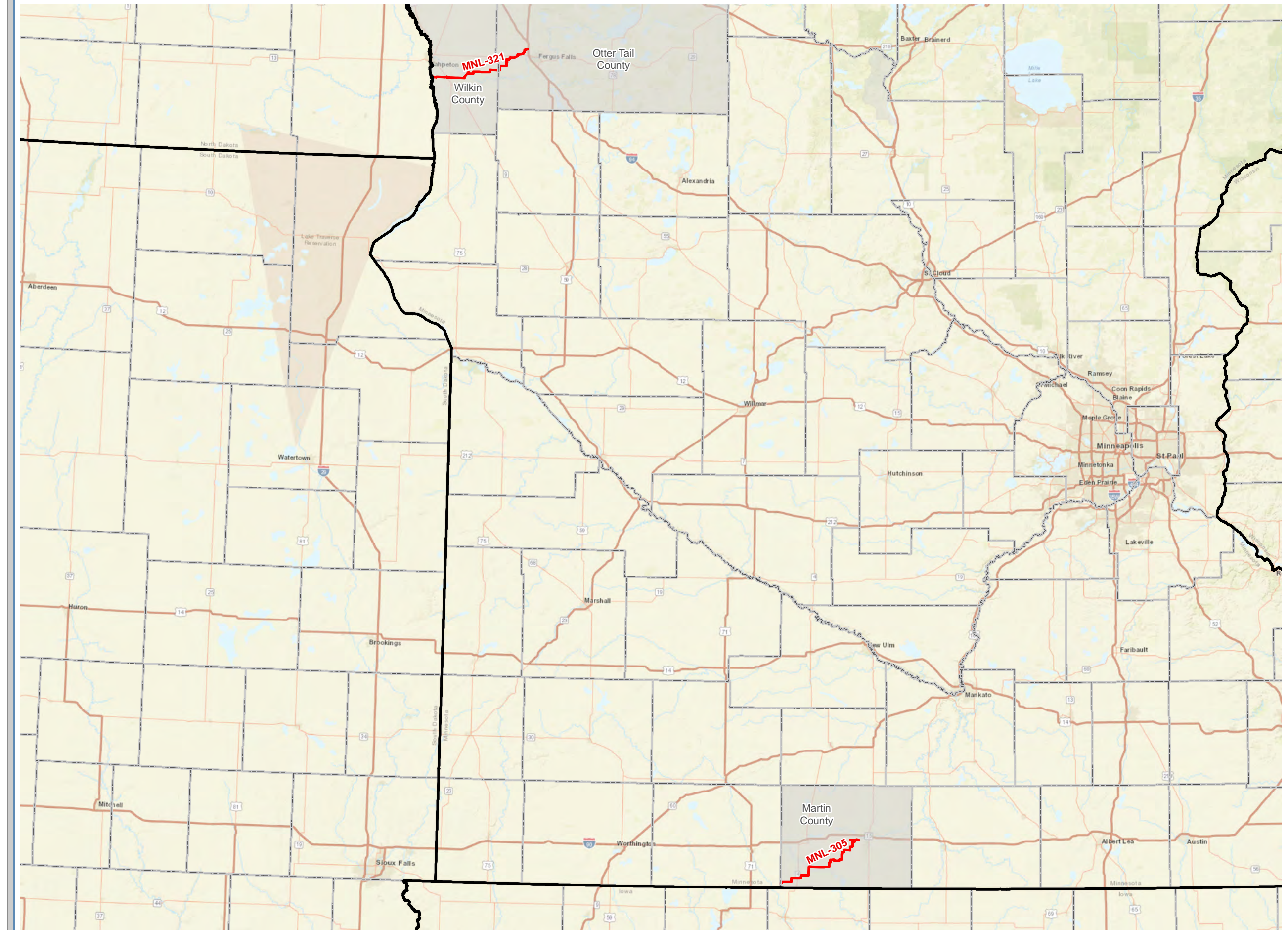
Wetland and waterbody surveys were conducted on two pipeline laterals in three counties in Minnesota (refer to Table 1 and Figure 1).

Table 1: Pipeline Laterals

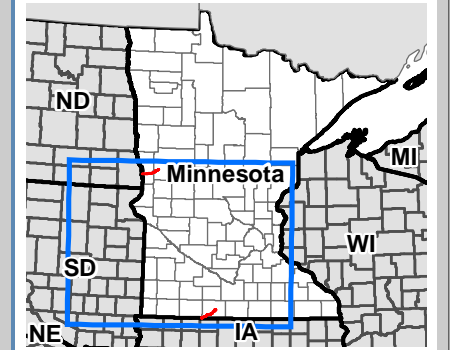
Pipeline Lateral	Counties	Total Mileage
MNL-305	Martin	29.4
MNL-321	Otter Tail, Wilkin	28.1
Total Mileage		57.5

The wetland delineation performed by Merjent included the identification and recording of physical features that may be considered Waters of the United States (WOTUS) as defined by the USACE. WOTUS include most wetlands, rivers, creeks, streams, lakes, tributaries, etc. This report summarizes the results of the wetland delineation within the Project environmental survey area and will be utilized to determine impacts to potential WOTUS.





Location Map



VICINITY MAP



LEGEND

-  Environmental Survey Area
-  State Boundary
-  County Boundary
-  Counties Crossed

REVISIONS

Date: 2023-02-28 Revised by: JLL Checked by: THE

Revision Letter/Number - Revision

Revision description: Rev5 Route (2/8/2023)

Date: YYYY-MM-DD Revised by: TBD Checked by: TBD

Revision Letter/Number - Revision

Revision description

Date: YYYY-MM-DD Revised by: TBD Checked by: TBD

Revision Letter/Number - Revision

Revision description

PREPARED BY

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SUMMIT CARBON
SOLUTIONS



MIDWEST CARBON EXPRESS PROJECT

Figure Title:

Location Map

Figure Number: Figure 1

<p>Scale:</p> <p>1:1,400,000</p> <p>1 in = 116,667 ft</p>	<p>Projection:</p> <p>Transverse Mercator</p> <p>NAD 1983 UTM Zone 15</p>
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Projection:
Transverse Mercator
NAD 1983 UTM Zone 15

Sheet: Sheet 1 Sheet 1 of 1	Drawing Number: 005-00027 Current Revision
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Drawing Number:
005-00027
Current Revision

2 Methodology

2.1 Identification of Potential Waters of the United States

Merjent completed a resource review of background site information to prepare for the survey effort. Data compiled as part of the resource review included:

- U.S. Geological Survey (USGS) topographic maps;
- U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS) soil survey data;
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data; and
- recent aerial imagery.

Appendix 1 includes the map index of the environmental survey area, and Appendix 2 includes the environmental features exhibit used to conduct the field survey and desktop review.

In addition to the Biological Survey Methodology and Protocols for Minnesota (“Biological Survey Protocols;” refer to Appendix 3) a unique naming scheme was used to identify wetlands and waterbody features. This consisted of feature type abbreviation (W for wetland, U for uplands, and S for waterbodies), company/team ID (1002, 1003, 1004, etc.), county code (e.g., OT for Otter Tail County), and feature ID number. For example, a wetland location would be labeled W1004OT001, an upland would be U10041OT001, and a waterbody would be S1004OT001. For multitype wetlands, a suffix with the cover type was added to the wetland name, such as Palustrine Forested (PFO), Palustrine Scrub-Shrub (PSS), or Palustrine Emergent (PEM) (e.g., W1004JA001_PEM).

A separate naming scheme was utilized for wetland and waterbody features that were identified via desktop analysis. Wetland features were labeled using a nomenclature that includes a feature type (W for wetlands and S for waterbodies), number code for company identification (1), county code (e.g., OT for Otter Tail County), feature number/ID, and “DT” to denote that the feature was generated at a workstation and not surveyed in the field. For example, a desktop wetland location would be labeled W_1_OT_001_DT.

2.1.1 Wetlands

Field crews conducted wetland surveys in accordance with the criteria and methods outlined in:

- the USACE Wetlands Delineation Manual, Technical Report Y-87-1 (Environmental Laboratory, 1987; Manual);
- subsequent guidance documents (USACE, 1991a; 1991b; 1992); and
- applicable Regional Supplements to the 1987 Manual.

Merjent determined antecedent precipitation within each county crossed by the environmental survey area using the date when the field survey was conducted. Merjent evaluated antecedent precipitation with the Precipitation Worksheet using the Gridded Database (Minnesota Climatology Working Group) for the 3 months prior to the date of field survey. The worksheet, which applies the methodology described in Engineering Field Handbook, Part 650: Hydrology Tools for Wetland Determination (NRCS, 1997), calculates the multi-month score for the prior 3 months based on precipitation data. Merjent generated a precipitation worksheet for the approximate mid-point of the environmental survey area within each county and is summarized in Table 2-1 and Table 2-2 (refer to Appendix 4).

Field crews conducted on-site wetland delineations using the three criteria technical approach (i.e., vegetation, soil, and hydrology) as described in the Biological Survey Protocols and as defined in the Manual and applicable Regional Supplements. According to procedures described in the Manual and applicable Regional Supplements, field crews determined an area to be a wetland if under normal circumstances it reflects a predominance of:

- hydrophytic vegetation;
- hydric soils; and

- wetland hydrology (e.g., inundated or saturated soils).

Field crews located and recorded wetland sample points and boundaries using global positioning system (GPS) technology with sub-meter accuracy. Each wetland feature was given a unique ID as defined in the Biological Survey Protocols. After collection, Merjent reviewed, geospatially corrected, and consolidated the collected data for use in workspace evaluation and impact analyses. Wetlands included PEM, PSS, and PFO vegetative communities.

2.1.2 Waterbodies

Field crews identified, classified, and documented waterbodies according to the methodology outlined in the Biological Survey Protocols and the Classification of Wetlands and Deepwater Habitats (Cowardin, 1979). Field crews located and delineated waterbody boundaries with sub-meter GPS technology. Each waterbody feature was given a unique ID as defined by the Biological Survey Protocols. Field crews collected the following attributes in the field and used them to classify each waterbody:

- top of bank width and height;
- ordinary high-water mark (OHWM) width and height;
- substrate type;
- flow direction;
- estimated water velocity;
- water quality; and
- dominant riparian vegetation.

Field crews identified OHWMs, if present, per USACE Regulatory Guidance Letter 05-05 (USACE, 2005) and took photographs of each waterbody to record general conditions at the time of the field survey. Field crews identified Ephemeral, Intermittent, Perennial, and pond or other open water types of waterbodies. When field crews encountered a mapped National Hydrography Dataset (NHD) waterbody that did not exhibit the characteristics to be classified as a waterbody, photographs were taken to document the presence of upland conditions. Photographs of these areas are available in Appendix 7 and Table 8-1 in Appendix 8 lists NHDs crossed by the Project environmental survey area that did not exhibit characteristics to be classified as a waterbody.

2.2 Desktop Delineation Review

A desktop delineation review of wetlands and waterbodies was conducted for all Project areas that were not surveyed by field crews during the 2021 or 2022 surveys. Merjent gathered available data and imagery resources to complete a detailed assessment of potential wetland and waterbody locations within the Project environmental survey area. Resources utilized for the desktop delineation review included:

- USGS topographic maps;
- NRCS soil survey data;
- USFWS NWI data;
- Google Earth™ historic imagery (multiple years);
- National Agricultural Imagery Program (NAIP) Imagery (multiple years); and
- NAIP imagery color-infrared (multiple years).

Each potential wetland and waterbody feature identified was given a unique feature ID. Each potential wetland community was classified according to the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, 1979), Circular 39 System, and Wetland Plants and Plant Communities of Minnesota and Wisconsin (Eggers and Reed, Ver. 3.2, 2015). Each potential waterbody was classified by flow regime. Field surveys for these areas are anticipated to be completed in the spring and summer of 2023, access and weather permitting.

3 Results

3.1 Survey Completion

Field crews conducted wetland and waterbody surveys of approximately 45.7 miles (1,600.0 acres) of the 57.5-mile (2,220.0-acre) Project environmental survey area in Minnesota. A desktop delineation review was completed for the remaining 11.8 miles (620.0 acres) in Minnesota.

3.2 Wetland & Waterbody Delineation Summary

Field crews identified 20 waterbodies and 65 wetlands containing 70 wetland communities. The desktop delineation review identified 11 waterbodies and 45 wetlands containing 46 wetland communities. Appendix 2 includes maps illustrating wetlands and waterbodies by Cowardin Class. Appendix 5 includes tables of wetland and waterbody features and associated data collected: Table 3 summarizes wetland and waterbody features by Cowardin Class; Table 3-1 provides a summary of wetland features; and Table 3-2 provides a summary of waterbody features. Appendix 6 includes the USACE Wetland Determination Data Forms. Appendix 7 includes a photograph location map set, photographs of each sampled wetland and waterbody, and representative photos of the environmental survey area.

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Appendix 1 – Map Index (Provided Electronically)

Appendix 2 – Environmental Features Exhibit (Provided Electronically)

Appendix 3 – Wetland & Waterbody Field Protocols

Biological Survey Methodology and Protocols for Minnesota; 2021 Merjent Field Services

*Summit Carbon Solutions
Midwest Carbon Express*

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REVISION HISTORY

DATE	REVISION	REVISION DESCRIPTION	PREPARED BY:	REVIEWED BY:	APPROVED BY:

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Acronyms and Abbreviations

AGO	ArcGIS Online
GIS	geographic information system
GPS	Global Positioning System
HASP	Health and Safety Plan
MCE	Midwest Carbon Express
Merjent	Merjent, Inc.
NHD	National Hydrography Database
NHIS	Natural Heritage Information System
NWI	National Wetland Inventory
OHWM	ordinary high-water mark
PEM	palustrine emergent
PFO	palustrine forested
PSS	palustrine scrub shrub
PUB	palustrine unconsolidated bottom
ROW	right-of-way
RTE	Rare, Threatened and Endangered
SCS	Summit Carbon Solutions
TOB	Top of Bank
USACE	U.S. Army Corps of Engineers

1 Scope

The objective of the Biological Survey Methodology and Protocols for Minnesota is to ensure that Merjent, Inc. (Merjent) and its subconsultants implement consistent field data collection procedures for wetland and waterbody surveys for Summit Carbon Solution's (SCS) Midwest Carbon Express (MCE) project. The Biological Survey Methodology and Protocols incorporates all applicable agency and client requirements to facilitate timely and complete permitting applications.

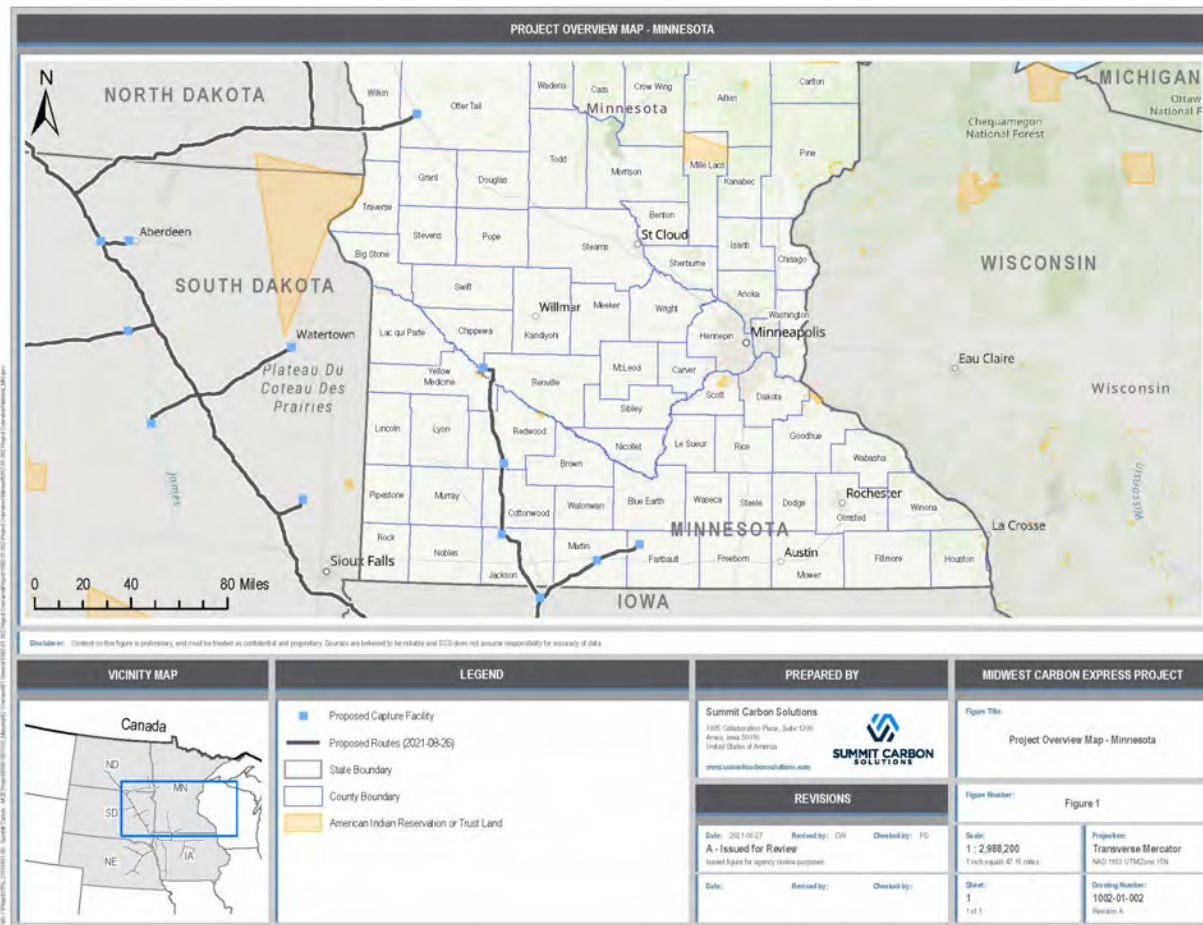


Figure 1 Project Overview in Minnesota

2 Preliminary Survey Protocols

2.1 Desktop Review

It is assumed prior to survey, the field staff will review all relevant and available spatial information related to each survey type including, but not limited National Wetland Inventory (NWI), National Hydrography Database (NHD), Natural Resource Conservation Service data for hydric soils, aerial imagery, etc.

2.2 Safety

Safety is a priority for SCS and Merjent. Compliance with all safety requirements is mandated by SCS and Merjent. For specific information on safety requirements, please refer to the Project Specific Health and Safety Plan (HASP). A daily tailgate form will be required to document potential site-specific issues and controls to address them.

For the MCE project, permission to conduct biological resource surveys within the environmental survey corridor will be secured through right-of-way (ROW) agents in coordination with Merjent's Field Logistics Coordinator prior to Merjent's biological crews entering the survey corridor. However, if a crew is ever asked by a landowner to vacate their property, the survey crew will cease work immediately, leave the property without question, and notify the appropriate ROW contact as well as the appropriate Merjent Field Logistics Coordinator.

3 Survey Protocols

3.1 Wetland and waterbody delineations

Crews will delineate and collect data for all wetland and waterbody features encountered in the environmental survey corridor as follows:

- Wetland delineation methods will follow the standardized protocol as described in the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (1987) and associated Regional Supplements (Midwest Region (Version 2.0, 2010) and Great Plains Region (Version 2.0, 2010))
 - Surveys will require the collection of wetland boundaries, sample points, and completion of the appropriate USACE Regional Supplement sample point forms. The boundaries of each regional supplement are defined by the U.S. Department of Agriculture Land Resource Regions boundaries.
- Surveys will require the delineation of wetland communities according to the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, 1979), Circular 39 System and Eggers and Reed.
- All waterbody features encountered in the environmental survey corridor will be delineated and have characteristics documented regardless of the potential jurisdictional status.

4 Typical Sampling Protocol

4.1 Wetland Sampling Protocol

The entire environmental survey corridor will be walked, not just the exterior boundary of a located wetland (as far as safe conditions allow). This will minimize the chance of missing upland inclusions, potential Rare, Threatened and Endangered (RTE) species habitat or wetland communities that may affect permitting, construction, or mitigation.

All wetlands will be delineated regardless of potential jurisdictional status. Examples of potential scenarios and sampling can be found in Appendix A.

4.1.1 Vegetation

Vegetation sampling and documentation will follow procedures as described in the appropriate Regional Supplement.

4.1.2 Hydrology

Hydrology sampling and documentation will follow procedures as described in the appropriate Regional Supplement.

4.1.3 Soils

Soil sampling and documentation will follow procedures as described in the appropriate Regional Supplement. This requirement includes one soil sample collected at each data point. Due to safety concerns, one exception is:

- 1) No soil sampling will occur near roadsides. In cases of roadside wetlands, crews will be restricted from sampling the soils and assume soils are hydric. Crews are to indicate such on their data forms (i.e., in soil notes write: “roadside wetland – soils assumed hydric).

4.1.4 Upland Inclusions within Wetland Complexes

Upland inclusions within a wetland may be observed. Upland inclusions greater than 2,500 square feet will be delineated. In these cases:

- Collect an USACE data form to represent the upland inclusion.

4.1.5 Photo Documentation

Photos of all surveyed wetlands will be captured. The purpose of photos is to characterize the surveyed wetland. A representative photograph should be taken of each wetland. If multiple plant communities are present in each wetland, a representative photograph of each plant community should be taken. Photos of upland areas are not necessary. Photos should:

- Be taken in the landscape (horizontal) orientation;
- Be representative of the wetland plant community. It is not necessary to be standing within the wetland, and it may be preferable to stand back from the wetland plant community while taking the photo;
- Not be taken looking into the sun as this will obscure the photo. When possible, the sun should be at the back of the photographer;
- Be level with the horizon such that the top quarter of the photo captures the sky (assuming flat topography and open conditions); and
- Be taken of NWI wetlands that are entirely upland (see below).

4.1.6 National Wetland Inventory – Upland Verification

An area may be identified as a NWI wetland, but field indicators may conclude that the area is entirely upland. In these situations, field crews will:

- 1) Collect a USACE wetland determination data point location within the area indicated by NWI to be wetland.
- 2) Complete a USACE wetland determination data form (including soils) to document why the NWI-indicated area is entirely upland.
- 3) Take a photograph of the NWI-indicated area to further characterize its upland nature.

In other instances, crews may locate a NWI that overlaps the observed wetland or is “skewed” from the observed wetland. In those cases, no additional documentation is needed for the upland fragment of the NWI area.

4.1.7 Lakes & Ponds

Lakes, ponds, and areas of small open water will be delineated as wetland features and classified according to the Cowardin Classification System (i.e., either Lacustrine or Palustrine).

A USACE wetland determination data point per feature may not be necessary where a lake or pond feature either lacks a vegetative fringe or has a narrow fringe comprised of annual or perennial vegetation.

Crews are to collect a USACE wetland determination point in the vegetative fringe if one is present. In that situation, crews should note in the data form that the emergent component is associated with an open water feature and crews should identify the Cowardin class for the open water component within the remarks section of the wetland data form (e.g., PUB, L1UB).

4.1.8 PUB Wetland vs Deepwater Aquatic Habitat (Lake or Pond)

In determining whether an area meets the definition of a palustrine unconsolidated bottom (PUB) wetland or a waterbody (lake or pond) the below criteria shall be used.

- Lakes or ponds are areas that are permanently inundated at mean annual water depths >6.6 feet or permanently inundated areas ≤6.6 feet in depth that do not support rooted-emergent or woody plant species.

4.1.9 Roadside Ditches

According to Merjent safety standard practices, no digging may occur in roadside ditches because of the increased likelihood that buried utilities will be present. Roadside ditches may fall into one of the three following categories:

The crews will delineate roadside ditches as wetlands when:

- They are entirely vegetated and dominated by hydrophytic vegetation; and
- A bed and bank are not present (i.e., no ordinary high-water mark (OHWM))

“Roadside ditch wetlands” will use the Wetland ID nomenclature outlined in this document, and only the vegetation and hydrology section of the USACE wetland determination data form will be filled out. Indicate in the soil comments, “Soils not sampled due to safety requirements – soils assumed hydric”.

The crews will delineate roadside ditches as waterbodies when:

- A bed and bank are present (i.e., OHWM present).

“Roadside ditch waterbodies” will use the Waterbody ID nomenclature outlined below in this protocol.

4.1.10 Special Resources

Special resources are features of unique agency designation or meet the criteria of unique agency designations. In general, all special resources wetlands will be delineated following standard delineation methods as described above. In addition, special resource wetlands will likely be evaluated by the team’s botanical staff separate from the delineation process.

4.1.11 Existing (Known) Special Resources

Known special resources such as areas identified as High and Outstanding Sites of Biological Significance by the Minnesota Biological Survey (formerly Minnesota County Biological Survey) will automatically be surveyed by the team’s botanical staff. The areas will be identified during the desktop review and targeted for rare plant surveys. The results of the botanical surveys will be addressed in a separate report.

4.1.12 Unknown Special Resources

There may be situations where field crews identify a previously undocumented special resource, such as calcareous fens. In these situations, field crews will report their findings to the biological lead, who will immediately alert the team. The team will formulate an adaptive field survey strategy to address these types of occurrences.

4.2 Waterbody Sampling Protocol

Crews will delineate and collect data for all waterbody features encountered in the environmental survey corridor as follows:

- Waterbodies <10 feet between OHWM will be delineated by capturing the centerline of the waterbody bed.
- Waterbodies >10 feet will be delineated by capturing the OHWM along each bank. The OHWM will be identified according to USACE Regulatory Guidance Letter (No. 05-05, December 7, 2005) *Subject: Ordinary High Water Mark Identification*.

- Each delineated waterbody will require the collection of a waterbody point and photos.

4.2.1 Flow Regime Classifications

Flow regime will be defined as ephemeral, intermittent, or perennial.

- 1) Ephemeral waterbodies – Inundated following spring thaw and after periods of rainfall. These features otherwise lack hydrology.
- 2) Intermittent waterbodies – Likely have water present within the feature throughout the growing season. These features will additionally show evidence of sorting or stratification of materials (cobble, sand, organic matter). During other seasons, these features generally lack hydrology.
- 3) Perennial waterbodies – Possess surface water hydrology consistently throughout the year, regardless of season.

4.2.2 Water Quality

The water quality of each individual water body will be classified as high, medium or low based on the below characteristics:

- 1) High - Waterbody consisting of either an Intermittent or Perennial flow regime which has aquatic fauna present. Riffles and pools are most likely present. Adjacent wetlands may be present and 30-60% native woody community species are present. No maintenance and/or grazing is apparent within the buffer. Additionally, channelization is absent, and no dams, dikes, levees, culverts, riprap, bulkheads, armor, or hoof tread found along the feature.
- 2) Medium - Waterbody consisting of either an Ephemeral, Intermittent or Perennial flow regime with a high degree of sedimentation or turbidity and few pools and riffles. Aquatic fauna may not be present. Area may be surrounded by woody vegetation with less than or equal to 30-60% aerial coverage with little to no maintenance or grazing visible. Less than 100 feet or the minority of the feature within the survey corridor is adversely impacted by channelization, dams, dikes, levees, culverts, riprap, bulkheads, armor, or hoof tread found along the feature.
- 3) Low - Waterbody consisting of either an Ephemeral or Intermittent flow regime, with a high degree of sedimentation or turbidity and no pools and riffles. Aquatic fauna most likely not present. Trash may or may not be present. Areas such as these may have a poor surrounding riparian buffer such as cropland, grazed pasture, maintained ROW or similar condition. More than 100 feet of the feature or the majority of the feature within the survey corridor is adversely impacted by channelization, dams, dikes, levees, culverts, riprap, bulkheads, armor, or hoof tread found along the feature.

4.2.3 Waterbodies within Wetland Complexes

There may be situations where a waterbody feature is surrounded by a poorly developed floating organic mat, leading to safety concerns for field crews. Under these circumstances, the waterbody feature will be digitized based on high resolution aerial photography. However, all pertinent data for the waterbody data form would be collected to the extent possible given the conditions.

4.2.4 Bank Heights

Crews will provide bank height data when delineating a waterbody. A view looking upstream will be used to differentiate the left bank from the right bank of a waterbody.

4.2.5 NHD Verification

An area may be identified as a NHD waterbody, but field indicators may conclude the area is not a waterbody or wetland resource and is entirely upland. In these situations, field crews will take a photopoint with at least two photos documenting the area as upland.

4.3 Habitat Assessment and Rare, Threatened, and Endangered Species

Merjent Technical Leads will review the available Natural Heritage Information System (NHIS) data. This review will also inform planning for Minnesota special-status species surveys that could need to occur to support routing/permitting of the Project. Merjent will submit an NHIS Review request to the Minnesota Department of Natural Resources to initiate consultation. The results of this review will provide information on specific species occurrences in or near the Project area and help define whether species-specific surveys may be needed.

4.3.1 Habitat Assessments

All field leads will determine the potential for suitable RTE species habitats within the environmental survey corridor. Crews will identify, collect data, and photograph areas within the survey corridor that have the potential to support the presence of RTE species. See Appendix B for a list of potential species within the project survey area.

4.4 Land Use

Land use descriptions will be collected along the environmental survey corridor for the project to classify current conditions observed on the ground. Examples of land use values include:

- Open Land
- Forested
- Agricultural field (active)
- Agricultural field (fallow)
- Residential
- Industrial
- Transportation
- Tallgrass Prairie
- Shortgrass Prairie
- Mixed Grass Prairie
- Sand Hills
- Hayfield
- Tamed Grassland

5 Field Data Collection

Data collection is limited to the bounds of the environmental survey corridor. Data will be collected electronically using a Global Positioning System (GPS) datalogger and a mobile tablet computer (tablet) on the ArcGIS Online (AGO) Field Maps Application. Survey teams will consist of two people. Recommended division of responsibility is as follows:

- Crew Member A will operate a sub-meter GPS datalogger (Trimble R1 GPS unit that pairs with a tablet via a Bluetooth connection) to geolocate the wetland boundary and USACE sample point locations.
- Crew Member B will operate a tablet to collect wetland parameter data, which includes:
 - USACE Wetland Determination Data Form information;
 - Wetland community observation point information; and
 - Photo, caption, and location.

5.1 Data Processing

5.1.1 Field Data QA/QC

The daily uploaded data (geographic information system (GIS), mobile device data and photos) shall be considered “raw” data that has not undergone post-processing, QA/QC, or editing. Merjent shall review all raw data to confirm completeness.

Crew members must QA/QC attribute data collected on their mobile device before the daily data upload. Post processing of the data will include edits to wetland lines and community polygons within a given wetland complex. Data sheets also require review following collection in the field and before uploading at the end of the day. Community polygons will be created during post-process within each wetland feature to match collected community observation points

5.1.2 Daily Data Upload

All data collected with the GPS datalogger will be converted to a GIS shapefile format and uploaded nightly to Merjent’s SharePoint site. Merjent shall review this data to confirm daily progress in the field

All data collected via tablet, or otherwise, will be uploaded to Merjent’s SharePoint site on a daily basis.

5.1.3 Daily Progress Tracking

5.1.3.1 Survey Start and Stop Points

Crews will log a “start” point and a “stop” point at the beginning and end of each day for the areas worked. If crews are moving around due to lack of survey access, the start and stop points will be used for each individual parcel or area surveyed.

5.1.3.2 Survey Status

At the end of the day, on the tablet in the collector application, crews will update the status of the individual parcels surveyed with the fields below:

- Complete – Biological surveys complete for the entirety of the environmental survey area in that parcel.
- In Progress – A portion of the environmental survey area has been completed in that parcel.
- Not Started (default) – Biological surveys have not been started in that parcel.

5.1.4 Post-Processed Data and QA/QC

Spatial data collected in the field will be post-processed by Merjent. Line data of wetlands and waterbodies will be processed into appropriate polygons and lines. Merjent will QA/QC attribute data collected on the tablets. GIS data will also include point data representing data collection points. The Feature ID of wetland polygons and waterbody lines must match that of the point data.

Post processing of the data will include edits to wetland lines and community polygons within a given wetland complex. Data sheets may also require editing following collection in the field. Community polygons will be created during post-process within each wetland feature to match collected community observation points. A unique numerical ID will be assigned for each community within a wetland.

An updated, contractor QA/QC Geodatabase of all GIS data, and updated data sheets are due Wednesday at 9:00 a.m. CDT. This data shall include all data collected for the prior week of fieldwork (i.e., the September 29 data submittal shall include all data collected for the period of September 20 through September 25). Merjent will conduct an additional QA/QC review of all data submitted.

5.1.5 Coordinate System

The WGS 84 UTM coordinate system will be used for all field-collected data.

5.1.6 Electronic Devices

5.1.6.1 Trimble GPS

Sub-meter Trimble R1 GPS Units paired with a tablet will be used to locate wetland boundaries and USACE sample point locations within the environmental survey corridor.

5.1.6.2 Mobile Tablet Computer

USACE data form information, wetland community observation point data, and photos will be collected using a tablet.

5.2 Field Data ID Nomenclature

5.2.1 Community Type Classification

The wetland community type will be categorized based on the Cowardin Classification System, Eggers & Reed Classification System, and Circular 39.

For wetlands with multiple Cowardin classes, each discrete community will be identified when it comprises 10 percent or more of the wetland complex. Each discrete community within a wetland complex will require a “wetland community observation point” form and photo. Each unique community will also require a representative USACE Wetland Determination Form.

Each wetland will be labeled in the following manner:

- “W”; Team ID; County Code, Chronological Feature Number
 - “W” – Each Wetland ID begins with a static “W”
 - Team ID – Unique four digit team ID (Merjent team numbers can start with 1 (1001, 1002, 1003, etc.)
 - County Code – Two letter county abbreviation
 - Numerical designation in consecutive order within the County Code and Team

Example 1: W1003OT001 is the first wetland delineated within Otter Tail County (OT abbreviation) by Team 1003.

Each waterbody will be labelled in the above manner with the exception of an “S” in place of an “W” at the beginning of the ID.

Each potential habitat will be labelled in the above manner with the exception of an “H” in place of an “W” at the beginning of the ID.

Each land use point will be labelled in the above manner with the exception of an “LU” in place of an “W” at the beginning of the ID.

5.2.1.1 USACE Wetland Determination Data Sheets & Points (Wetland & Upland)

Each USACE wetland determination data point will be labeled in the following manner.

- Wetland (“W”) or Upland (“U”); Team ID; County Code; Wetland Number; Point Number.
 - As with the “W1003OT001” example above, all data points for this wetland will contain 1003OT001, which identifies these data points as part of the first wetland delineated within in Otter Tail County by Team 1003.

- Wetland data sheets will begin with “W” and end with a Point Number that increases with each wetland data point collected (“W1003OT001_W1” “W1003OT001_W2” and so on).
- Upland data sheets will begin with “U” and end with a “U” and Point Number that increases with each upland data point collected (“W1003OT001_U1” “W1003OT001_U2” and so on).
- Transects of upland/wetland data points should have matching point numbers when possible (“W1003OT001_W2” paired with “W1003OT001_U2”).
- For multitype wetlands, a suffix with the cover type will be added to the wetland name, such as palustrine forested (PFO), palustrine scrub shrub (PSS) or palustrine emergent (PEM). An example wetland ID for a single type of wetland would be W1001OL001, while a PFO/PEM wetland complex would be labeled as W1001OL001_PFO and W1001OL001_PEM, respectively.

5.2.1.2 Photos

Photo IDs should match Wetland IDs. To take a photo of a wetland, or a specific plant community within a complex, it may be necessary to do so from outside the wetland or community. The name for the photo should match the wetland or community being photographed; not the location where it was taken. For example, a photo of a wetland taken from an upland should be labeled with a W, not a U or upland label.

5.2.2 Data Collection Fields

Wetland Line Data – Collected on AGO Field Maps

- 1) Feature ID – Unique Wetland Feature ID (see above for naming convention)
- 2) Feature Type – Select PEM, PFO, PSS, PUB
- 3) State and County – State and County the wetland line is in
- 4) Date – Date of survey
- 5) Remarks – Additional comments of importance

Wetland Community Observation Point - Collected on AGO Field Maps

- 1) Feature_ID – Unique Wetland Feature ID (see above for naming convention)
- 2) Sub Community ID – Starting with “01”, increase incrementally for each wetland community within a wetland complex
- 3) Date – Date of survey
- 4) Cowardin – Select PEM, PFO, PSS, PUB

USACE Data Form Point or Soil Station Point - Collected on AGO Field Maps

- 1) Feature Type – Select PEM, PFO, PSS, PUB, Upland
- 2) Feature ID – Unique Wetland Feature ID (see above for naming convention)
- 3) State and County – State and County the photo point is in
- 4) Date – Date of photograph
- 5) Remarks – Additional comments of importance

Wetland Community Observation Form – Collected on tablet

- 1) Feature ID – Unique Wetland Feature ID (see above for naming convention)
- 2) Sub Community ID – Starting with “01”, increase incrementally for each wetland community within a wetland complex
- 3) Date – Date of survey

- 4) Cowardin – Select PEM, PFO, PSS, PUB
- 5) Eggers & Reed – Identify the appropriate community type
 - a) Seasonally Flooded Basin
 - b) Shallow, Open Water Community
 - c) Fresh (Wet) Meadow
 - d) Wet to Wet-Mesic Prairie
 - e) Calcareous Fen
 - f) Deep Marsh
 - g) Shallow Marsh
 - h) Sedge Meadow
 - i) Open Bog
 - j) Shrub-Carr
 - k) Alder Thicket
 - l) Coniferous Swamp
 - m) Coniferous Bog
 - n) Hardwood Swamp
 - o) Floodplain Forest
- 6) Circular 39
 - a) Type 1 – Seasonally Flooded Basins or Floodplains
 - b) Type 2 – Wet Meadows
 - c) Type 3 – Shallow Marshes
 - d) Type 4 – Deep Marshes
 - e) Type 5 – Open Water Wetlands
 - f) Type 6 – Shrub Swamps
 - g) Type 7 – Wooded Swamps
 - h) Type 8 – Bogs
- 7) Dominant Plants – List the top three dominant plants
- 8) Notes – Relevant information observed by crews in the field
- 9) Data Sheet – Was a data sheet completed for the sample point (Y/N)
- 10) County – County the wetland is located in
- 11) State – State the wetland is located in

USACE Wetland Determination Forms (applicable regional supplement) – Collected on tablet

- 1) Standard USACE form information

Stream Data Plot - Collected on AGO Field Maps

- 1) Feature ID – Unique Stream Feature ID (see above for naming convention)
- 2) Flow Regime – Ephemeral, intermittent, or perennial
- 3) OHWM Width – Width of OHWM
- 4) OHWM Point – Left Bank (when facing upstream)
- 5) OHWM Point – Right Bank (when facing upstream)

- 6) Top of Bank (TOB) Width – Width of top of bank
- 7) TOB Point – Left Bank (when facing upstream)
- 8) TOB Point – Right Bank (when facing upstream)
- 9) Depth – Current water depth
- 10) Substrate – Channel substrate (e.g. sand, cobble/gravel, organic, silt/clay)
- 11) Flow Rate – Flow rate in feet per second
- 12) Riparian Species – List the three dominant riparian species (regardless if adjacent area is upland or wetland)
- 13) Water Quality – High, Medium, Low
- 14) Flow Direction – North, South, Northwest, etc.
- 15) Bank Heights – Height measurement for both the right and left bank

Photo Point – Collected on Tablet

- 1) Feature ID – See above for naming convention. Feature ID of photo point should match the wetland or stream photographed
- 2) Feature Description – Direction in which the photo was taken (East, West, Southeast etc.)
- 3) State and County – State and County the photo point is in
- 4) Date – Date of photograph
- 5) Remarks – Additional comments of importance

Start and Stop Survey Point - Collected on AGO Field Maps

- 1) Feature Type – Start or Stop point
- 2) Crew ID – Unique Crew ID
- 3) State and County – State and County the point is in
- 4) Date – Date of survey
- 5) Remarks – Additional comments of importance

RTE Habitat Point - Collected on AGO Field Maps

- 1) Feature Type – Choose species from dropdown
- 2) Feature ID – Unique habitat ID
- 3) Feature Description – General description of habitat
- 4) State and County – State and County the habitat point is in
- 5) Date – Date of survey
- 6) Remarks – Additional comments of importance

Land Use Point - Collected on AGO Field Maps

- 1) Feature Type – Choose type of land use from dropdown
- 2) Feature ID – Unique Land Use ID (see above for naming convention)
- 3) Feature Description – General description of land use (if applicable)
- 4) State and County – State and County the habitat point is in
- 5) Date – Date of survey
- 6) Remarks – Additional comments of importance

County Codes

Chippewa (CH)
Cottonwood (CO)
Faribault (FA)
Jackson (JA)
Martin (MA)
Otter Tail (OT)
Redwood (RE)
Wilkin (WI)
Yellow Medicine (YM)

Appendix 1 – Illustrated Field Scenario Examples

ILLUSTRATED FIELD SCENARIOS

Example 1. Small Size (<750' linear boundary length) and One Vegetative Community

Collection should include:

- 1) **1 red point** to represent upland USACE wetland determination data form (on the tablet) and associated GPS location (on the Trimble);
- 2) **1 blue point** to represent wetland USACE wetland determination data form (tablet) and associated GPS location (Trimble);
- 3) **1 pink point** to represent wetland community observation point form with photo (tablet); and
- 4) **Blue lines** to represent GPS location of wetland boundary (Trimble).
 - a. Crews should collect enough vertices to capture the true shape of the wetland feature and avoid square or rectangular boundaries.
 - b. At a minimum, five points should be recorded per vertex.



Example 2. Large Size (>750' linear boundary length) and One Vegetative Community

Collection should include:

- 1) **2 red points** to represent upland USACE wetland determination data forms (on the tablet) and associated GPS location (on the Trimble);
- 2) **2 blue points** to represent wetland USACE wetland determination data forms (tablet) and associated GPS location (Trimble);
- 3) **1 pink point** to represent wetland community observation point form with photo (tablet); and
- 4) **Blue lines** to represent GPS location of wetland boundary (Trimble).
 - a. Crews should collect enough vertices to capture the true shape of the wetland feature and avoid square or rectangular boundaries.
 - b. At a minimum, five points should be recorded per vertex.



Example 3. Large Size (>750' linear boundary length), 3 Unique Vegetative Communities Comprised of 9 Discrete Areas, and One Wetland Boundary Adjacent to the Road

Collection should include:

- 5) **1 red point** to represent upland USACE wetland determination data form (on the tablet) and associated GPS location (on the Trimble);
- 6) **3 blue points** to represent wetland USACE wetland determination data forms (tablet) and associated GPS location (Trimble);
- 7) **9 pink points** to represent wetland community observation point forms with photo (tablet); and
- 8) **Blue lines** to represent GPS location of wetland boundary (Trimble).
 - a. Crews should collect enough vertices to capture the true shape of the wetland feature and avoid square or rectangular boundaries.
 - b. At a minimum, five points should be recorded per vertex.

When multiple wetland community boundaries (pink points) are present, respective GIS staff will align them during the QA/QC process.



Example 4. Upland Inclusions (>2,500 ft²) and 2 Unique Vegetative Communities

Collection should include:

- 1) **3 red points** to represent upland USACE wetland determination data forms (on the tablet) and associated GPS location (on the Trimble);
- 2) **2 blue points** to represent wetland USACE wetland determination data forms (tablet) and associated GPS location (Trimble);
- 3) **2 pink points** to represent wetland community observation point forms with photo (tablet); and
- 4) **Blue lines** to represent GPS location of wetland boundary (Trimble).
 - a. Crews should collect enough vertices to capture the true shape of the wetland feature and avoid square or rectangular boundaries.
 - b. At a minimum, five points should be recorded per vertex.

When multiple wetland community boundaries are present, respective GIS staff will align them during the QA/QC process.



Example 5. Series of 2 Wetlands in Close Proximity to One Another

Collection should include:

- 1) **4 red points** to represent upland USACE wetland determination data forms (on the tablet) and associated GPS location (on the Trimble);
- 2) **3 blue points** to represent wetland USACE wetland determination data forms (tablet) and associated GPS location (Trimble);
- 3) **2 pink points** to represent community observation point forms with photo (tablet); and
- 4) **Blue lines** to represent GPS location of wetland boundary (Trimble).
 - a. Crews should collect enough vertices to capture the true shape of the wetland feature and avoid square or rectangular boundaries.
 - b. At a minimum, five points should be recorded per vertex.

When multiple wetland community boundaries (pink points) are present, respective GIS staff will align them during the QA/QC process.



Example 6. Lakes, Ponds and Open Water

Collection should include:

- 1) **1 red point** to represent upland USACE wetland determination data form (on the tablet) and associated GPS location (on the Trimble);
- 2) **1 blue point** to represent wetland USACE wetland determination data form (tablet) and associated GPS location (Trimble);
- 3) **1 pink point** to represent wetland community observation point form with photo (tablet); and
- 4) **Blue lines** to represent GPS location of wetland boundary (Trimble).
 - a. Crews should collect enough vertices to capture the true shape of the wetland feature and avoid square or rectangular boundaries.
 - b. At a minimum, five points should be recorded per vertex.



Appendix 2 – Potential Rare, Threatened, and Endangered Species

Merjent, Inc. (Merjent), reviewed the U.S. Fish and Wildlife Service’s Information for Planning and Consultation (IPaC) website¹ for a list of species and critical habitat that may be present along the proposed route in both Minnesota and Iowa. The table below provides the federal status and counties of occurrence where species and designated critical habitat may occur.

Scientific Name	Common Name	Federal Status	County	State	Line
<i>Myotis sodalis</i>	Indiana bat	Endangered	Boone, Story	IA	IAL-301 IAL-302
<i>Myotis septentrionalis</i>	Northern long-eared bat	Threatened	All	Both	All
<i>Charadrius melodus</i>	Piping plover	Endangered	Pottawatomie, Woodbury	IA	IAL-306 IAL-307 IAL-308
<i>Sistrurus catenatus</i>	Eastern massasauga	Threatened	Chickasaw	IA	IAM-101
<i>Notropis topeka</i>	Topeka shiner	Endangered	8	IA	IAL-301 IAL-302 IAT-202 IAM-102 SDM-104
<i>Scaphirhynchus albus</i>	Pallid sturgeon	Endangered	5	IA	IAL-318 IAT-205 IAL-306 IAL-307
<i>Bombus affinis</i>	Rusty patched bumble bee	Endangered	Boone/Story Jackson	IA MN	IAL-301 IAL-302 MNL-304
<i>Hesperia dacotae</i>	Dakota Skipper	Threatened	Chippewa	MN	MNL-303
<i>Oarisma poweshiek</i>	Poweshiek skipperling	Endangered	5 4	IA MN	IAM-101 IAM-102 IAT-201 IAT-202 IAT-203 MNL-304 MNL-303 MNL-305 ML-321
<i>Danaus plexippus</i>	Monarch butterfly	Candidate	All	Both	All
<i>Lespedeza leptostachya</i>	Prairie bush clover	Threatened	Most	Both	All
<i>Platanthera praeclara</i>	Western prairie fringed orchid	Threatened	All Iowa	IA	All Iowa lines
<i>Platanthera leucophaea</i>	Eastern prairie fringed orchid	Threatened	Hardin, Story	IA	IAL-301

¹ Information for Planning and Consultation (IPaC). USFWS website. Available at <https://ecos.fws.gov/ipac/>. Accessed July 2021

Indiana bat

Indiana bats hibernate in caves or, occasionally, in abandoned mines. They require cool, humid caves with stable temperatures under 50°F but above freezing; very few caves within the range of the species have these conditions. Hibernation is an adaptation for survival during the cold winter months when prey species are not available. Bats must store energy in the form of fat before hibernating; during the 6 months of hibernation, this stored fat is the bat's only source of energy. If bats are disturbed during hibernation, they may deplete energy stores meant to sustain them until spring emergence. This depletion could lead to reduced fitness and death of individuals.

After hibernation, Indiana bats migrate to their summer habitat in wooded areas and small stream corridors with well-developed riparian woods where they usually roost under exfoliating tree bark on dead or dying trees. They can also be found foraging in upland areas in or along the edges of forest habitat. During summer, males roost alone or in small groups, while females roost in larger groups of up to 100 bats or more.

The range of the Indiana bat overlaps the proposed route in Boone and Story Counties, IA. Tree clearing within these two counties will need to be addressed for impacts on Indiana bats. Generally, tree clearing of trees greater than 5" diameter at breast height (dbh) may only occur between November 1 and March 31. Suitable hibernacula such as caves or mines do not appear to be present within the Project area and therefore impacts to winter habitat are not expected.

Indiana bat summary

- Only in Boone and Story Counties, Iowa
- Tree clearing generally prohibited April 1 to October 31 (potentially October 1)
- Winter habitat (i.e., caves/hibernacula) unlikely based on initial desktop review
- Habitat assessments can be done almost any time of year
- Presence/Absence (P/A) surveys (unlikely to be required, would not recommend) need to be done in summer

Northern long-eared bat

The range of the northern long-eared bat stretches across much of the Eastern and Midwestern U.S. During summer, northern long-eared bats roost singly or in colonies under bark, in cavities, or in crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places such as caves and mines. This species is thought to be opportunistic in selecting roosts, utilizing tree species based on the tree's ability to retain bark or provide cavities or crevices. It has also been found, rarely, roosting in structures such as barns and sheds. In winter, northern long-eared bats utilize caves and mines as hibernacula.

The northern long-eared bat was listed as a federally threatened species in May 2015, with an interim 4(d) rule; effective February 16, 2016, the U.S. Fish and Wildlife Service (USFWS) finalized the 4(d) rule. A 4(d) rule may only be applied to species listed as threatened, and is a tool periodically utilized by the USFWS to allow for flexibility in Endangered Species Act implementation. The rule allows the USFWS to tailor take restrictions to those that make the most sense for protecting and managing at-risk species and directs the USFWS to issue regulations considered "necessary and advisable to provide for the conservation of threatened species."

Merjent reviewed the USFWS Known Northern Long-eared Bat Hibernacula and Roost Trees in Iowa map² (dated May 3, 2016) to identify the presence of maternity roost trees or hibernacula in the vicinity of the Project. No known roost trees or hibernacula have been recorded in the counties and/or townships in which the Project occurs. Therefore, Incidental take of northern long-eared bats would not be prohibited under the 4(d) rule because project activities are not conducted within 0.25 mile of known hibernacula and do not remove known roost trees or trees within 150 feet of known roosts. Streamlined consultation can be used to satisfy Section 7 consultation for projects with a federal nexus.

Northern long-eared bat summary

- Present in all counties
- Tree clearing should be covered by 4(d)/Programmatic Biological Opinion (which will go away if/when listed as endangered)

Eastern massasauga

The eastern massasauga rattlesnake is a short, heavy-bodied snake found wet prairies, marshes, and low-lying areas along lakes and rivers. Massasaugas are very rare in Iowa and prefer emergent wetlands, shrub wetlands, and lowland hardwood habitats, and avoid upland hardwood and disturbed habitats. The massasauga is primarily a diurnal ambush predator, feeding mainly on small mammals. They generally occupy wetland habitats in the spring, fall, and winter, and overwintering habitat varies depending on geographic location. The species is often reported to overwinter in crayfish burrows, but may also use small mammal burrows, old stumps, rotten logs and moist poorly drained habitats. Known sites appear to be characterized by the presence of the water table near the surface for hibernation, and hibernation sites are located below the frost line; the presence of water that does not freeze is critical to hibernaculum suitability. Individuals emerge from winter dormancy as spring floods begin in March and April and are active until late October.

The range of the eastern massasauga overlaps the proposed route in Chickasaw County, IA. Suitable wetland habitat for the species is isolated and fragmented in the vicinity of the proposed route. Eastern massasaugas are sensitive to vibration. Impacts are possible where the proposed route crosses wetlands, bottomland forest, and adjacent uplands. Areas such as agricultural fields, and open landscape not adjacent to wetlands are unsuitable habitat.

Eastern massasauga rattlesnake summary:

- Only in Chickasaw County, IA
- Impacts should be considered in areas of large, contiguous tracts of wetland habitat
- Due to isolated and heavily fragmented landscape, impacts are unlikely

Topeka shiner

The Topeka shiner, an endangered species, is a small minnow that lives in small to mid-size prairie streams in the central U.S. where it is usually found in pool and run areas. Suitable streams tend to have good water quality and cool to moderate temperatures. In Iowa, Minnesota, and portions of South Dakota, Topeka shiners also occur in oxbows and off-channel pools.

² Known Northern Long-eared Bat Hibernacula and Roost Trees in Iowa. Available at <https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/IowaNLEBHibernaculaAndRoostsByTWP03May16.pdf>. Accessed August 2019.

Suitable habitat may present along the proposed route at stream crossings in eight Iowa counties. USFWS designated critical habitat (DCH) is present in several counties, but specifically in close proximity to the route in Greene County, IA.

Topeka shiner summary:

- Listed in 8 counties in Iowa
- DCH occurs in 18 project counties in IA and MN
- Primary concern is stream crossings

Pallid sturgeon

Pallid sturgeon are bottom dwelling, slow growing fish that feed primarily on small fish and immature aquatic insects. Suitable habitat is present in the Missouri River on the border between Iowa and Nebraska and Big Sioux River between Iowa and South Dakota. Impacts need to only be considered for impacts to the Missouri River and immediate tributaries.

Pallid sturgeon summary:

- Iowa border counties with Missouri River
- Only habitat is Missouri River and Big Sioux River and immediate tributaries

Rusty patched bumble bee

The rusty patched bumble bee is a medium-sized bumble bee; workers and males are characterized by a rusty-colored patch located centrally on the second abdominal segment. Queens lack the species' eponymous rusty patch and can be further distinguished from workers and males by their large size.

Suitable habitat for the rusty patched bumble bee can be found in grasslands, prairies, marshes, agricultural areas, woodlands, and residential parks and gardens. The species is a generalist forager and utilizes both pollen and nectar from a wide variety of plants. It is thought that like other bumble bee species, rusty patched bumble bees typically forage within 0.6 mile from the nest site. Nests are commonly established underground in abandoned rodent burrows or other cavities, typically 1 to 4 feet beneath the surface; however, the species may also utilize clumps of grass aboveground. Suitable habitat must also provide overwintering sites for hibernating queens. While little is known regarding the overwintering habits of rusty patched queens, it is thought they may behave similarly to other *Bombus* species, that is, queens hibernate in a chamber created in uncompacted soils. Rusty patched bumble bees may choose sites in sandy, moss-covered soils on northwest slopes, and may be found in interior forest areas; areas with these characteristics near forested edges and open fields may be especially important. They may also use other areas, such as compost piles or mole hills.

The USFWS has identified "high potential zones (HPZ)" around current records (i.e., 2007-present); these areas indicate a high probability of rusty patched bumble bee presence. Within these zones, both suitable and unsuitable habitat may be present. The proposed Project route (8/2/6/2021 route) does not intersect a high potential zone as defined in the March 17, 2021 USFWS dataset, but does occur within a low potential zone in Jackson County, MN and Story County, IA. Low potential zones are the most likely areas to convert to HPZ during USFWS dataset updates. If the

Project occurs in HPZ, to fully determine impacts, field surveys assessing suitable foraging and overwinter habitat may need to be conducted. In general, cropland and roadside shoulders that exhibit high compaction do not provide suitable habitat; however, any pockets of floral blooms would provide suitable habitat. Forest edge habitat provides suitable overwinter habitat and would need to be avoided

during the hibernation period of October 15 to March 14. Inversely, habitat that provides only suitable active season foraging resources should be avoided from March 15 to October 14.

Rusty patched bumble bee summary:

- Boone and Story County, IA and Jackson County, MN
- Jackson County HPZ is in close proximity to route
- Impacts can be avoided by conducting work in summer habitat between October 15 and March 14
- Impacts to overwintering habitat can be avoided by conducting work March 15 to October 14

Dakota skipper

The Dakota skipper is a small butterfly that lives in high-quality mixed and tallgrass prairie. It has been extirpated from Illinois and Iowa and now occurs in remnants of native mixed and tallgrass prairie in Minnesota, the Dakotas and southern Canada. Impacts to Dakota skipper should be considered where the proposed route crosses native prairie. It does not appear the route crosses native prairie in the lone county in which Dakota skipper is listed along the proposed route (Chippewa County, MN).

Dakota skipper summary:

- Only in Chippewa County, MN
- Not within USWFS DCH
- Suitable habitat not identified on desktop review
- If route crosses prairie, research and surveys to identify native vs restored prairie will be prudent

Poweshiek skipperling

Poweshiek skipperlings are small butterflies most often found in remnants of native prairie in Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin and in fens in Michigan. However, this skipperling may have been extirpated from the Dakotas, Minnesota and Iowa within the last 10 years – an area that, until recently, contained the vast majority of the surviving populations.

Poweshiek skipperling summary:

- Multiple counties in IA and MN.
- Not within USFWS DCH
- If route crosses prairie, research and surveys to identify native vs restored prairie will be prudent

Monarch butterfly

In general, butterfly habitat requirements include host plants for larvae, adult nectar sources, and sites for roosting, thermoregulation, mating, hibernation, and predator escape. In addition to these, the monarch butterfly requires conditions and resources for initiating and completing migration both to and from winter roosting areas, making them vulnerable to habitat degradation across wide areas. Because monarchs are host-plant specific, they are entirely dependent on the abundance of milkweeds, and threats to milkweed thus threaten their survival, as do threats to the specific forested areas that provide the microclimatic conditions they need to survive the winter.

This species is currently listed as a candidate species and therefore is not granted the full legal protections of a threatened or endangered species. Impacts to suitable habitat would occur where floral resources are present, especially milkweed.

Monarch butterfly summary:

- Candidate species
- Suitable habitat likely present throughout proposed route
- Species may be listed before Project goes to construction
- Candidate Conservation Agreement with Assurances (CCAA) an option

Prairie bush clover

Prairie bush clover is found only in the tallgrass prairie region of four Midwestern states. It is a member of the bean family and a midwestern "endemic" – known only from the tallgrass prairie region of the upper Mississippi River Valley.

Impacts can be avoided by avoiding work in any native prairies along the proposed route.

Prairie bush clover summary:

- Listed in most counties
- Habitat is limited to native tallgrass prairie
- Survey period: July to August (source: WI DNR; verify with botanist on staff for IA regional differences). MN DNR: August-September optimal; ID possible anytime after early June

Western prairie fringed orchid

The western prairie fringed orchid occurs most often in mesic to wet unplowed tallgrass prairies and meadows (native prairie areas and prairie remnants). Impacts can be avoided by avoiding work in any native prairies along the proposed route.

Western prairie fringed orchid summary:

- Western Iowa counties
- Habitat limited to mesic and wet native prairie
- Survey: July (source: MN DNR)

Eastern prairie fringed orchid

The eastern prairie fringed orchid occurs in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, even bogs. It requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment. A symbiotic relationship between the seed and soil fungi, called mycorrhizae, is necessary for seedlings to become established. This fungi helps the seeds assimilate nutrients in the soil.

Suitable habitat may be present in Hardin and Story Counties, Iowa where the proposed route crosses wetland or prairie habitat.

Eastern prairie fringed orchid summary:

- Hardin and Story Counties, IA only
- Habitat more general than western prairie fringed orchid

- Survey period: July (source: WI DNR; verify with botanist on staff for IA regional differences).
USFWS: June 28 to July 11

Appendix 4 – WETS Precipitation Summary Table

Table 2-1
Precipitation Worksheet Using Gridded Database*
2021 Summary of Worksheet Outputs by Minnesota County

County	Month	First Prior Month	Second Prior Month	Third Prior Month	Multi-Month Score**
Martin	October	Dry	Wet	Dry	(10) Normal
	November	Wet	Dry	Wet	(14) Normal
Otter Tail	October	Normal	Normal	Dry	(11) Normal
	November	Wet	Normal	Normal	(15) Wet
Wilkin	October	Normal	Normal	Normal	(12) Normal
	November	Wet	Normal	Normal	(15) Wet

* Minnesota Climatology Working Group, Precipitation Documentation Worksheet Using Gridded Database – 1991-2021 Normal Period

** Multi-Month Score: 6-9 (dry), 10-14 (normal), 15-18 (wet)

Table 2-2
Precipitation Worksheet Using Gridded Database*
2022 Summary of Worksheet Outputs by Minnesota County

County	Month	First Prior Month	Second Prior Month	Third Prior Month	Multi-Month Score**
Martin	May	Dry	Normal	Dry	(8) Dry
	June	Wet	Dry	Normal	(13) Normal
	July	Dry	Normal	Normal	(9) Dry
	August	Normal	Dry	Normal	(10) Normal
	September	Normal	Normal	Dry	(11) Normal
	October	Dry	Normal	Normal	(9) Dry
Otter Tail	May	Wet	Dry	Wet	(14) Normal
	June	Wet	Wet	Dry	(16) Wet
	July	Dry	Wet	Wet	(12) Normal
	August	Dry	Dry	Wet	(8) Dry
	September	Normal	Dry	Dry	(9) Dry
	October	Dry	Normal	Dry	(8) Dry
Wilkin	May	Wet	Dry	Wet	(14) Normal
	June	Wet	Wet	Dry	(16) Wet
	July	Normal	Wet	Wet	(15) Wet
	August	Normal	Normal	Wet	(13) Normal
	September	Normal	Normal	Normal	(12) Normal
	October	Dry	Normal	Normal	(9) Dry
<p>* Minnesota Climatology Working Group, Precipitation Documentation Worksheet Using Gridded Database – 1991-2021 Normal Period</p> <p>** Multi-Month Score: 6-9 (dry), 10-14 (normal), 15-18 (wet)</p>					

Appendix 5 – Wetland & Waterbody Summary Tables

Table 3 - Wetland and Waterbody Classification Summary

Table 3 - Wetland and Waterbody Classification Summary										
County	Feature Category	Total Number of Documented Wetlands and Waterbodies	Number of Wetland Communities and Waterbody Classifications Observed							
			PEM	PSS	PFO	PUB	Ephemeral	Intermittent	Perennial	Open Water/Pond
Lateral Line MNL-305										
Martin	Wetlands (Field)	11	9	0	4	0				
	Wetlands (Desktop)	20	19	1	1	0				
	Waterbodies (Field)	10					3	2	6	0
	Waterbodies (Desktop)	4					1	0	4	0
Lateral Line MNL-321										
Otter Tail	Wetlands (Field)	17	17	2	0	0				
	Wetlands (Desktop)	16	15	0	1	0				
	Waterbodies (Field)	5					1	2	2	0
	Waterbodies (Desktop)	6					0	4	2	0
Wilkin	Wetlands (Field)	37	36	1	1	0				
	Wetlands (Desktop)	9	9	0	0	0				
	Waterbodies (Field)	5					0	2	2	1
	Waterbodies (Desktop)	1					0	1	0	0
Sub-total Documented Features			105	4	7	0	5	11	16	1
TOTAL			110 wetlands / 116 communities				31 waterbodies / 33 waterbody types			

Table 3-1 – Wetland Summary Table¹

Feature ID	County	Survey Type	Coverttype	Wetland Area (Acres) ¹	Wetland Complex Area (Acres) ¹
MNL-305					
W_1_MA_011_DT	Martin	Desktop	PEM	0.063	
W_1_MA_025_DT	Martin	Desktop	PEM	0.069	
W_1_MA_026_DT	Martin	Desktop	PEM	5.070	
W_1_MA_027_DT	Martin	Desktop	PEM	0.382	
W_1_MA_028_DT	Martin	Desktop	PEM	0.126	
W_1_MA_029_DT	Martin	Desktop	PEM	0.099	
W_1_MA_030_DT	Martin	Desktop	PEM	0.031	
W_1_MA_031_DT	Martin	Desktop	PEM	0.074	
W_1_MA_032_DT	Martin	Desktop	PEM	1.877	
W_1_MA_033_DT	Martin	Desktop	PEM	0.293	
W_1_MA_034_DT	Martin	Desktop	PEM	0.229	
W_1_MA_035_DT	Martin	Desktop	PEM	0.072	
W_1_MA_036_DT	Martin	Desktop	PEM	0.162	
W_1_MA_037_DT	Martin	Desktop	PSS	0.031	
W_1_MA_038_DT	Martin	Desktop	PEM	0.110	
W_1_MA_039_DT	Martin	Desktop	PEM	0.275	
W_1_MA_040_DT	Martin	Desktop	PEM	0.236	
W_1_MA_041_DT	Martin	Desktop	PEM	0.028	
W_1_MA_042_DT	Martin	Desktop	PEM	0.377	
W1015MA001	Martin	Survey	PEM	1.147	
W1016MA001	Martin	Survey	PFO	0.087	
W1016MA002_PEM	Martin	Survey	PEM	0.478	0.730
W1016MA002_PFO	Martin	Survey	PFO	0.252	
W1016MA003	Martin	Survey	PEM	0.244	
W1016MA004_PEM	Martin	Survey	PEM	0.100	0.238
W1016MA004_PFO	Martin	Survey	PFO	0.138	
W1016MA004_PEM_DT	Martin	Desktop	PEM	0.099	0.262
W1016MA004_PFO_DT	Martin	Desktop	PFO	0.163	
W1017MA001	Martin	Survey	PFO	0.652	
W1017MA002	Martin	Survey	PEM	3.227	
W1017MA003	Martin	Survey	PEM	0.045	
W1020MA001	Martin	Survey	PEM	0.055	
W1020MA002	Martin	Survey	PEM	0.235	
W1020MA003	Martin	Survey	PEM	0.667	
MNL-321					
W_1_OT_020_DT	Otter Tail	Desktop	PEM	3.472	
W_1_OT_021_DT	Otter Tail	Desktop	PEM	1.981	
W_1_OT_022_DT	Otter Tail	Desktop	PEM	0.351	
W_1_OT_023_DT	Otter Tail	Desktop	PEM	0.974	
W_1_OT_024_DT	Otter Tail	Desktop	PEM	0.066	
W_1_OT_026_DT	Otter Tail	Desktop	PEM	0.664	
W_1_OT_027_DT	Otter Tail	Desktop	PFO	0.540	
W_1_OT_028_DT	Otter Tail	Desktop	PEM	4.236	
W_1_OT_029_DT	Otter Tail	Desktop	PEM	0.163	
W_1_OT_030_DT	Otter Tail	Desktop	PEM	1.452	
W_1_OT_031_DT	Otter Tail	Desktop	PEM	2.494	
W_1_OT_032_DT	Otter Tail	Desktop	PEM	1.303	
W_1_WI_056_DT	Wilkin	Desktop	PEM	0.155	
W_1_WI_078_DT	Wilkin	Desktop	PEM	0.064	

Table 3-1 – Wetland Summary Table¹

Feature ID	County	Survey Type	Coverttype	Wetland Area (Acres) ¹	Wetland Complex Area (Acres) ¹
W_1_WI_079_DT	Wilkin	Desktop	PEM	0.043	
W_1_WI_090_DT	Wilkin	Desktop	PEM	0.007	
W_1_WI_092_DT	Wilkin	Desktop	PEM	0.182	
W1002OT001	Otter Tail	Survey	PEM	0.109	
W1002OT001_DT	Otter Tail	Desktop	PEM	2.620	
W1002OT005	Otter Tail	Survey	PEM	0.054	
W1002OT005_DT	Otter Tail	Desktop	PEM	3.094	
W1002OT007_PEM W1002OT007_PSS	Otter Tail Otter Tail	Survey Survey	PEM PSS	1.175 1.859	3.034
W1002OT009	Otter Tail	Survey	PEM	0.443	
W1002WI001	Wilkin	Survey	PEM	0.251	
W1002WI002	Wilkin	Survey	PEM	0.051	
W1002WI003	Wilkin	Survey	PEM	0.059	
W1002WI004	Wilkin	Survey	PEM	0.122	
W1002WI005_PEM W1002WI005_PSS	Wilkin Wilkin	Survey Survey	PEM PSS	1.897 0.221	2.118
W1002WI010	Wilkin	Survey	PEM	0.213	
W1002WI012	Wilkin	Survey	PEM	0.365	
W1010WI002	Wilkin	Survey	PEM	0.105	
W1010WI007	Wilkin	Survey	PEM	0.024	
W1010WI008	Wilkin	Survey	PEM	0.014	
W1010WI009	Wilkin	Survey	PEM	0.011	
W1010WI010	Wilkin	Survey	PEM	0.065	
W1016OT001	Otter Tail	Survey	PEM	0.397	
W1016OT002	Otter Tail	Survey	PEM	0.041	
W1016OT003	Otter Tail	Survey	PEM	0.906	
W1016OT004	Otter Tail	Survey	PEM	0.289	
W1016OT004_DT	Otter Tail	Desktop	PEM	0.267	
W1016OT005_PEM W1016OT005_PSS	Otter Tail Otter Tail	Survey Survey	PEM PSS	5.205 0.423	5.628
W1016OT005_PEM_DT	Otter Tail	Desktop	PEM	0.553	
W1016OT006	Otter Tail	Survey	PEM	0.111	
W1016OT007	Otter Tail	Survey	PEM	0.054	
W1016OT008	Otter Tail	Survey	PEM	0.012	
W1016WI001	Wilkin	Survey	PEM	0.169	
W1016WI002	Wilkin	Survey	PEM	0.113	
W1016WI002_DT	Wilkin	Desktop	PEM	0.029	
W1016WI003	Wilkin	Survey	PEM	0.080	
W1016WI003_DT	Wilkin	Desktop	PEM	0.014	
W1016WI004	Wilkin	Survey	PEM	0.575	
W1016WI004_DT	Wilkin	Desktop	PEM	0.342	
W1016WI006	Wilkin	Survey	PEM	0.087	
W1016WI008_DT	Wilkin	Desktop	PEM	0.046	
W1017WI001	Wilkin	Survey	PEM	0.051	
W1017WI002	Wilkin	Survey	PEM	0.118	
W1019WI001	Wilkin	Survey	PEM	0.060	
W1019WI002	Wilkin	Survey	PEM	2.608	
W1019WI003	Wilkin	Survey	PEM	0.580	
W1019WI004	Wilkin	Survey	PEM	0.548	

Table 3-1 – Wetland Summary Table¹

Feature ID	County	Survey Type	Covertime	Wetland Area (Acres) ¹	Wetland Complex Area (Acres) ¹
W1019WI005	Wilkin	Survey	PEM	0.086	
W1019WI006	Wilkin	Survey	PEM	0.066	
W1019WI007	Wilkin	Survey	PEM	1.602	
W1019WI008	Wilkin	Survey	PEM	0.019	
W1019WI009	Wilkin	Survey	PEM	2.085	
W1019WI010	Wilkin	Survey	PEM	0.336	
W1019WI011	Wilkin	Survey	PEM	0.241	
W1019WI012	Wilkin	Survey	PEM	0.037	
W1019WI013	Wilkin	Survey	PEM	0.111	
W1019WI014	Wilkin	Survey	PEM	0.319	
W1019WI015	Wilkin	Survey	PFO	0.234	
W1019WI016	Wilkin	Survey	PEM	0.025	
W1019WI024	Wilkin	Survey	PEM	0.032	
W1020WI001	Wilkin	Survey	PEM	0.043	
W1025OT001	Otter Tail	Survey	PEM	0.345	
W1025OT002	Otter Tail	Survey	PEM	0.101	
W1025OT004	Otter Tail	Survey	PEM	0.774	
W1025OT005	Otter Tail	Survey	PEM	0.403	
W1025OT006	Otter Tail	Survey	PEM	0.099	

¹ Within Environmental Survey Area

Table 3-2 – Waterbody Summary Table

[illegible]

Table 3-2 – Waterbody Summary Table

[illegible]

Appendix 6 – USACE Wetland Determination Data Forms

Appendix 7 – Photos

Appendix 8 – Upland NHD Crossings Table

Table 8-1 Non-Water Feature NHD Crossings		
County	Approximate Mile Post (MP)	Description
MNL-305		
Martin	MP 2.5	Desktop reviewed. Multiple years of aerial imagery and desktop review indicate no evidence of waterbody
MNL-321		
Otter Tail	MP 1.6	Swale in between agricultural fields dominated by upland grass species. No evidence of OHWM or bed/bank, channel, flow, or scouring
Otter Tail	MP 3.6	Flat agricultural field. No evidence of OHWM or bed/bank, channel, flow, or scouring
Otter Tail	MP 5.6	Desktop reviewed. Multiple years of aerial imagery and desktop review indicate no evidence of waterbody
Otter Tail	MP 8.9	Flat agricultural field. No evidence of OHWM or bed/bank, channel, flow, or scouring
Otter Tail	MP 9.8	Flat agricultural field. No evidence of OHWM or bed/bank, channel, flow, or scouring
Wilkin	MP 15.4	Flat agricultural field. No evidence of OHWM or bed/bank, channel, flow, or scouring
Wilkin	MP 15.9	Flat agricultural field. No evidence of OHWM or bed/bank, channel, flow, or scouring
Wilkin	MP 18.1	Flat agricultural field. No evidence of OHWM or bed/bank, channel, flow, or scouring
Wilkin	MP 23.8	Flat agricultural field. No evidence of OHWM or bed/bank, channel, flow, or scouring
NHD – National Hydrography Dataset OHWM – Ordinary High-Water Mark		

From: Scott O'Konek <sokonek@summitcarbon.com>
Sent: Wednesday, July 10, 2024 1:52 PM
To: Levi, Andrew (COMM) <andrew.levi@state.mn.us>
Cc: Christina Brusven <cbrusven@fredlaw.com>; Dornfeld, Richard <Richard.Dornfeld@ag.state.mn.us>
Subject: MN EIS IR 13 question 19

This message may be from an external email source.

Do not select links or open attachments unless verified. Report all suspicious emails to Minnesota IT Services Security Operations Center.

Andrew,
Please see the response from Lake Region Electric Cooperative.

SCOTT O'KONEK | O: (515) 384-0964 | SOKONEK@SUMMITCARBON.COM

From: Tim Thompson <TThompson@lrec.coop>
Sent: Wednesday, July 10, 2024 5:56 AM
To: Daniel Wood <dwood@summitcarbon.com>
Cc: Charlie Chamblee <cchamblee@summitcarbon.com>; David Smith <dsmith@summitcarbon.com>; Scott O'Konek <sokonek@summitcarbon.com>; Alan Fazio <AFazio@lrec.coop>

Some people who received this message don't often get email from tthompson@lrec.coop. [Learn why this is important](#)

Hi Daniel,

Al and I both like your response and feel it is very adequate. Good luck with your process and don't hesitate to ask us for any support you need. Thanks and have a great day.

Tim



Tim Thompson
CEO

D: (218) 863-9835 | **M:** (218) 205-2405

1401 South Broadway | PO Box 643

Pelican Rapids, MN 56572

TThompson@lrec.coop | lrec.coop | lakeregionenergy.com

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From: Daniel Wood <dwood@summitcarbon.com>
Sent: Tuesday, July 9, 2024 3:06 PM
To: Tim Thompson <TThompson@lrec.coop>
Cc: Charlie Chamblee <cchamblee@summitcarbon.com>; David Smith <dsmith@summitcarbon.com>; Scott O'Konek <sokonek@summitcarbon.com>; Alan Fazio <AFazio@lrec.coop>
Subject: RE: MN EIS - Questions & Letter of Support

CAUTION: This email originated from a sender outside of LREC. Please use caution when opening links and attachments.

Good afternoon, Tim. Below is a question (text in black) we received pertaining to our MN EIS and our response (text in red). Could you review the response and see if you agree with my answer from the LREC perspective?

19. Public commenters ask about electricity use at the capture facility. Representative comments include: "EERA should revisit the potential for impacts to the electrical system and other Lake Region Coop customers and member-owners. It is important to know both the total expected energy use as well as the variable demand that is anticipated by the project's additional electric usage. Will the project's use spike at the same time as the existing plant's demand? Will Lake Region Coop have to implement peak-shaving policies and technologies elsewhere to manage this new intense use? Even if no immediate upgrades are required to deliver energy to the plant, will this increase member-owners' exposure to power outages or brown-outs in times of peak demand?" Also, "who is paying for that electricity? Summit or the ethanol facility? And if the latter, will those cost increases be passed on to producers or other member-owners?"

When operating, the CO₂ capture facility is expected to draw 3,678 kW of electrical load from the grid. Summit plans to install variable frequency drives on all medium-voltage electrical loads to limit the impact on the electrical grid as loads come online. To serve our load, Lake Region Electric Coop (LREC) plans to upgrade a feeder in the existing substation. They have indicated to Summit that their system has ample capacity to manage the incremental load without issue. Summit is responsible for all costs associated with the upgrade and operation of the capture facility, including the cost of the utility power. LREC has not indicated to Summit that the additional load would cause the utility to implement peak-shaving policies or technologies anywhere in their system. LREC has not indicated that, nor does Summit anticipate an increase in other member-owners exposure to power outages or brown-outs.

Thanks,
DANIEL WOOD | O: 515-531-2611 | M: 307-331-9491 | DWOOD@SUMMITCARBON.COM

Appendix J

Tribal Government and State Agency Correspondence

Appendix J

Tribal Government and State Agency Correspondence

Summary of EERA Outreach

Department of Commerce Energy Environmental Review and Analysis (EERA) staff provided a summary of the scoping process to the Minnesota Public Utilities Commission (Commission) and recommended a final scope for the environmental impact statement (EIS) for the Otter Tail to Wilkin Carbon Dioxide (CO₂) Pipeline Project (project). The Commission concurred with EERA staff recommendations. On September 26, 2023, the Commission issued an *Order Approving Scope of Environmental Review and Denying Stay* (Order) approving the scope of the EIS. In the Order, the Commission requested that EERA staff coordinate with the Minnesota Office of Pipeline Safety (MNOPS), Tribal governments, and state agencies to ensure that their expertise is reflected in the EIS and that the environmental review process benefits from their expertise.

EERA staff compiled a list of Tribal government and state agency contacts. The following summarizes correspondence between EERA staff and those Tribal government and state agency contacts. The Tribal governments and state agencies contacted are listed in **Table 1** below.

EERA Emails to Contacts

On October 20, 2023, EERA staff emailed the Tribal government contacts a letter to provide an update on the project and request their participation in the preparation of the draft EIS. The letter also provided an estimated timeline, anticipated opportunities for contacts to formally comment on the project, a preliminary EIS table of contents, and a project factsheet.

On October 27, 2023, EERA staff emailed state agency contacts a letter similar to the letter emailed to Tribal governments.

A representative sample of these emails and letters is included in **Attachment A**.

On November 17, 2023, EERA staff sent a follow-up email to the contacts (**Table 1**). EERA staff notified the contacts that preliminary draft EIS chapters would be sent to them in approximately 2 to 3 weeks. This email also asked that the contacts provide EERA staff with their comments within 2 weeks of receiving the preliminary draft EIS chapters. A representative sample of this email is included in **Attachment A**.

EERA Preliminary Draft Submission

On December 8, 2023, EERA staff emailed the contacts a preliminary draft of the EIS. This included Chapters 1 through 5, Chapters 7 through 9, a detailed mapset, and a comment table. EERA staff requested that responses be provided in the comment table by December 22, 2023. Representative samples of these emails are included in **Attachment A**.

Responses

On October 25, 2023, EERA staff received an email from the Shakopee Mdewakanton Community stating that they would defer their comments to the White Earth Nation (**Attachment B**).

On December 13, 2023, Mille Lacs Band of Ojibwe, Air Quality Specialist Charles J. Lippert, responded to the email with a few follow-up questions. EERA staff contacted Mr. Lippert to discuss his questions. On December 21, 2023, Mr. Lippert emailed the Mille Lacs Band of Ojibwe’s responses and comments to EERA staff.

On December 15, 2023, EERA staff received an email from the White Earth Nation. Renee Keezer, the Pesticide Coordinator for White Earth Nation, had a few questions about the preliminary draft EIS Chapters 6 and 9.

On December 21, 2023, Paul Hartzheim with the Department of Transportation (MnDOT) emailed comments to EERA staff in the comment table (**Attachment B**). MnDOT had staff from the Office of Environmental Stewardship–Environmental Assessment Unit, Cultural Resources Unit, Scenic Byways, and District 4 provide comments and review of the preliminary draft chapters and detailed mapset.

On December 22, 2023, EERA staff received an email response from MNOPS. Jon Wolfgram, Deputy Director of MNOPS, provided responses in the comment table and included a letter with “comments regarding the MNOPS oversight of intrastate pipelines and the interstate agent agreement with [the Pipeline and Hazardous Materials Safety Administration] PHMSA” (**Attachment B**).

On December 22, 2023, EERA staff received an email response from the Department of Health (MDH). David Bell, a research scientist at MDH, emailed EERA staff a completed comment table that provided EERA staff with feedback on the draft of Chapter 5 of the EIS (**Attachment B**). Comments from MDH focused on environmental justice, noise, public health, air quality, geology, and water.

On December 27, 2023, EERA staff received an email response from the Department of Natural Resources (DNR). Cynthia Warzecha, an Energy Projects Planner, sent DNR’s comment table as an email attachment (**Attachment B**). DNR’s comments focused on natural resources and mitigation recommendations.

Tribal Government and State Agency Contacts

Table 1 lists the Tribal government and state agency contacts included in the initial correspondence on October 20, 2023, and their email addresses. The same state contacts were used for the November 17, 2023, and December 8, 2023, follow-up emails from EERA staff.

Some Tribal government contacts were updated after the October and November 2023 emails due to changes in staff and contact information. For the December 8, 2023, EERA staff email to contacts, the EERA comment form was not sent to Alissa Jacobson and Jordan Holcomb at the Prairie Island Indian Community (see * in **Table 1**), Steve Shier of 1854 Treaty Authority was removed (see ** in **Table 1**), and Tyler Kaspar of 1854 Authority was added (see *** in **Table 1**) based on follow-up responses with contacts.

Table 1 Contact List of Tribal Governments and State Agencies

Tribe or Agency	Name of Contact	Email of Contact
Tribal Governments		
Lower Sioux	Robert Larsen Cheyanne St. John Deb Dirlam	robert.larsen@lowersioux.com cheyanne.stjohn@lowersioux.com deb.dirlam@lowersioux.com
White Earth Nation	Michael Fairbanks Jaime Arsenault Amy Moore Will Bement Ed Snetsinger Renee Keezer Dustin Roy Monica Hedstrom Zachary Paige Wade Jackson	michael.fairbanks@whiteearth-nsn.gov Jaime.Arsenault@whiteearth-nsn.gov amy.moore@whiteearth-nsn.gov will.bement@whiteearth-nsn.gov ed.snetsinger@whiteearth-nsn.gov Renee.Keezer@whiteearth-nsn.gov Dustin.Roy@whiteearth-nsn.gov monica.hedstrom@whiteearth-nsn.gov zachary.paige@whiteearth-nsn.gov Wade.Jackson@whiteearth-nsn.gov
Bois Forte Band of Chippewa	Frank Villebrun Cathy Chavers Jaylen Strong	fvillebrun@boisforte-nsn.gov cchavers@boisforte-nsn.gov jaylen.strong@boisforte-nsn.gov
Red Lake Nation	John Leblanc Allen Pemberton Kade Ferris Darrell Seki, Sr. Jennifer Malinski Shane Bowe Kayla Bowe Joshua Jones Sharon James Tyler Orgon	jleblanc@redlakenation.org apemberton@redlakenation.org kade.ferris@redlakenation.org dseki@redlakenation.org jmalinski@redlakenation.org sbowe@redlakenation.org kayla.bowe@redlakenation.org Joshua.jones@redlakenation.org sjames@4directionsrl.org Tyler.orgon@redlakenation.org
Upper Sioux	Daniel Ellenbecker Alena Boklep Samantha Odegard Kevin Jensvold	daniele@uppersiouxcommunity-nsn.gov alenab@uppersiouxcommunity-nsn.gov samanthao@uppersiouxcommunity-nsn.gov kevinj@uppersiouxcommunity-nsn.gov
Grand Portage	Robert Deschampe Agatha Armstrong April McCormick	robertdeschampe@grandportage.com agathaa@grandportage.com Aprilm@grandportage.com
Fond du Lac Band of Lake Superior Chippewa	Kevin Dupuis Evan Schroeder Paige Huhta Anthony Mazzini Nancy Schuldt Richard Gitar Jack Bassett David Smith Phillip Savage Lance Northbird	kevindupuis@fdlrez.com evanschroeder@fdlrez.com paigehuhta@fdlrez.com anthonymazzini@fdlrez.com nancyschuldt@fdlrez.com richardgitar@fdlrez.com jackbassett@fdlrez.com davidsmith@fdlrez.com phillipsavage@fdlrez.com lancenorthbird@fdlrez.com

Tribe or Agency	Name of Contact	Email of Contact
Prairie Island Indian Community	*Alissa Jacobson Madeline Hyde Noah White Gabriel Miller Cody Mattison *Jordan Holcomb Franky Jackson	alissa.jacobson@piic.org madeline.hyde@piic.org noah.white@piic.org Gabriel.Miller@piic.org Cody.Mattison@piic.org Jordan.Holcomb@piic.org franky.jackson@piic.org
Mille Lacs Band of Ojibwe	Perry Bunting Susan Klapel Jamie Edwards Kelly Applegate Melanie Benjamin Mike Wilson Charlie Lippert Chad Weiss Andrew Boyd Alexandria Clark Jon Houle	perry.bunting@millelacsband.com Susan.Klapel@millelacsband.com Jamie.Edwards@millelacsband.com kelly.applegate@millelacsband.com melanie.benjamin@millelacsband.com Mike.Wilson@millelacsband.com Charlie.Lippert@millelacsband.com chad.weiss@millelacsband.com andrew.boyd@millelacsband.com Alexandria.Clark@millelacsband.com Jon.Houle@millelacsband.com
Leech Lake Band of Ojibwe	Brandy Toft Amanda Wold Faron Jackson Amy Burnette Carma Huseby Jakob Sorensen Jeff Harper Jason Helgeson Diane Thompson Eugene Strowbridge Lakota Ironboy	brandy.toft@llojibwe.net Amanda.wold@llojibwe.net Faron.Jackson@llojibwe.net amy.burnette@llojibwe.net Carma.huseby@llojibwe.net Jakob.sorensen@llojibwe.net Jeff.harper@llojibwe.net jason.helgeson@llojibwe.net Diane.thompson@llojibwe.net eugene.strowbridge@llojibwe.net Lakota.ironboy@llojibwe.net
MIAC	Shannon Geshick Melissa Cerda	shannon.geshick@state.mn.us melissa.cerda@state.mn.us
1854 Treaty Authority	Sonny Myers Darren Vogt **Steve Shier ***Tyler Kaspar	Smyers@1854treatyauthority.org dvogt@1854treatyauthority.org sshier@1854treatyauthority.org tkaspar@1854treatyauthority.org
MN Chippewa Tribe, Bois Forte, and Grand Portage	Michael Northbird Beth Drost Cathy Chavers Rob Hull	mnorthbird@mnchippewatribe.org bdrost@mnchippewatribe.org cchavers@boisforte-nsn.gov thpo@grandportage.com

Agencies

Office of the State Archaeologist	Sarah Beimers Amanda Gronhovd Jennifer Tworzyanski Office of State Archaeologist	sarah.beimers@state.mn.us amanda.gronhovd@state.mn.us Jennifer.Tworzyanski@state.mn.us OSA.Project.Reviews.ADM@state.mn.us
Department of Health	David Bell	david.bell@state.mn.us
Board of Water and Soil Resources	Annie Felix Gerth Melissa King	annie.felix-gerth@state.mn.us Melissa.King@state.mn.us

Tribe or Agency	Name of Contact	Email of Contact
Department of Labor and Industry	Todd Green	todd.a.green@state.mn.us
Department of Transportation	Stacy Kotch	stacy.kotch@state.mn.us
Department of Agriculture	Stephan Roos	stephan.roos@state.mn.us
Department of Natural Resources	Cynthia Warzecha	cynthia.warzecha@state.mn.us
Department of Revenue	State Assessed Property	sa.property@state.mn.us
Pollution Control Agency	Katrina Hapka	Katrina.Hapka@state.mn.us
Department of Employment and Economic Development	Chet Bodin	chet.bodin@state.mn.us
Department of Public Safety	Jonathan Wolfgram	jonathan.wolfgram@state.mn.us

Attachment A

October 20, 2023
Example Email to Tribes

From: Levi, Andrew (COMM)
Sent: Friday, October 20, 2023 8:40 AM
To: Melanie Benjamin, Chief Executive; kelly.applegate; Perry Bunting, Director, Environmental Programs; Susan.Klapel@millelacsband.com; Jamie.Edwards@millelacsband.com; Mike Wilson, THPO; Charles Lippert, Air Quality Specialist; Chad Weiss, Water Resource Manager; Andrew Boyd, Environmental Compliance Officer; Alexandria Clark, Environmental Programs Coordinator; Jon Houle, Agricultural Coordinator
Cc: Bruce, Charley (PUC)
Subject: State of MN - Otter Tail to Wilkin EIS
Attachments: 2023-10-20-O2W-MilleLacsBandofOjibwe.pdf

Greetings:

Attached is a letter from the Department of Commerce inviting you to help prepare the draft environmental impact statement for the Otter Tail to Wilkin Carbon Dioxide Pipeline Project.

Please don't hesitate to contact me with any questions.

Thank you.

—Andrew

Andrew Levi

Environmental Review Manager

Energy Environmental Review and Analysis

Department of Commerce

85 Seventh Place East, Suite 280 | Saint Paul, MN 55101

P: (651) 539-1840 | F: (651) 539-0109

Schedule: Tuesday – Friday



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VIA EMAIL

October 20, 2023

To: **Mille Lacs Band of Ojibwe**

Melanie Benjamin, Chief Executive melanie.benjamin@millelacsband.com

Kelly Applegate, Commissioner of Natural Resources kelly.applegate@millelacsband.com

Perry Bunting, Director, Environmental Programs perry.bunting@millelacsband.com

Susan Klapel, Executive Director, Department of Natural Resources

Susan.Klapel@MilleLacsBand.com

Jamie Edwards, Special Advisor of Government Affairs Jamie.Edwards@millelacsband.com

Mike Wilson, THPO Mike.Wilson@millelacsband.com

Charles Lippert, Air Quality Specialist charlie.lippert@millelacsband.com

Chad Weiss, Water Resource Manager chad.weiss@millelacsband.com

Andrew Boyd, Environmental Compliance Officer andrew.boyd@millelacsband.com

Alexandria Clark, Environmental Programs Coordinator Alexandria.Clark@millelacsband.com

Jon Houle, Agricultural Coordinator Jon.Houle@millelacsband.com

Re: **Otter Tail to Wilkin Carbon Dioxide Pipeline Project**

Draft Environmental Impact Statement Preparation

Greetings:

The purpose of this letter is to provide an update on the Otter Tail to Wilkin Carbon Dioxide Pipeline Project (project) and request your participation in the preparation of the draft environmental impact statement (EIS) for the project.

On August 31, 2023, the Minnesota Public Utilities Commission (Commission) determined the scope of the EIS. Staff within the Department of Commerce, Energy Environmental Review and Analysis (EERA) unit are responsible for preparing the EIS. On September 26, 2023, EERA issued a *Notice of Environmental Impact Statement Preparation*. The Commission has 280 days from the notice date to determine the adequacy of the EIS. To meet the 280-day deadline, EERA staff must issue the draft EIS in January 2024.

The Commission requested EERA coordinate with Tribal governments and other state agencies to ensure their expertise is reflected in the EIS. To ensure Tribal government expertise is included, we plan to send you select draft sections of the EIS. It is difficult to say exactly when this will occur, but we anticipate this to be in December 2023. We will provide you additional notice about two weeks before we send the draft sections. We plan to send the following sections, but can send others as requested:

- Archaeological and Historic Resources
- Cultural Resources
- Environmental Justice
- Public Health and Safety
- Tribal Treaty Rights

We ask that you provide comments within two weeks of receipt of the draft sections so that we can incorporate your comments into the draft EIS. Your comments in their entirety will be included as an appendix to the draft EIS along with comments from other Tribal governments and state agencies.

In addition to our request in this letter, there will be multiple opportunities to formally comment on the project. These include:

- Draft EIS comment period (opens with issuance of draft EIS)
- Draft EIS public meetings (February 2024)
- Comment on adequacy of the EIS (May 2024)
- Public Hearings (May 2024)

Should you have any comments at this time, please provide those to me now at the email below. Also, please let me know if you would like to review any draft sections beyond those listed here.

Thank you for your assistance in preparing the draft EIS. If you have any questions or concerns, please don't hesitate to contact me at 651-539-1840 or andrew.levi@state.mn.us.

Sincerely,

A handwritten signature in blue ink, appearing to read "A. Levi", is positioned above the typed name.

Andrew Levi
Energy Environmental Review and Analysis

cc: Charley Bruce, Minnesota Public Utilities Commission

Enclosures: Notice of Environmental Impact Statement Preparation
Preliminary EIS Table of Contents
Project Factsheet

EIS Preparation Notice

On September 26, 2023, the environmental impact statement preparation notice required by Minn. R. 4410.2100, Subp. 9, was published in the EQB Monitor. Newspaper notification will be documented in a subsequent filing.

A handwritten signature in blue ink, appearing to read 'A. Levi'.

Andrew Levi
Energy Environmental Review and Analysis

October 27, 2023
Example Email to State Agencies

From: Levi, Andrew (COMM) <andrew.levi@state.mn.us>

Sent: Friday, October 27, 2023 9:19 AM

To: Beimers, Sarah (ADM) <sarah.beimers@state.mn.us>; Bell, David (MDH) <david.bell@state.mn.us>; Felix-Gerth, Annie (BWSR) <annie.felix-gerth@state.mn.us>; Green, Todd (DLI) <todd.a.green@state.mn.us>; Kotch Egstad, Stacy (DOT) <stacy.kotch@state.mn.us>; Roos, Stephan (MDA) <stephan.roos@state.mn.us>; Warzecha, Cynthia (DNR) <cynthia.warzecha@state.mn.us>; MN_MDOR_Sa Property <sa.property@state.mn.us>; King, Melissa (BWSR) <Melissa.King@state.mn.us>; Gronhovd, Amanda (She/Her/Hers) (ADM) <amanda.gronhovd@state.mn.us>; Hapka, Katrina (MPCA) <Katrina.Hapka@state.mn.us>; Bodin, Chet (DEED) <chet.bodin@state.mn.us>

Cc: Sedarski, Joe <Joe.Sedarski@hdrinc.com>; Storey, Catherine <catherine.storey@hdrinc.com>

Subject: EIS Preparation -- Otter Tail to Wilkin Carbon Dioxide Pipeline Project

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good morning,

Attached is a letter from the Department of Commerce inviting your agency to provide input on the EIS being prepared for the Otter Tail to Wilkin Carbon Dioxide Pipeline Project.

If you are not the appropriate contact, please let me know who is. I have copied HDR, our technical contractor, on this email.

Don't hesitate to contact me with any questions.

Enjoy your weekend!

Thank you.

—Andrew

Andrew Levi

Environmental Review Manager

Energy Environmental Review and Analysis

Department of Commerce

85 Seventh Place East, Suite 280 | Saint Paul, MN 55101

P: (651) 539-1840 | F: (651) 539-0109

Schedule: Tuesday – Friday



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VIA EMAIL

October 27, 2023

To: **State Agency Technical Representatives**

Re: **Otter Tail to Wilkin Carbon Dioxide Pipeline Project**
Draft Environmental Impact Statement Preparation

Greetings:

The purpose of this letter is to provide an update on the Otter Tail to Wilkin Carbon Dioxide Pipeline Project (project) and request your participation in the preparation of the draft environmental impact statement (EIS) for the project.

On August 31, 2023, the Minnesota Public Utilities Commission (Commission) determined the scope of the EIS. Staff within the Department of Commerce, Energy Environmental Review and Analysis (EERA) unit are responsible for preparing the EIS. On September 26, 2023, EERA issued a *Notice of Environmental Impact Statement Preparation*. The Commission has 280 days from the notice date to determine the adequacy of the EIS. To meet the 280-day deadline, EERA staff must issue the draft EIS in January 2024.

The Commission requested EERA coordinate with Tribal governments and other state agencies to ensure their expertise is reflected in the EIS. To ensure your expertise is included, ***we plan to send you draft section(s) of the EIS that you request*** (see attached Preliminary EIS Table of Contents). It is difficult to say exactly when this will occur, but we anticipate this to be in December 2023. We will provide you additional notice about two weeks before we send the draft section(s).

We ask that you provide comments within two weeks of receipt of the draft section(s) so that we can incorporate your comments into the draft EIS. Your comments in their entirety will be included as an appendix to the draft EIS along with comments from Tribal governments and other state agencies.

In addition to our request in this letter, there will be multiple opportunities to formally comment on the project. These include:

- Draft EIS comment period (opens with issuance of draft EIS)
- Draft EIS public meetings (February 2024)
- Comment on adequacy of the EIS (May 2024)
- Public Hearings (May 2024)

Should you have any comments at this time, please provide those to me now at the email below. As indicated above, please let me know which sections of the draft EIS you would like to review.

Thank you for your assistance in preparing the draft EIS. If you have any questions or concerns, please don't hesitate to contact me at 651-539-1840 or andrew.levi@state.mn.us.

Sincerely,

A handwritten signature in blue ink, appearing to read 'A. Levi'.

Andrew Levi

Energy Environmental Review and Analysis

Enclosures: Notice of Environmental Impact Statement Preparation

Preliminary EIS Table of Contents

Project Factsheet

November 17, 2023
Example Email to Tribes

From: Levi, Andrew (COMM) <andrew.levi@state.mn.us>

Sent: Friday, November 17, 2023 10:09 AM

To: Melanie Benjamin, Chief Executive <melanie.benjamin@millelacsband.com>; kelly.applegate <kelly.applegate@millelacsband.com>; Perry Bunting, Director, Environmental Programs <perry.bunting@millelacsband.com>; Susan.Klapel@millelacsband.com; Jamie.Edwards@millelacsband.com; Mike Wilson, THPO <Mike.Wilson@millelacsband.com>; charlie.lippert <Charlie.Lippert@millelacsband.com>; Chad Weiss, Water Resource Manager <chad.weiss@millelacsband.com>; Andrew Boyd, Environmental Compliance Officer <andrew.boyd@millelacsband.com>; Alexandria Clark, Environmental Programs Coordinator <Alexandria.Clark@millelacsband.com>; Jon Houle, Agricultural Coordinator <Jon.Houle@millelacsband.com>

Cc: Bruce, Charley (PUC) <charley.bruce@state.mn.us>; Sedarski, Joe <Joe.Sedarski@hdrinc.com>; Storey, Catherine <catherine.storey@hdrinc.com>

Subject: State of MN - Otter Tail to Wilkin EIS

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Greetings:

As follow up to our October 2023 email, we are providing notice that preliminary draft sections of the draft environmental impact statement (EIS) being prepared for the Otter Tail to Wilkin Carbon Dioxide Pipeline Project will be sent to you in two to three weeks.

We ask that you provide comments within two weeks of receipt of the draft sections so that we have time to incorporate your comments into the draft EIS. We understand this is a short turnaround, but to meet deadlines outlined in rule the draft EIS must be published in January 2024.

To speed our review of the comments we receive, we will also provide a table for your comments. More explanation will be given at that time.

Thank you in advance for your assistance in preparing the draft EIS. If you have any questions or concerns, please don't hesitate to contact me at 651-539-1840 or by email.

Enjoy the weekend!

Thank you.

—Andrew

Andrew Levi

Environmental Review Manager

Energy Environmental Review and Analysis

Department of Commerce

85 Seventh Place East, Suite 280 | Saint Paul, MN 55101

P: (651) 539-1840 | F: (651) 539-0109

Schedule: Tuesday – Friday



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November 17th, 2023
Example Email to State Agencies

From: Levi, Andrew (COMM) <andrew.levi@state.mn.us>

Sent: Friday, November 17, 2023 9:26 AM

To: Beimers, Sarah (ADM) <sarah.beimers@state.mn.us>; Bell, David (MDH) <david.bell@state.mn.us>; Felix-Gerth, Annie (BWSR) <annie.felix-gerth@state.mn.us>; Green, Todd (DLI) <todd.a.green@state.mn.us>; Kotch Egstad, Stacy (DOT) <stacy.kotch@state.mn.us>; Roos, Stephan (MDA) <stephan.roos@state.mn.us>; Warzecha, Cynthia (DNR) <cynthia.warzecha@state.mn.us>; MN_MDOR_Sa Property <sa.property@state.mn.us>; King, Melissa (BWSR) <Melissa.King@state.mn.us>; Gronhovd, Amanda (She/Her/Hers) (ADM) <amanda.gronhovd@state.mn.us>; Hapka, Katrina (MPCA) <Katrina.Hapka@state.mn.us>; Bodin, Chet (DEED) <chet.bodin@state.mn.us>

Cc: Sedarski, Joe <Joe.Sedarski@hdrinc.com>; Storey, Catherine <catherine.storey@hdrinc.com>

Subject: EIS Preparation -- Otter Tail to Wilkin Carbon Dioxide Pipeline Project

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Greetings:

As follow up to our October 2023 email, we are providing notice that preliminary draft sections of the draft environmental impact statement (EIS) being prepared for the Otter Tail to Wilkin Carbon Dioxide Pipeline Project will be sent to you in two to three weeks.

We ask that you provide comments within two weeks of receipt of the draft sections so that we have time to incorporate your comments into the draft EIS. We understand this is a short turnaround, but to meet deadlines outlined in rule the draft EIS must be published in January 2024.

To speed our review of the comments we receive, we will also provide a table for your comments.

More explanation will be given at that time.

Thank you in advance for your assistance in preparing the draft EIS. If you have any questions or concerns, please don't hesitate to contact me at 651-539-1840 or by email.

Enjoy the weekend!

Thank you.

—Andrew

Andrew Levi

Environmental Review Manager

Energy Environmental Review and Analysis

Department of Commerce

85 Seventh Place East, Suite 280 | Saint Paul, MN 55101

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December 8, 2023
Example Email to Tribes

From: Levi, Andrew (COMM)

Sent: Friday, December 8, 2023 3:43 PM

To: perry.bunting@millelacsband.com; Susan.Klapel@millelacsband.com; Jamie.Edwards@millelacsband.com; kelly.applegate@millelacsband.com; melanie.benjamin@millelacsband.com; Mike.Wilson@millelacsband.com; charlie.lippert@millelacsband.com; chad.weiss@millelacsband.com; andrew.boyd@millelacsband.com; Alexandria.Clark@millelacsband.com; Jon.Houle@millelacsband.com

Cc: Sedarski, Joe <Joe.Sedarski@hdrinc.com>; Storey, Catherine <catherine.storey@hdrinc.com>; Brenton, Eric <Eric.Brenton@hdrinc.com>; Sand, Mauli <Mauli.Sand@hdrinc.com>; Bruce, Charley (PUC) <Charley.Bruce@state.mn.us>

Subject: Otter Tail to Wilkin EIS -- Draft Chapters

Good afternoon,

As indicated in my emails sent to you in October and November, I am now sending you preliminary sections of the draft Environmental Impact Statement (EIS) being prepared for the Otter Tail to Wilkin CO2 Pipeline Project for your review and comment. There are three items for your attention: 1) pdfs of EIS chapters, 2) a comment table for your use, and 3) a link to a SharePoint site where you can view detailed maps showing the three route alternatives analyzed in the draft EIS.

1) Attached are separate pdf files of: Chapters 1 to 5 and Chapters 7 and 8, a drawing of the proposed CO2 capture facility, and the EIScreen report for the census tracts that would be crossed by the route alternatives. Each chapter includes a brief table of contents on the first page to help guide your review.

2) Also attached is a comment table (an Excel file) that we request be used to provide consolidated comments. Please save the file with the name of your Tribe or agency. Instructions are on the form. The comments you provide in the attached comment table will be included in an appendix to the draft EIS.

3) A SharePoint site has been established: [Detailed Mapset - Otter Tail to Wilkin CO2 Pipeline](#) . Here you will find detailed maps showing the three route alternatives analyzed. (You will be receiving an invitation from Eric Benton with HDR concerning SharePoint indicating your access is open. Please disregard. It is autogenerated and we can't shut it off. Use the link in this email.)

We are working as quickly as we can to prepare the document; however, it is still a work in progress. The attached draft EIS chapters are the current working versions; they are works in progress, lack some information and details, and are subject to change. Where portions are not ready, we note this with placeholders. Some chapters, along with the pipeline rupture study, are not ready. Also, these documents have not had a final technical edit and formatting review.

some information and details, and are subject to change. Where portions are not ready, we note this

Please focus your time on providing substantive comments using the attached Excel comment table. While pointing out something to fix or change is useful, providing a suggested fix is most helpful. We appreciate your attention to this matter and your time to provide your review and expertise to help inform the draft EIS. Don't hesitate to contact me with any questions. Note: I work a four 10-hour day schedule Tuesday through Friday.

We need your comments back no later than **Friday, December 22**, so that we can address and incorporate as many of your comments as possible into the Draft EIS that will be published January 23, 2024.

Thank you.

—Andrew

Andrew Levi

Environmental Review Manager

Energy Environmental Review and Analysis

Department of Commerce

85 Seventh Place East, Suite 280 | Saint Paul, MN 55101

P: (651) 539-1840 | F: (651) 539-0109

Schedule: Tuesday – Friday



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From: [Levi, Andrew \(COMM\)](#)
To: [perry.bunting](#); [Susan.Klapel](#); [Jamie.Edwards](#); [kelly.applegate](#); [melanie.benjamin](#); [Mike.Wilson](#); [charlie.lippert](#); [chad.weiss](#); [andrew.boyd](#); [Alexandria.Clark](#); [Jon.Houle](#)
Cc: [Sedarski, Joe](#); [Storey, Catherine](#); [Brenton, Eric](#); [Sand, Mauli](#); [Bruce, Charley \(PUC\)](#)
Subject: RE: Otter Tail to Wilkin EIS -- Draft Chapters
Date: Friday, December 8, 2023 8:32:56 PM
Attachments: [image001.png](#)
[Comment Table PrelimDraft CQ2 EIS.xlsx](#)

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good evening,

It occurred to me that I forgot to attach the Excel document. I apologize for any inconvenience.

Thank you.

—Andrew

COMMENT SUMMARY TABLE

Available Sections of Draft Environmental Impact Statement (dated Dec. 8, 2023)

Otter Tail to Wilkin Carbon Dioxide Pipeline Project -- MPUC Docket No.: IP7093/PPL-22-422

Commenting Tribe or Agency	Please fill in name in this cell

Fill out the table and provide the page number and paragraph of the text on which you are commenting, along with your specific comment, recommendation, or any mitigation measures or other strategies that could address potential impacts of the proposed project. The first row of the comment table is filled out as an example.

Note to Reviewers: Please focus your comments on substantive content. It is most helpful to us if you include a suggested resolution and/or information that you would like added, including potential mitigation measures.

[illegible]

December 8, 2023
Example Email to State Agencies

From: [Levi, Andrew \(COMM\)](#)
To: [Beimers, Sarah \(ADM\)](#); [Bell, David \(MDH\)](#); [Felix-Gerth, Annie \(BWSR\)](#); [Green, Todd \(DLI\)](#); [Kotch Egstad, Stacy \(DOT\)](#); [Roos, Stephan \(MDA\)](#); [Warzecha, Cynthia \(DNR\)](#); [MN MDOR, Sa Property](#); [King, Melissa \(BWSR\)](#); [Gronhoyd, Amanda \(She/Her/Hers\) \(ADM\)](#); [Hapka, Katrina \(MPCA\)](#); [Bodin, Chet \(DEED\)](#); [Wolfgram, Jonathan \(DPS\)](#); [Tworzyanski, Jennifer \(ADM\)](#); [MN ADM OSA Project Reviews](#)
Cc: [Sedarski, Joe](#); [Storey, Catherine](#); [Brenton, Eric](#); [Sand, Mauli](#)
Subject: Otter Tail to Wilkin EIS - Draft Chapters
Date: Friday, December 8, 2023 3:46:43 PM
Attachments: [image001.png](#)
[Chapter 1 Introduction Draft.pdf](#)
[Chapter 2 Project Information Draft.pdf](#)
[Chapter 3 Regulatory Framework Draft.pdf](#)
[Chapter 4 Alternatives Draft.pdf](#)
[Chapter 5 Potential Impacts Alternative Routes Draft.pdf](#)
[Chapter 7 No Action Alternative Draft.pdf](#)
[Chapter 8 Unavoidable Impacts Draft.pdf](#)
[Chapter 9 Cumulative Potential Effects Draft.pdf](#)

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good afternoon,

As indicated in my emails sent to you in October and November, I am now sending you preliminary sections of the draft Environmental Impact Statement (EIS) being prepared for the Otter Tail to Wilkin CO2 Pipeline Project for your review and comment. There are three items for your attention: 1) pdfs of EIS chapters, 2) a comment table for your use, and 3) a link to a SharePoint site where you can view detailed maps showing the three route alternatives analyzed in the draft EIS.

1) Attached are separate pdf files of: Chapters 1 to 5 and Chapters 7 and 8, a drawing of the proposed CO2 capture facility, and the EIScreen report for the census tracts that would be crossed by the route alternatives. Each chapter includes a brief table of contents on the first page to help guide your review.

2) Also attached is a comment table (an Excel file) that we request be used to provide consolidated comments. Please save the file with the name of your Tribe or agency. Instructions are on the form. The comments you provide in the attached comment table will be included in an appendix to the draft EIS.

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We are working as quickly as we can to prepare the document; however, it is still a work in progress. The attached draft EIS chapters are the current working versions; they are works in progress, lack some information and details, and are subject to change. Where portions are not ready, we note this with placeholders. Some chapters, along with the pipeline rupture study, are not ready. Also, these documents have not had a final technical edit and formatting review.

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We need your comments back no later than **Friday, December 22**, so that we can address and incorporate as many of your comments as possible into the Draft EIS that will be published January 23, 2024.

Thank you.

—Andrew

Andrew Levi

Environmental Review Manager

Energy Environmental Review and Analysis

Department of Commerce

85 Seventh Place East, Suite 280 | Saint Paul, MN 55101

P: (651) 539-1840 | F: (651) 539-0109

Schedule: Tuesday – Friday



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Attachment B

COMMENT SUMMARY TABLE

Available Sections of Draft Environmental Impact Statement (dated Dec. 8, 2023)

Otter Tail to Wilkin Carbon Dioxide Pipeline Project -- MPUC Docket No.: IP7093/PPL-22-422

Commenting Tribe or Agency: Mille Lacs Band of Ojibwe

Fill out the table and provide the page number and paragraph of the text on which you are commenting, along with your specific comment, recommendation, or any mitigation measures or other strategies that could address potential impacts of the proposed project. The first row of the comment table is filled out as an example.

Note to Reviewers: Please focus your comments on substantive content. It is most helpful to us if you include a suggested resolution and/or information that you would like added, including potential mitigation measures.

Chapter and Section	Page No.	Paragraph No. (from top of page)	Comment
Example: Section 5.4.3 Environmental Justice	Example: 5-37	Example: 2	Example: Text reads "Using these criteria, census tract 9609 in Otter Tail County was identified as an MPCA EJ area of concern within the ROI because 43 percent of the population has a reported income which is less than 100 percent of the federal poverty level." MPCA areas of concern are based on 200 percent of the federal poverty level. Correction: The sentence should read, "Using these criteria, census tract 9609 in Otter Tail County was identified as an MPCA EJ area of concern within the ROI because 43 percent of the population has a reported income which is less than 200 percent of the federal poverty level."
1.2 What is the project's purpose	1-2	1	Change "... permitted Class VI injection wells." to "... permitted federal Class VI injection wells issued by North Dakota." for clarity. This class of wells are done with a Federal permit, issued by North Dakota, as they have taken primacy for this permit type.
2.7 Decommissioning	2-14	8	Either remove draft document reviewer comment "[Comment from Andrew:....]" or highlight for draft document so that it wouldn't get lost in the final edits.
3.2.3 Public Meetings and Hearings	3-03	4	Appreciate the uncertain draft text areas being highlighted in this chapter, but wasn't sure if the "(note the Second Prehearing Order...)" was a comment for the draft document or if it was supposed to be part of the EIS text.
3.7 Are other permits or approvals required?	3-10	2 Right	In addition to federal agency providing the permit or approval constult with the SHPO, there may also be a consultation with Tribes or Tribal Historic Preservation Office (THPO), facilitated by the SHPO.
4 Alternatives			In other chapters, notes are marked in Arabic Numerals but in this chapter they are in Roman Numerals. Change to Arabic Numerals for consistency.
5.02.02 Minnesota River Prairie Subsection	5-04	2	When naming plants, also use botanical taxonomical names for clarity. Example: silver maple (Acer saccharinum).
5.02.03 Red River Prairie Subsection	5-04	3	When naming plants, also use botanical taxonomical names for clarity. Example: bluestems (Andropogon gerardii, Schizachyrium scoparium, etc.).
5.04.01.01 Existing Conditions	5-06	5	There are no montions of the historical trails to Abercrombie or historical trails to Brekenridge. RA-North crosses such trails at MP 2.6 and 14.7. RA-South crosses them at MP 2.8, 10.4, 15.6, and 15.9. RA-Hybrid crosses them at MP 2.6, 10.8, 16.4, and 16.7.
5.04.02.01 Existing Conditions	5-10	2	First bullet point "According to the U.S. Department of Housing and Urban Development..." shouldn't be a bullet point, as it introduces the list of tribes following it.
5.04.02.01 Existing Conditions	5-10	1	Change sentence to "During the period of European contact (1650-1837 AD) into the Post-Contact Period (1837 AD to Present), the Dakota people (historically known by Euro-American settlers as the Sioux) and the Ojibwe (historically known by the Euro-American settlers as the Chippewa) occupied the land within the local vicinity of the project area. In the 1825 Treaty of Prairie du Chien (7 Stat 272), the Ojibwe relinquished their claims to the area."
5.04.02.01 Existing Conditions			Ojibwe toponymy can describe the area a little more. For example: Otter Tail River is known in Ojibwe as Nigigwaanowe-ziibi (Otter Tail River) due to the long sandbar at the river's outlet into Otter Tail Lake which results in Fergus Falls being called Nigigwaanowe gakaabikaans (Little falls of the Otter Tail), Bois de Sioux as Gaa-edawayi'ii-maamiwang-ziibi (River from which it [Lake Traverse] flows out from both ends) due to the lake's location within Glacial Lake Agassiz and now is a basin divide, and Pelican River as Zhede-zaaga'iganiwi-ziibi (River that of Pelican Lake) due to Lakes Lizzie and Lida, known as Zhede-zaaga'igan aazhawaakwa (Pelican lake beyond the woods) and Zhede-zaaga'igan (Pelican lake) respectively, being a habitat for American white pelican (Pelecanus erythrorhynchos).

5.04.03.01 Existing Conditions	5-13	6	There is a discussion here on EPA tool EJScreen, but absent from the discussion is CEQ's Climate and Economic Justice Screening Tool (CEJST). See: https://screeningtool.geoplatform.gov/en/#9.9/46.2844/-96.3457 . It also identifies Census Tract 9609 as a disadvantaged community due to Legacy pollution by being in the proximity to Risk Management Plan facilities located within 5 kilometers (3 miles).
5.04.09.01 Existing Conditions	5-53	2	Mention that there are 115 kV and 345 kV Electric Transmission Lines nearby, but the project does not cross them.
5.04.10.01 Existing Conditions	5-63	Figure 5-11	Missing from the map are Wildlife Management Areas and Walk-in Access Areas, as these are also Recreational facilities in the project vicinity.
5.04.10.01 Existing Conditions	5-63	Figure 5-11	Change title "vacinity" to "vicinity".
5.04.10.01 Existing Conditions	5-63	Figure 5-11	Otter Tail River State Water Trail is shown in the map but isn't labeled. Please label this feature.
5.04.12.01 Existing Conditions	5-67	9	Change subsection title to "Treaty with the Sioux-Sisseton and Wahpeton Bands (10 Stat. 949)" for clarity.
5.04.12.01 Existing Conditions	5-67	9	Discuss in this section that Dakota (Sioux) and Ojibwe (Chippewa) occupied the project area, and the Ojibwe relinquished their claims to the area in 1825. Then speak about the lands in the local vicinity of the project were ceded to the United States government in two 1851 treaties. The area that was ceded in 1851 should be referenced as Royce Area 289.
5.04.12.01 Existing Conditions	5-68	3	Change subsection title to "Treaty With the Sioux-Mdewakanton and Wahpakoota Bands (10 Stat. 954)" for clarity.
5.04.12.01 Existing Conditions			Since the project ends at the Bois de Sioux River and the river serves as the boundary for Royce Area 538, there should be a very brief discussion about the September 20, 1872, Agreement with the Sisseton and Wahpeton Sioux (Rev. Stat. 1050), which the Royce Area 289 abuts.
5.04.12.01 Existing Conditions			There should be a very brief acknowledgement that the project is greater than 30-miles upstream from Royce Area 357 for the February 22, 1855, Treaty with the Chippewa-Mississippi and Pillager Bands (10 Stat. 1165) and Royce Area 445 for the 1863 Treaty with the Chippewa-Red Lake and Pembina Bands (13 Stat. 667).
5.05.05.01 Existing Conditions	5-78	4	Add "Next closest aggregate source is within ¾ mile of the RA-North route width (ID: 56139). Satellite imagery from August 2022 shows no evidence of mining operations at this location."
5.07.01.02 Existing Conditions	5-93	5	Add additional information regarding the next closest air monitoring station to the project area is in Fargo, North Dakota. Also mention that as of the time of this EIS, there were air sensor units located in Fargo, Cotton Lake, and Alexandria.
7 No Action Alternative	7-1	2	If the project is not constructed, will this result in Green Plains Ethanol Plant emitting CO2 into the environment? This is not captured in this paragraph.
9 Cumulative Potential Effects			Cumulative Potential Effects should also take into consideration any projects, discharges, and emissions in neighboring state (North Dakota) that are within 50-miles of Minnesota borders that can have impacts in Minnesota, and more specifically to the project, though cannot be regulated by Minnesota, but have the potential to limit Minnesota's ability to permit its own sources.

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Available Sections of Draft Environmental Impact Statement (dated Dec. 8, 2023)

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Commenting Tribe or Agency: MnDOT

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Chapter and Section	Page No.	Paragraph No. (from top of page)	Comment
Example: Section 5.4.3 Environmental Justice	Example: 5-37	Example: 2	Example: Text reads "Using these criteria, census tract 9609 in Otter Tail County was identified as an MPCA EJ area of concern within the ROI because 43 percent of the population has a reported income which is less than 100 percent of the federal poverty level." MPCA areas of concern are based on 200 percent of the federal poverty level. Correction: The sentence should read, "Using these criteria, census tract 9609 in Otter Tail County was identified as an MPCA EJ area of concern within the ROI because 43 percent of the population has a reported income which is less than 200 percent of the federal poverty level."
All Maps			Add symbology in legend to denote, county, state, and US highways.
Route Overview, RA-South, and RA-Hybrid Overview maps			Move label for city of Fergus Falls to the east. The majority of the city (including downtown) is located east of I-94. The label on the figure appears to be on/near the airport (which I am sure is within city limits, but not in the center of the city). The label on the RA-North map looks good.
Route Overview Map			Add "MINNESOTA" on east side of Bois de Sioux River ("NORTH DAKOTA" is identified on the west side)
Detailed Mapsets	All		The detailed maps all display "undelineated NWI wetlands." Is there a reason why delineated wetlands within the study area are not displayed?
Chapter 1.2	1-1	6	The pipeline does not technically interconnect to the broader MCE project at the MN/ND border. Based on mapping of the overall MCE project on the applicant's website, the line continues for several miles in ND before combining with another lateral from an ethanol plant located in ND.
Chapter 2.1	2-2	Fig 2-1	Can you include a higher resolution figure? Some of the text is not clear (particularly in the legend), even when zooming in.
Chapter 2.2	2-3		Clarify typical TWS and ATWS dimensions (XX' x XX') at road crossings (MnDOT and County/Township).
Chapter 2.8	2-15	2	This is the first mention of "North" and "Hybrid" route alternatives, and neither are mentioned in Chapter 1 either. Need to define and describe these routes (and include figures) before introducing here out of the blue without context.
Chapter 3.2	3-2	Fig 3-1	Suggest adding rough timelines for each EIS step to the figure.
Chapter 3.2.3	3-3	4 and 5	Include locations/times of Feb 7 and 8 public meetings and May hearings, if/when known. Clarify if in-person only, or if a hybrid option will be available.
Chapter 3.7	3-6	4	RE: the sentence: Tables 3-1 and 3-2 lists permits and approvals that <i>might</i> be required for the project pipeline and capture facilities, and a description of applicable agency role(s) associated with the permits/approvals. Is it possible in the tables to denote which permits that applicant <i>must/will</i> acquire, versus those that <i>might/may</i> be required (pending final project design)?
Chapter 3.7	3-10		Rename MnDOT "Road Crossing Permits" to "Utility Accommodation on Trunk Highway Right of Way" and "Miscellaneous Work on Trunk Highway Right of Way" permits
Chapter 4.3	4-2	1	Suggest adding a few sentences to describe how/why the alternatives were derived.
Chapter 4.3.1-3	4-2 and 4-3		To me, it makes sense to describe RA-North and RA-South before introducing the RA-Hybrid option, since the hybrid option is a combination of the two. Suggest swapping current Section 4.3.2 and 4.3.3, or move the South (preferred option) to 4.3.1, then North as 4.3.2, and Hybrid as 4.3.3.
Chapter 5.4.1.1 and 5.4.1.3 (Applicant Proposed Mitigation)	5-9	3	There should be a statement if any trees and/or shrubby vegetation will need to be removed within the 1,600 foot ROI of the Scenic Byway crossings. There does not appear to be any trees/shrubby veg at the crossing locations themselves, but unclear if clearing may be needed within the ROI that may impact users of Scenic Byway.

Chapter 5.4.3.1	5-16	Fig 5-4	This figure shows <i>all</i> EJ Census tracts, EJ tracts should be called out and added to the legend. Also, the figure gives percentages for minority populations but no info on percent of low-income households
Chapter 5.4.3.2	5-17	5	Re: air emissions, the paragraph mentions a 100,000 tpy limit for CO2. What other air quality parameters (e.g., NOx, SO4, etc.) are in this permit? Suggest listing out as these are likely to have a more localized impact compared to CO2 emissions.
Chapter 5.4.4.1	5-18	2	A bit nitpicky, but the sentence " <i>the project is located entirely on privately owned land</i> " is a bit misleading. Suggest something like "With the exception or road, railroad, and public water crossings, the project is located entirely on privately owned land." There is also mention of crossing of USFWS WPAs later in the document. Clarify if these are publicly owned (or privately owned but managed by USFWS).
Chapter 5.4.9.1	5-54 - 5-56	Table 5-17	Sort road crossings for each alternative in a logical order (suggest from east to west, MP 0.0 - MP 24.5), also call out US 75 as King of Trails Scenic Byway.
Chapter 5.4.9.2 (Roadways)	5-57 and 5-8		Suggest moving last paragraph in section to the front to address impacts on the roadways crossed first, and then go on to describe general traffic/roadway impacts in the region.
Chapter 5.4.10.2	5-63	2	The paragraph states "Both RA-Hybrid and RA-South would also cross the King of Trails State Scenic Byway (U.S. Highway 75)". In fact, all three RAs (including North) cross the SB. The north route crosses in a different location; RA-Hybrid and South cross at the same location. Also, confirm if any trees/shrubs need to be removed within 1600 feet of SB crossing (see earlier comment)
Chapter 5.5.6	5-78		General Comment - The role of the King of Trail Scenic Byway as it relates to local tourism should be addressed/mentioned in this section.
Chapter 5.6 (Archaeological and Historic Resources)	General comments from OES-CRU: not sure if changes to DEIS are warranted or if these should be incorporated into permit conditions		There are no known or suspected archaeological sites, burials, or historic properties are within or immediately adjacent to MnDOT ROW where crossings are proposed. <u>General comments/expectations are below:</u> The Applicant should provide a summary of cultural field surveys and coordination with SHPO to date. If surveys have not been completed, provide an anticipated schedule for completion. If the Applicant is aware of or becomes aware of significant cultural resources findings in or adjacent to MnDOT ROW, please contact our office at CulturalResources.dot@state.mn.us. In addition, the Applicant shall prepare a Post Review Discovery Plan (PRDP - <i>previously referred to as an Unanticipated Discoveries Plan</i>) and submit to MnDOT for review and contact information for MnDOT's Cultural Resource Unit (CRU) staff must be included in the PRDP. This plan should outline the steps to be followed in the event of an unanticipated discovery of archaeological materials, human remains, or burials, and include language specific to the coordination with MnDOT when a discovery is on MnDOT ROW. MnDOT CRU staff should be notified (CulturalResources.dot@state.mn.us) within 24 hours/days in the event of an unanticipated find on or adjacent to MnDOT property during construction. Additional archaeological investigations (e.g., literature reviews, reconnaissance surveys [if warranted]) may be required where co-location is proposed or where temporary easement may be located within MnDOT ROW. Investigations should include in-field inspections to document areas of soil disturbance and to identify potentially unknown archaeological sites within areas of moderate to high archaeological potential. A PRDP should be developed for the project in advance of construction and provided to MnDOT CRU.
Chapter 5.7.5			The DEIS discusses potential for take of eggs or young of state-listed birds. Will a state DNR takings permit be sought? Most birds are also protected by federal law, will a federal permit be sought? Will tree clearing be done during the non-nesting season? If not, that's also a risk for incidental take of birds under the Migratory Bird Treaty Act (federal).
Chapter 5.7.5			Soil stockpiles, trenches, and other exposed soils typically attract birds that nest if vertical faces. The DEIS/EIS should address how this will be avoided or minimized (e.g., soil stock piles covered or graded to avoid creating vertical faces).
Chapter 5.7.5.2			The USFWS listing work plan has several potential listing decisions expected in the coming 6-12 months. Project proponent is encouraged to monitor these development and update consultations / analyses as required. https://www.fws.gov/project/national-listing-workplan
Chapter 5.7.5.3	5-118		Effective date for northern long-eared bat was delayed to March 31, 2023. Update text to reflect the delay.
Chapter 5.7.5.3	5-118		Note removal of non-roost trees during bird nesting season is expected to result in incidental take of protected birds.
Chapter 5.7.5.3	5-118		Impacts to monarch butterfly may be negligible, but 'take' as defined in regulation may still occur. Explicitly acknowledge this.
Chapter 5.7.5.3	5-118		States that take of state-listed birds "would not occur as part of project operation." Mowing and herbicide applications on utility and other rights-of-way may result in direct and indirect effects, including take of ground-nesting species. The effects of project operation should be reassessed and verified.
Chapter 5.7.5.4	5-119		Riprap and other erosion control practices (i.e., use of plastic erosion blanket) may entrap or entangle small wildlife, including protected wild animals. The DEIS/EIS should state whether it will use erosion techniques that avoid these impacts. If not, these impacts should be assessed as part of the proposed action.
Chapter 5.7.10.2	5-158		The DEIS states, "... the impacts to the viability of any given reptile or amphibian species would be short-term and negligible to minimal." What is the basis of the statement? Provide data, references, citations. Many studies exist, especially for turtles (a reptile), that even small increases in human-caused mortality is significant and unsustainable for population viability.
Chapter 9.1	Table 9-1		Several of the projects in the table have construction dates in the past. Try to get updates on status of these projects.
Chapter 9.1			Potential future MnDOT projects in the area should be considered in Cumulative Impacts. These can be accessed by MnDOT's State Transportation Improvement Program (STIP, https://www.dot.state.mn.us/planning/program/stip.html) and Capital Highway Investment Program (CHIP, https://www.dot.state.mn.us/planning/10yearplan/district-chip.html).

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Commenting Tribe or Agency: MNOPS

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Chapter 3 - Section 3.7	3-8	Table 3-1	The chart lists "Potential Permits and Approvals Required – Pipeline Facilities." DPS / MNOPS does not issue any permits associated with the project. Tex reads "The Minnesota Office of Pipeline Safety (MNOPS) acts as a regulatory agency ensuring Minnesota’s pipeline infrastructure is in compliance with applicable pipeline safety standards." Text should be amended to:The Minnesota Office of Pipeline Safety (MNOPS) acts as a regulatory agency ensuring Minnesota’s intrastate pipeline infrastructure is in compliance with applicable pipeline safety standards. <u>MNOPS maintains an agreement with PHMSA annually to conduct inspections of interstate pipelines as requested.</u>

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Commenting Tribe or Agency: Minnesota Department of Health

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Chapter and Section	Page No.	Paragraph No. (from top of page)	Comment
Section 5.4.3.1 Environmental Justice	5-14	2 & 3	First two paragraphs under heading "Pollution Control Agency Areas of Concern" are very similar and repeat each other often. Correction: remove or edit one of the paragraphs
Section 5.4.3.2 Environmental Justice	5-16	general comment	While the document identifies census tract 9609 as an environmental justice (EJ) area of concern and states that, "This census tract is given additional consideration in evaluating potential disproportionate impacts from construction and operation of the project", no mention is made as to whether additional consideration or effort was, or is, planned to ensure meaningful community engagement within this EJ area of concern. A key tenant of effective EJ work is ensuring that communities have the opportunity to meaningfully participate in decisions that may affect their community and health. Document should clarify if specific effort has been made or when it plans to do so.
Section 5.4.5.2 Noise	5-32	1	Text reads "If noise mitigation is required, temporary sound dampening barrier walls would be placed around the equipment. The applicant has stated that it would coordinate with nearby landowners prior to starting HDDs, and its contractor would determine the need for noise mitigation and noise monitoring based on feedback received from landowners during construction." Comment: While open conversation with NSR landowners is a good step, the above sentence could be interpreted to mean that noise mitigation and noise monitoring at these HDD NSR locations will only be used if landowner feedback requests it. The onus for determining safe/acceptable sound levels should not be placed on the landowner. Further, since document states that "Because some NSRs would be less than 1,320 feet from the drilling equipment, the noise standards listed in Table 5-5 could be exceeded at these locations," these HDD NSR locations should be set up for noise monitoring and then appropriate mitigations should be employed as needed. Text should be updated to clarify these points
Section 5.4.5.3 Noise	5-33	6	MDH agrees with Mitigation recommended by EERA staff stating "EERA staff recommends as a special permit condition that the applicant provide, for Commission review and approval, a plan for coordinating with residents located within 1,320 feet of HDD entries, and as needed, monitoring noise levels at these locations during HDD operations to ensure noise standards are met. The plan should be provided 30 days prior to submittal of the plan and profile."
Section 5.4.8.2 Public Health and Safety	5-43	2	Section heading, "Operations Health and Safety". Comment: This section did not include a discussion on potential distances that CO2 plumes could reach in the event of pipeline rupture. Presumably this information would be available in "Appendix G Pipeline Rupture Analysis Study" though MDH has not yet had the opportunity to review this study/appendix. Accurate modeling of these potential distances for multiple scenarios but especially during worst case scenarios, is vitally important to protecting the health and safety of first responders and of the residents and communities located along the proposed routes so that proper route planning and preparedness training can be in place.
Section 5.4.8.2 Public Health and Safety	5-44	5	Text reads "The minimum depth of the pipeline as built by the applicant would be below the maximum depth where soil freezes in this region, except under potentially extreme conditions." Comment: Specific depths should be listed here as well as a definition given for what constitutes "potentially extreme conditions".
Section 5.4.8.3 Public Health and Safety	5-45	4	MDH emphasizes and supports the statement that reads "If PHMSA identifies any updated mitigation strategies or safety guidelines during this environmental review, the Commission has stated that it would be prudent for EERA staff and the applicant to take that information into account even if the updates have not been finalized as amended federal rules by the time the EIS is completed."
Section 5.4.8.3 Public Health and Safety	5-47	2	Text reads "...the applicant has developed a draft Emergency Response Plan, provided as Appendix 6 to its Route Permit Application,..." Comment: It is unclear if the draft Emergency Response Plan will also be provided as an appendix to this EIS. Due to the importance of this plan to protecting health and safety of the communities this proposed project will pass through and due to the fact that the PHMSA is reviewing and potentially updating its pipeline safety rules specifically for CO2 pipelines, any and all plans relating to emergency response and safety measures/procedures should be made readily available. Correction: Ensure draft Emergency Response Plan is included in this EIS

Section 5.4.8.3 Public Health and Safety	5-49	2	Text reads "This mitigaion would not be consistent with PHMSA regulations, which set out standards for the design and safety of liquid and gas pipelines, but do not specify any setback or minimum distance between the pipeline and a residence." Comment: While this statement is true of current PHMSA regulations, as noted elsewhere in this document, PHMSA have initiated rulemaking specially to look at whether design and safety standards for CO2 pipelines need updating. Text here should again aknowledge the upcoming PHMSA rulemaking process. It is possible that setbacks become incorporated as part of that rulemaking process. Again, while residential setbacks are not required at this time, MDH would encourage design and placement of CO2 pipelines that ensure to the best degree possible the safety of the communities and individual residences with which the pipeline crosses.
Section 5.7.1.1 Air Quality and Greenhouse Gas Emissions	5-90	5	Heading: Regulatory Framework. Comment: MDH has developed health-based air guidance values which may be used by the public, industry, state and local risk managers, and other stakeholders to assist in evaluating potential health risks to people from exposures to a chemical in air. MDH has air guidance values for NO2 and H2S and encourages the project to consider whether these values may be useful when evaulating the health, safety, and emergency preparedness of this project.
Section 5.7.3 Geology and Topography	5-109	5.7.3.1	A review of well records in the County Well Index shows land surface artesian conditions - static water levels above the land surface at the time of construction as opposed to static water levels above the top of the buried aquifer, within 1 mile of RA-South, RA-North and RA-hybrid for both shallow (less than 100 feet) and deeper confined aquifers. Recommend this section include brief discussion of artesian aquifers.
Section 5.7.8.1 Water Resources	5-135	6	Text reads "Placeholder for summary" Recommend potential artesian conditions in buried aquifers added to summary.
Section 5.7.8.1 Water Resources	5-136	1	Text states that the project does not cross state special designated waters. RA-North, RA-Hybrid, and RA-South make multiple crossing over surface waterways that have been delineated as portions of the Spill Management Area (SMA) of the city of Moorhead's Drinking Water Supply Management Area - Surface Water as delineated by the Minnesota Department of Health (MDH). Document should be updated with this information.
Section 5.7.8.1 Water Resources	5-138	2	Text acknowledges the Otter Tail River as a drinking water protected surface water in the RA-Hybrid area. Consideration should be given to project impacts to the Fergus Falls Source Water Assessment Area. The project area is downstream of the city's surface water intake and impacts are unlikely.
Section 5.7.8.1 Water Resources	5-140	2	Text acknowledges the Otter Tail River as a drinking water protected surface water in the RA-South area. Consideration should be given to project impacts to the Fergus Falls Source Water Assessment Area. The project area is downstream of the city's surface water intake and impacts are unlikely.
Section 5.7.8.1 Water Resources	5-143	3	"Based on the Minnesota Department of Health's (MDH's) County Well Index (CWI) database: <ul style="list-style-type: none"> • 56 wells are located within one mile of RA-North • 42 wells are located within one mile of RA-Hybrid • 73 wells are located within one mile of RA-South" CWI does not include all existing wells in Minnesota. In order to provide a more complete inventory of all wells located within one mile of each proposed pipeline route, and more importantly wells located within the construction workspaces, a field inspection of each route would need to be completed. Document should be updated with whether this step has been taken or should aknowledge that field inspections may discover more wells and what the plans would be for those potentially discovered wells.
Section 5.7.8.1 Water Resources	5-143	4	Text reads "The tables below summarize wells located within the respective construction workspace for each alternative." Well setback distances should be noted as well as noting the proper procedure should any wells require sealing. Minnesota Rules, part 4725.2150 provides minimum required separation distances between a well and a pipe with flammable or volitle gas, a pipeline. The requirements of this part are minimum standards and do not exempt persons from more restrictive requirements of the Occupational Safety and Health Administration. Any well that is identified to be located less than the minimum required distance from the pipeline provided in Minnesota Rules, part 4725.2150, must be sealed by a Minnesota licensed well contractor. The licensed well contractor is required to provide a report of any well sealed to MDH. Any well discovered during excavation and construction work for the pipeline should be reported to MDH, protected from damage, and protected from becoming lost, so an evaluation for sealing by a licensed well contractor can be completed. Any well that is uncovered, where the wellhead had been buried, cannot be reburied unless sealed by a licensed well contractor.
Section 5.7.8 Water Resources	5-143	5	Text acknowledges four wells within the RA-North construction workspace. Text should also acknowledge that this route crosses the city of Breckenridge Drinking Water Supply Management Area.
Section 5.7.8.2 Water Resources	5-144	2	Impacts to surface water during construction activity is addressed. The temporary risk to Moorhead's Spill Management Areas should be added as a potential impact due to the expected land use change and temporary modification to the natural environment which can be expected to increase the rate of contaminant conveyance and reduce the ability for the utility and area emergency response entities to take action within the previously calculated response time period.
Section 5.7.8.2 Water Resources	5-145	4	Dewatering of the trench locations may impact aquifer recharge rates. The impact can't be assumed as temporary and short-term as stated. More detailed discussion/analysis should be added.
Section 5.7.8.2 Water Resources	5-145	5, 6, 7, 8	Text reads "Ground disturbance associated with construction would be primarily limited to the upper 5-6 feet of soil, which above the water table of most regional aquifers" Here and in subsequent paragraphs, recommend placeholders for additional text include potential aquifer impacts due to excavation in areas with land surface or near-land surface artesian conditions in buried aquifers.

Commenting Tribe or Agency: **MN DNR**

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Chapter and Section	Page No.	Paragraph No. (from top of page)	Comment
Example: Section 5.4.3 Environmental Justice	Example: 5-37	Example: 2	Example: Text reads "Using these criteria, census tract 9609 in Otter Tail County was identified as an MPCA EJ area of concern within the ROI because 43 percent of the population has a reported income which is less than 100 percent of the federal poverty level." MPCA areas of concern are based on 200 percent of the federal poverty level. Correction: The sentence should read, "Using these criteria, census tract 9609 in Otter Tail County was identified as an MPCA EJ area of concern within the ROI because 43 percent of the population has a reported income which is less than 200 percent of the federal poverty level."
5.7.5.2	5-115	RA South	Starting here and in following sections there appears to be some inaccuracies/inconsistencies in names of state and federal wildlife lands along the routes. WPAs are Waterfowl Production Areas managed by the US Fish & Wildlife Service. WMAs are Wildlife Management Areas administered by the MN DNR. Also note the Walk-in-Area public hunting area (Otter Tail #921 https://www.dnr.state.mn.us/walkin/index.html , private land open to public hunting) south of Hw 210 along RA S & Hybrid most applicable to 5.4.10 Recreation and 5.7.4 Public and Designated Lands.
5.7.5.4	5-119		RA North - Recommended mitigation at Foxhome Prairie High Biodiversity MBS site is to align pipe on the south side of the road in this area and not cross the MBS site.
5.7.5	5-113		Please review August 23, 2023 Natural Heritage Review letter (MCE 2023-00306) for further rare natural feature information from MN DNR for the applicants preferred route (RA South). Recommend the RA-North and Hybrid routes be reviewed by MN DNR by submitting review request through Minnesota Conservation Explorer https://mce.dnr.state.mn.us/natural-heritage-review [attach file]
5.7.5.3	5-118		" <i>There would be no removal of western prairie fringed orchid...</i> " How do we know this? Have all RAs been surveyed over several years to confirm no western prairie fringed orchid occurrence? Recommend plant surveys on all RAs. Plant surveys have been conducted on RA South and found Small White Lady's Slipper in the Orwell 9 MBS site and potential habitat for western prairie fringed orchid.
5.7.5.4	5-123		" <i>Direct impacts to state-listed nesting birds would be minimized by conducting nesting surveys...</i> " Surveys alone would not mitigate for impacts to listed-birds (or any other migratory birds), only document what is there, without an avoidance plan. One additional mitigation for nesting birds in areas of grass/shrub vegetation to be cleared for construction would be to mow/cut these areas during non-nesting season prior to actual construction so suitable nesting habitat is not present prior to final clearing and construction.
5.7.6.2	5-126		" <i>Soil temperature may vary from heat convection and conduction of the operating pipeline. As described in Section 2.6.1, the CO2 would enter the pipeline at a temperature between 90 °F and 115 °F and would then cool down to the ambient ground temperature.</i> " EIS should consider effects of the elevated pipe temperature on surrounding soils, wetlands, and waterbodies. The high temperature of the pipeline may alter decomposition rate in soils/wetlands, change soil frost formation, alter shallow groundwater flow, and have other effects.
5.7.5.4	5-122		In addition to HDD inadvertent release evaluations, robust plans for inadvertent release response should be developed (probably in the ECP).
5.7.7.3	5-133		" <i>prepare a VMP VMPWG.</i> " should probably be reworded to: prepare a VMP <i>in consultation with the</i> VMPWG.

5.7.8.2	5-145		Groundwater. This section should be expanded. Initial groundwater investigations by the applicant did find artesian groundwater conditions are present along proposed route RA-South in the beach ridge system. The other RAs have not had groundwater investigations conducted. The section of overlap between RA-North and Hybrid is the area of greatest groundwater concern for those routes. The applicant is conducting groundwater investigations on route RA-South in the beach ridge area on the eastern side of the project in consultation with MN DNR. Applicant should continue to consult with MN DNR on groundwater investigations for the potential routes and on construction methods in relation to groundwater. Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer. Shallow geology and groundwater can be highly variable and complex in the beach ridge areas.
5.7.8.2	5-145		The potential maximum depth of project disturbance should be considered in relation to groundwater resources. For example if sheetpile is used to stabilize the trench, the depth of the sheetpile will extend beyond the trench excavation depth. Breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.
5.7.10.1	5-156		Some wildlife species in the project area are listed, but no specific fish species are given, EIS could include at least representative fish found in the major rivers in the project area - Pelican and Otter Tail rivers.
5.7.10.3	5-160		"(Category 3N or 4N natural fibers)" MN DOT 2020 Standard Specifications for Construction for rolled erosion control materials now only use only natural fibers with no plastic mesh and these specifications could be used for this project.

October 25, 2023
Shakopee Mdewakanton Sioux Community
Deferral Email

From: Steve Albrecht (TO) <Steve.Albrecht@shakopeedakota.org>
Sent: Wednesday, October 25, 2023 8:34 AM
To: Levi, Andrew (COMM) <andrew.levi@state.mn.us>; Sara Dobesh (TO) <sara.dobesh@shakopeedakota.org>; Scott Walz (TO) <scott.walz@shakopeedakota.org>; Leonard Wabasha (TO) <leonard.wabasha@shakopeedakota.org>; Stacy Boone (TO) <Stacy.Boone@shakopeedakota.org>; Ferin Davis Anderson (TO) <FerinDavis.Anderson@shakopeedakota.org>
Cc: Bruce, Charley (PUC) <charley.bruce@state.mn.us>
Subject: RE: State of MN - Otter Tail to Wilkin EIS

You don't often get email from steve.albrecht@shakopeedakota.org. [Learn why this is important](#)

Andrew-

I confirmed yesterday with our Business Council that we will not be participating in the EIS and will defer to the White Earth Nation on this.

Thanks,

Steve



STEVE ALBRECHT

Operations Administrator • Land
Shakopee Mdewakanton Sioux Community
d: 952.233.4236 | c: 612.590.5277
SMSCLand.Org
Steve.Albrecht@shakopeedakota.org

The Shakopee Mdewakanton Sioux Community is a federally recognized, sovereign Indian tribe located southwest of Minneapolis/St. Paul. With a focus on being a good neighbor, good steward of the earth, and good employer, the SMSC is committed to charitable donations, community partnerships, a healthy environment, and a strong economy.

From: Levi, Andrew (COMM) <andrew.levi@state.mn.us>
Sent: Tuesday, October 24, 2023 7:19 AM
To: Steve Albrecht (TO) <Steve.Albrecht@shakopeedakota.org>; Sara Dobesh (TO) <sara.dobesh@shakopeedakota.org>; Scott Walz (TO) <scott.walz@shakopeedakota.org>; Leonard Wabasha (TO) <leonard.wabasha@shakopeedakota.org>; Stacy Boone (TO) <Stacy.Boone@shakopeedakota.org>; Ferin Davis Anderson (TO) <FerinDavis.Anderson@shakopeedakota.org>
Cc: Bruce, Charley (PUC) <charley.bruce@state.mn.us>
Subject: RE: State of MN - Otter Tail to Wilkin EIS

You don't often get email from andrew.levi@state.mn.us. [Learn why this is important](#)

This message came from **outside the organization**. Do Not click on links, open attachments or respond unless you know the content is safe.

Good morning,

Thank you for your reply. If you do choose to decline, please let me know. If I have a record of that I won't need to continue to fill up your inboxes.

Have a good week!

Thank you.

—Andrew

From: Steve Albrecht (TO) <Steve.Albrecht@shakopeedakota.org>

Sent: Friday, October 20, 2023 9:35 AM

To: Levi, Andrew (COMM) <andrew.levi@state.mn.us>; Sara Dobesh (TO) <sara.dobesh@shakopeedakota.org>; Scott Walz (TO) <scott.walz@shakopeedakota.org>; Leonard Wabasha (TO) <leonard.wabasha@shakopeedakota.org>; Stacy Boone (TO) <Stacy.Boone@shakopeedakota.org>; Ferin Davis Anderson (TO) <FerinDavis.Anderson@shakopeedakota.org>

Cc: Bruce, Charley (PUC) <charley.bruce@state.mn.us>

Subject: RE: State of MN - Otter Tail to Wilkin EIS

You don't often get email from steve.albrecht@shakopeedakota.org. [Learn why this is important](#)

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Levi-

Thanks for the email and letter. I will discuss with our BC next week, but in this instance, we will most likely decline and defer to White Earth based on the location.

Thanks,

Steve



STEVE ALBRECHT

Operations Administrator • Land
Shakopee Mdewakanton Sioux Community
d: 952.233.4236 | c: 612.590.5277
SMSCLand.Org
Steve.Albrecht@shakopeedakota.org

The Shakopee Mdewakanton Sioux Community is a federally recognized, sovereign Indian tribe located southwest of Minneapolis/St. Paul. With a focus on being a good neighbor, good steward of the earth, and good employer, the SMSC is committed to charitable donations, community partnerships, a healthy environment, and a strong economy.

From: Levi, Andrew (COMM) <andrew.levi@state.mn.us>

Sent: Friday, October 20, 2023 8:37 AM

To: Sara Dobesh (TO) <sara.dobesh@shakopeedakota.org>; Scott Walz (TO) <scott.walz@shakopeedakota.org>; Leonard Wabasha (TO) <leonard.wabasha@shakopeedakota.org>; Stacy Boone (TO) <Stacy.Boone@shakopeedakota.org>; Steve Albrecht (TO) <Steve.Albrecht@shakopeedakota.org>; Ferin Davis Anderson (TO) <FerinDavis.Anderson@shakopeedakota.org>

Cc: Bruce, Charley (PUC) <charley.bruce@state.mn.us>

Subject: State of MN - Otter Tail to Wilkin EIS

This message came from **outside the organization**. Do Not click on links, open attachments or respond unless you know the content is safe.

Greetings:

Attached is a letter from the Department of Commerce inviting you to help prepare the draft environmental impact statement for the Otter Tail to Wilkin Carbon Dioxide Pipeline Project.

Please don't hesitate to contact me with any questions.

Thank you.

—Andrew

Andrew Levi

Environmental Review Manager

Energy Environmental Review and Analysis

Department of Commerce

85 Seventh Place East, Suite 280 | Saint Paul, MN 55101

P: (651) 539-1840 | F: (651) 539-0109

Schedule: Tuesday – Friday



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Appendix K

Environmental Justice Screen Report

Appendix K EJScreen REPORT

The following excerpt is from *How to Interpret a Standard Report in EJSCREEN* prepared by the U.S. Environmental Protection Agency and retrieved from <https://www.epa.gov/ejscreen/how-interpretstandard-report-ejscreen>.

Percentiles are a way to see how local residents compare to everyone else in the United States. Instead of just showing numbers out of context, EJSCREEN lets you compare a community to the rest of the state, EPA region and nation, by using percentiles. The national percentile tells you what percent of the US population has an equal or lower value, meaning less potential for exposure/risk/proximity to certain facilities, or a lower percent minority.

The U.S. percentile uses the U.S. population as the basis of comparison. The state percentile is calculated based on the population in a given state (or District of Columbia or Puerto Rico).

The state and U.S. percentiles will be similar if the state and U.S. average indicator values are similar. However, if the state average is lower than the U.S. average, the state percentile shown will be higher than U.S. percentile shown. Alternatively, if the state average is higher than the U.S. average, the state percentile shown will be lower than U.S. percentile shown. The state percentile being lower than the U.S. percentile does not mean the indicator value is lower in the given place, it just means the state average is higher than the U.S. average.

Percentages or Percentiles?

A percentage is an absolute term. If you received 80% on a test of one hundred questions you had 80 correct answers.

A percentile is a relative term, and tells you how you have done on the test in comparison to the others who took the test. A percentile of 80 means that you scored equal to or better than 80% of people who took the test.

In EJSCREEN, if your results indicate that an area is 48% minority and is at the 69th national percentile, this means that 48% of the area's population is minority, and that is an equal or higher % minority than where 69% of the US population lives.



EJScreen Community Report

This report provides environmental and socioeconomic information for user-defined areas, and combines that data into environmental justice and supplemental indexes.

Otter Tail County, MN

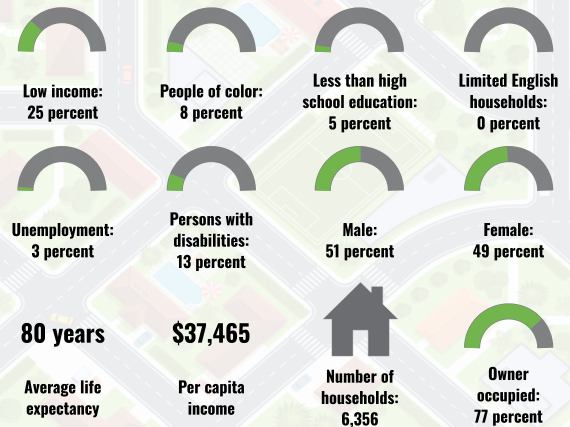
Tract: 27111960800,27111961700,27167950100,27111960900
Population: 15,193
Area in square miles: 1184.71

Dynamic map initially showing the user-selected area

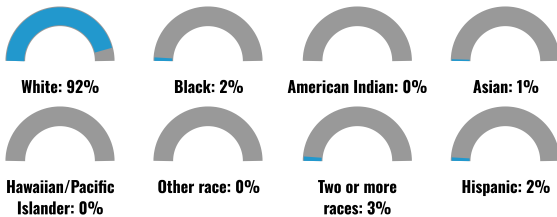
COMMUNITY INFORMATION

LANGUAGES SPOKEN AT HOME

LANGUAGE	PERCENT
English	97%
Spanish	1%
Other and Unspecified	1%
Total Non-English	3%



BREAKDOWN BY RACE



BREAKDOWN BY AGE



LIMITED ENGLISH SPEAKING BREAKDOWN



Notes: Numbers may not sum to totals due to rounding. Hispanic population can be of any race. Source: U.S. Census Bureau, American Community Survey (ACS) 2017-2021. Life expectancy data comes from the Centers for Disease Control.

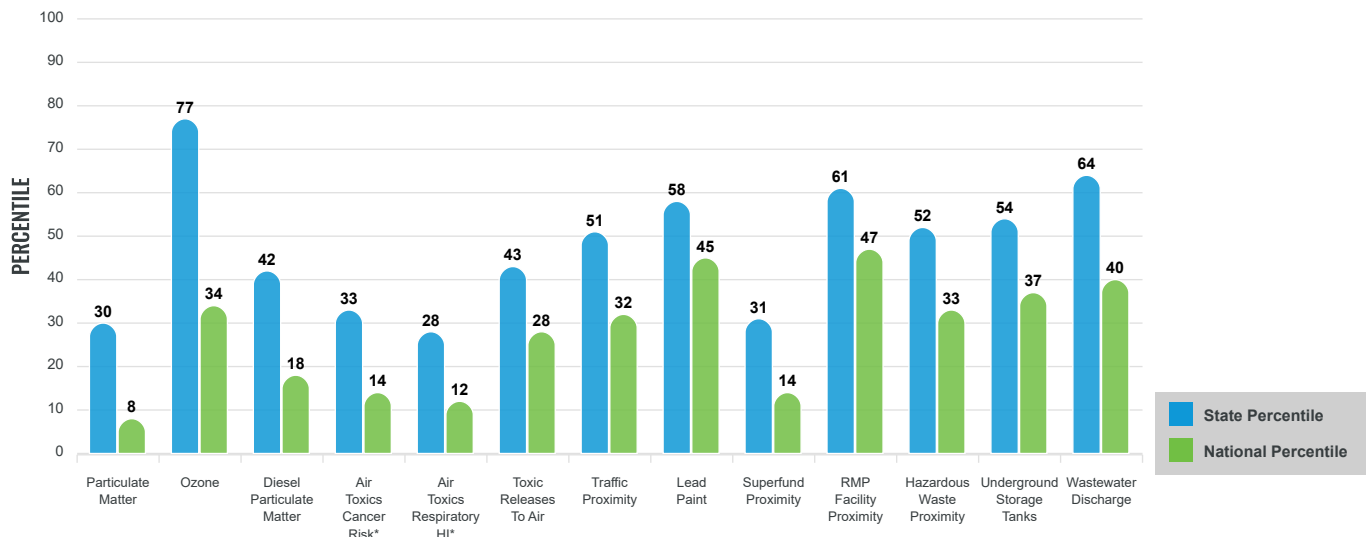
Environmental Justice & Supplemental Indexes

The environmental justice and supplemental indexes are a combination of environmental and socioeconomic information. There are thirteen EJ indexes and supplemental indexes in EJScreen reflecting the 13 environmental indicators. The indexes for a selected area are compared to those for all other locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the [EJScreen website](#).

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

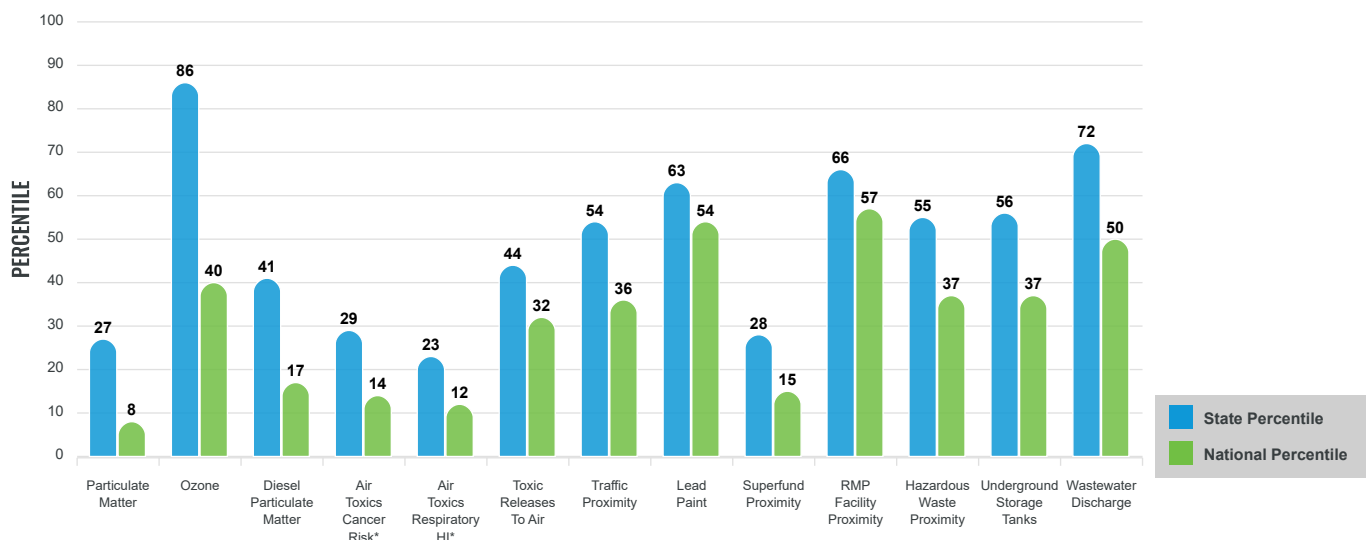
EJ INDEXES FOR THE SELECTED LOCATION



SUPPLEMENTAL INDEXES

The supplemental indexes offer a different perspective on community-level vulnerability. They combine data on percent low-income, percent linguistically isolated, percent less than high school education, percent unemployed, and low life expectancy with a single environmental indicator.

SUPPLEMENTAL INDEXES FOR THE SELECTED LOCATION



These percentiles provide perspective on how the selected block group or buffer area compares to the entire state or nation.

Report for Tract: 27111960800,27111961700,27167950100,27111960900

EJScreen Environmental and Socioeconomic Indicators Data

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
POLLUTION AND SOURCES					
Particulate Matter ($\mu\text{g}/\text{m}^3$)	5.79	6.78	20	8.08	7
Ozone (ppb)	60.1	58.2	95	61.6	41
Diesel Particulate Matter ($\mu\text{g}/\text{m}^3$)	0.0987	0.21	27	0.261	16
Air Toxics Cancer Risk* (lifetime risk per million)	16	22	0	25	1
Air Toxics Respiratory HI*	0.18	0.26	0	0.31	1
Toxic Releases to Air	220	1,500	30	4,600	33
Traffic Proximity (daily traffic count/distance to road)	52	140	50	210	41
Lead Paint (% Pre-1960 Housing)	0.36	0.33	60	0.3	63
Superfund Proximity (site count/km distance)	0.02	0.19	22	0.13	17
RMP Facility Proximity (facility count/km distance)	0.48	0.48	67	0.43	76
Hazardous Waste Proximity (facility count/km distance)	0.32	1.3	48	1.9	43
Underground Storage Tanks (count/km ²)	0.79	1.8	54	3.9	44
Wastewater Discharge (toxicity-weighted concentration/m distance)	1.3	0.19	98	22	92
SOCIOECONOMIC INDICATORS					
Demographic Index	16%	22%	48	35%	24
Supplemental Demographic Index	10%	11%	57	14%	36
People of Color	8%	20%	34	39%	18
Low Income	25%	23%	62	31%	46
Unemployment Rate	3%	4%	57	6%	46
Limited English Speaking Households	0%	2%	0	5%	0
Less Than High School Education	5%	7%	52	12%	35
Under Age 5	6%	6%	60	6%	62
Over Age 64	21%	17%	72	17%	71
Low Life Expectancy	18%	17%	54	20%	34

*Diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: <https://www.epa.gov/haps/air-toxics-data-update>.

Sites reporting to EPA within defined area:

Superfund	0
Hazardous Waste, Treatment, Storage, and Disposal Facilities	1
Water Dischargers	13
Air Pollution	20
Brownfields	1
Toxic Release Inventory	4

Other community features within defined area:

Schools	7
Hospitals	5
Places of Worship	44

Other environmental data:

Air Non-attainment	No
Impaired Waters	Yes

Selected location contains American Indian Reservation Lands*	No
Selected location contains a "Justice40 (CEJST)" disadvantaged community	Yes
Selected location contains an EPA IRA disadvantaged community	Yes

Report for Tract: 27111960800,27111961700,27167950100,27111960900

EJScreen Environmental and Socioeconomic Indicators Data

HEALTH INDICATORS					
INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Low Life Expectancy	18%	17%	54	20%	34
Heart Disease	6.8	5.6	76	6.1	65
Asthma	8.7	9	34	10	17
Cancer	7.7	6.4	77	6.1	82
Persons with Disabilities	12.7%	11.4%	65	13.4%	51

CLIMATE INDICATORS					
INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Flood Risk	11%	8%	73	12%	69
Wildfire Risk	1%	4%	88	14%	79

CRITICAL SERVICE GAPS					
INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Broadband Internet	20%	11%	83	14%	74
Lack of Health Insurance	4%	5%	47	9%	27
Housing Burden	No	N/A	N/A	N/A	N/A
Transportation Access	Yes	N/A	N/A	N/A	N/A
Food Desert	Yes	N/A	N/A	N/A	N/A

Footnotes

Report for Tract: 27111960800,27111961700,27167950100,27111960900

Appendix L

Minnesota Unanticipated Discoveries Plan

Appendix 11 – Unanticipated Discoveries Plan (DRAFT)

Unanticipated Discoveries Plan – Cultural Resources and Human Remains – Minnesota

Project Name:

Summit Carbon Solutions

Document Number:

SCS-0700-ENV-01-PLN-013

MPUC Docket Number:

IP7093/PPL-22-422

Date:

September 12, 2022

Revision History

DATE	REVISION	REVISION DESCRIPTION	PREPARED BY:	REVIEWED BY:	APPROVED BY:
2022-09-12	A	Draft	MM	ES	JS

DRAFT

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3	PROCEDURES FOR THE DISCOVERY OF HUMAN REMAINS	3
4	PROJECT CONTACTS	4

DRAFT

1 Introduction

Summit Carbon Solutions (SCS) intends to execute a project to capture and transport carbon dioxide (CO₂) in Minnesota (the Project), including six capture facilities, one pump station, and approximately 200 miles of CO₂ pipeline laterals that will cross portions of Chippewa, Cottonwood, Jackson, Kandiyohi, Martin, Otter Tail, Redwood, Renville, Wilkin, and Yellow Medicine Counties. The Project is part of a larger system identified as the Midwest Carbon Express (MCE) also located in North Dakota, South Dakota, Nebraska, and Iowa. MCE scope includes construction of capture facilities, approximately 2,000 miles of new CO₂ pipeline, pipeline facilities (pump stations, metering stations, etc.), and permanently storage in Class VI sequestration injection facilities.

SCS has committed to conducting historic and cultural surveys on 100% of disturbed areas across MCE, including the Project. If previously unidentified historic properties are discovered by monitors, construction personnel, or unanticipated adverse effects on previously identified historic properties occur as Project construction activities are carried out, the construction contractor will immediately halt all construction activity in the vicinity and implement measures to protect the discovery from further impacts, looting, or vandalism.

This document describes the procedures for dealing with unanticipated discoveries during the course of Project construction in the State of Minnesota. The plan will be implemented across all lands regardless of ownership. It is intended to:

- Maintain compliance with applicable Federal and State laws and regulations during construction of the Project.
- Describe the procedure the Project or its representative will follow to prepare for and deal with unanticipated discoveries.
- Provide directions and guidance to Project personnel as to the proper procedure to be followed should an unanticipated discovery occur.

Ahead of Project construction, Environmental Inspection (EI) staff and construction personnel across the Project will complete a comprehensive training program, including how to identify and protect possible cultural resources or human remains. EIs and construction personnel will have a responsibility to communicate possible discoveries to qualified staff retained by SCS, such as a professional archaeologist or physical anthropologist. A qualified archaeologist is an archaeologist who meets the Secretary of the Interior's Qualifications and Standards, as outlined in Title 36 of the Code of Federal Regulations (CFR) Part 61 and can be permitted by the Minnesota Office of the State Archaeologist (Minnesota Office of the State Archaeologist [MN OSA]).

2 Protection and Discovery of Cultural Resources

The EI staff will be responsible for erecting exclusionary fencing prior to construction in select locations where significant cultural resource sites are mapped directly adjacent to the Project workspace area. The EI staff may also install exclusionary signage that indicates a sensitive resource is present, and no trespassing may occur beyond the boundary fencing. EI staff will also be responsible for monitoring and spot-checking exclusion zones throughout all stages of construction to ensure the sites are entirely avoided by construction staff, equipment, or activity. If an exclusion zone is breached, or a cultural resources discovery is encountered outside of an exclusion zone, the procedures outlined below will be implemented. Cultural resources may include:

- Accumulation of shells, burned rocks, or other subsistence related materials;
- Area of charcoal or very dark soil with artifacts;
- Stone tools, projectile points, or dense concentrations of stone artifacts;
- Cluster of bones in association with shell, charcoal, burned rocks, or stone artifacts; and
- Historic structure or assemblage of historic materials older than 50 years.

2.1 Discovery Procedures

- 1) When a finding is made, the EI staff or construction personnel that identified the finding will notify their supervisor, the EI, and other personnel in the vicinity, and all ground disturbing work within a 100-foot radius will cease.
- 2) The EI will:
 - Immediately notify SCS or its representative;
 - Flag a 100-foot buffer zone around the find spot;
 - Ensure adequate security is in place to keep workers, press, and curiosity seekers away from the find spot;
 - Cover the find spot with a tarp; and
 - Have an individual stay at the location to prevent further disturbance until the qualified archaeologist has reviewed the find spot. The qualified archaeologist's review can be accomplished in-person or remotely with information provided by individuals at the find spot. This information would include photographs of suspected artifacts and/or cultural features as well as the setting of the find spot.
- 3) The EI will investigate the find spot in consultation with a qualified archaeologist. If it is determined that the find spot is not a cultural resource discovery, the EI will remove construction restrictions at the location. If the archaeologist evaluates the find spot as a cultural resources discovery, the EI will continue to protect the discovery location as noted above. The EI will include the event (regardless of how it is evaluated) in the applicable Project documentation.
- 4) If, upon field review by a qualified archaeologist, the finding is determined to be a cultural resources discovery, the qualified archaeologist will evaluate the resource in accordance with applicable regulations. The qualified archaeologist will make an initial recommendation of eligibility for inclusion on the National Register of Historic Places (NRHP). If the site is not likely to be NRHP-eligible, the qualified archaeologist will conclude the evaluation by preparing a site form that essentially exhausts the research potential of the site and, subsequently, the EI will remove construction restrictions at the location. If the discovery is determined to have the potential to be NRHP-eligible, the archaeologist and SCS or its representative will also consult with the Minnesota State Historic Preservation Office (SHPO) and/or MN OSA on how best to avoid, minimize, or otherwise mitigate further impacts.
- 5) If the discovery is within an area of federal or state jurisdiction, the appropriate federal/state agency will be immediately notified and consulted accordingly. Treatment measures may include mapping, photography, sample collection, or excavation. Note that SCS or its representative may choose to notify and coordinate with Native American Tribes or a Tribal organization such as the Minnesota Indian Affairs Council (MIAC). Notified federal or state agencies may also consult with these entities for compliance with applicable statutes or guidelines.

- 6) The archaeologist will implement the appropriate treatment measure(s) and provide a report on its methods and results as required. The investigation and technical report will be performed in compliance with the Secretary of Interior's Standards and Guidelines for Archaeological Documentation (48 CFR 44734—44737f); the Advisory County on Historic Preservation (ACHP) publication "Treatment of Archaeological Properties" (ACHP 1980); and follow the guidelines set forth by the SHPO and/or MN OSA. SCS or its representative will also consult with the applicable federal, tribal, and state entities on how best to avoid, minimize, or otherwise mitigate further impacts.

3 Procedures for the Discovery of Human Remains

In the event suspected human remains or funerary objects are discovered during construction activities, the following steps will be taken pursuant to Minnesota's Private Cemetery Act (Minn. Stat. §307.08):

- 1) All ground disturbing work within a 100-foot radius will cease. An EI will be notified, assuming one is not already on-site.
- 2) The EI will investigate the finding in consultation with a qualified archaeologist (virtually or in-person). If it is determined that the finding is not human remains, funerary objects, or archaeological, the EI will remove construction restrictions at the location. If it is determined that the finding may include human remains or funerary objects, the finding will be considered a discovery and the EI will take appropriate steps to protect the discovery location, including the following:
 - Immediately notify SCS or its representative;
 - Flag a buffer zone around the find spot;
 - Ensure adequate security is in place to keep workers, press, and curiosity seekers away from the find spot;
 - Cover the find spot with a tarp; and
 - Have an individual stay at the location to prevent further disturbance until law enforcement arrives.
- 3) If the discovery occurs on federal lands, SCS or its representative shall notify the federal law enforcement to initiate that agency's specific protocols.
- 4) If the discovery occurs on non-federal lands (both non-federal public and private), SCS or its representative shall notify the county sheriff. As required by Minn. Stat. §307.08, SCS will also notify the MN OSA of the discovery if it occurs on non-federal lands.
- 5) Should the human remains be determined not to be associated with a crime scene, federal law enforcement or the MN OSA (depending on jurisdiction) will determine if the discovery is Native American. If the discovery is determined to be Native American, federal law enforcement (on federal lands) will engage Native American Tribes to resolve next steps for handling the discovery under the Native American Graves Protection and Repatriation Act. If the MN OSA has jurisdiction (on non-federal public and private lands) the MN OSA will coordinate with the MIAC to resolve next steps for handling the discovery under the Private Cemeteries Act (Minn. Stat. Ch. 307).
- 6) After permission to resume construction has been issued by federal law enforcement, county sheriff, or State Archaeologist, SCS or its representative shall notify the on-site construction manager to restart ground-disturbing activities.

4 Project Contacts

SCS Project Representative, EXP Energy Services, Inc

Contact: Erin Salisbury, MA, RPA
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SCS Retained Archeologist, Merjent, Inc.

Contact: Michael J. Madson, MS, RPA
Telephone: 612.834.3074
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Minnesota State Historical Preservation Office

Contact: Sarah Beimers, Environmental Review Program Manager
Telephone: 651.201.3287
E-mail: sarah.beimers@state.mn.us
Address: Minnesota State Historical Preservation Office
50 Sherburne Avenue,
Administration Building 203
Saint Paul, MN 55155

Minnesota Office of the State Archaeologist

Contact: Amanda Gronhovd, MS, Minnesota State Archaeologist
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E-mail: Amanda.Gronhovd@state.mn.us
Address: Minnesota Office of the State Archaeologist
328 Kellogg Boulevard
St. Paul, MN 55102

Appendix M

Alternative Technologies Supplemental Information

**Agricultural Practices
Supplemental Information:
COMET Farm Testing Matrix**

COMET-Farm - Testing Matrix

Test #	Project ID	Description	Acres	Acres	Historical	Baseline	Future
			Con	Alt/regen			
1	AlternativeAg_Scenario1	Business As Usual - conventional	1000	0	conventional	conventional	conventional
2	AlternativeAg_Scenario2	25% acreage of alt practices	750	250	conventional	conventional	No till, Cover Crop, 50% reduced fertilizer
3	AlternativeAg_Scenario3	50% acreage of alt practices	500	500	conventional	conventional	No till, cover crop, 50% reduced fertilizer
4	AlternativeAg_Scenario4	75% acreage of alt practices	250	750	conventional	conventional	No till, cover crop, 50% reduced fertilizer

**Agricultural Practices
Supplemental Information:
Estimated Acres for Corn
Production**

Estimated acres required for maximum ethanol production

Green Plains Ethanol Plant Results

	<u>Value</u>	<u>Units</u>	<u>ref</u>
Air permit max production of EtOH	65,000,000	gals/yr	
EtOH produced per bushel		2.9 gals/bu	
			https://downloads.usda.library.cornell.edu/usda-esmis/files/tm70mv177/5x21w011c/9306vh649/crop1123.pdf
MN corn yield 2023		180 bu/acre	
acreage needed	124521.0728	acres	

$$\frac{65MgalsEtOH}{1year} \times \frac{1bu}{2.9galsEtOH} \times \frac{1acre}{180bu} = 124,521 acresannually$$

2017 USDA Census estimation results

	<u>Value</u>	<u>Units</u>	<u>ref</u>
Air permit max production of EtOH	65,000,000	gals/yr	
EtOH produced per bushel		2.9 gals/bu	
			2017 USDA Census averages for Otter Tail & Wilkin County - see Baseline Corn Yield tab
MN corn yield 2023		150 bu/acre	
acreage needed	149425.2874	acres	

**Agricultural Practices
Supplemental Information:
Estimated Farming Practices**

Farming Practice Estimations

Data sourced from 2017 USDA Census Minnesota: Chapter 2 table 41

Source Data: https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/Minnesota/st27_2_0041_0041.pdf

Appendix B - General Explanation and Census of Agriculture Report Form:

https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/usappxb.pdf

Otter Tail County

state	county	data item	value
MINNESOTA	OTTER TAIL	PRACTICES, LAND USE, CROPLAND, CONSERVATION TILLAGE, NO-TILL - ACRES	33,515
MINNESOTA	OTTER TAIL	PRACTICES, LAND USE, CROPLAND, CONSERVATION TILLAGE, NO-TILL - AREA, MEASURED IN ACRES / OPERATION	193
MINNESOTA	OTTER TAIL	PRACTICES, LAND USE, CROPLAND, CONSERVATION TILLAGE, (EXCL NO-TILL) - NUMBER OF OPERATIONS	502
MINNESOTA	OTTER TAIL	PRACTICES, LAND USE, CROPLAND, CONSERVATION TILLAGE, (EXCL NO-TILL) - ACRES	204,850
MINNESOTA	OTTER TAIL	PRACTICES, LAND USE, CROPLAND, CONSERVATION TILLAGE, (EXCL NO-TILL) - AREA, MEASURED IN ACRES / OPERATION	408
MINNESOTA	OTTER TAIL	PRACTICES, LAND USE, CROPLAND, CONVENTIONAL TILLAGE - NUMBER OF OPERATIONS	784
MINNESOTA	OTTER TAIL	PRACTICES, LAND USE, CROPLAND, CONVENTIONAL TILLAGE - ACRES	194,118
MINNESOTA	OTTER TAIL	PRACTICES, LAND USE, CROPLAND, CONVENTIONAL TILLAGE - AREA, MEASURED IN ACRES / OPERATION	248
MINNESOTA	OTTER TAIL	PRACTICES, LAND USE, CROPLAND, COVER CROP PLANTED, (EXCL CRP) - NUMBER OF OPERATIONS	186
MINNESOTA	OTTER TAIL	PRACTICES, LAND USE, CROPLAND, COVER CROP PLANTED, (EXCL CRP) - ACRES	19,501
MINNESOTA	OTTER TAIL	PRACTICES, LAND USE, CROPLAND, COVER CROP PLANTED, (EXCL CRP) - AREA, MEASURED IN ACRES / OPERATION	105
MINNESOTA	OTTER TAIL	FARM OPERATIONS - ACRES OPERATED	794,496
MINNESOTA	OTTER TAIL	LAND AREA, INCL NON-AG - ACRES	1,262,075
MINNESOTA	OTTER TAIL	AG LAND, CROPLAND - ACRES	576,163
MINNESOTA	OTTER TAIL	AG LAND, CROPLAND, HARVESTED - ACRES	502,572

MINNESOTA	OTTER TAIL	CORN, GRAIN - OPERATIONS WITH AREA HARVESTED	781
MINNESOTA	OTTER TAIL	CORN, GRAIN - ACRES HARVESTED	168,402
MINNESOTA	OTTER TAIL	CORN, GRAIN - PRODUCTION, MEASURED IN BU	28,739,618
MINNESOTA	OTTER TAIL	CORN, GRAIN, IRRIGATED - OPERATIONS WITH AREA HARVESTED	143
MINNESOTA	OTTER TAIL	CORN, GRAIN, IRRIGATED - ACRES HARVESTED	31,347
% Total Cropland Acreage that harvested corn	29.23		
% Total Corn Grain harvested was irrigated	18.61		
% Total Cropland Acreage using Conventional Tillage	33.69		
% Total Cropland Acreage using Reduced Tillage	35.55		
% Total Cropland Acreage using No Till	5.82		
% of Total Farm Acreage Cover Crop Planted	3.38		

Wilkin County

state	county	data item	value
MINNESOTA	WILKIN	PRACTICES, LAND USE, CROPLAND, CONSERVATION TILLAGE, NO-TILL - ACRES	10,772
MINNESOTA	WILKIN	PRACTICES, LAND USE, CROPLAND, CONSERVATION TILLAGE, NO-TILL - AREA, MEASURED IN ACRES / OPERATION	634

MINNESOTA	WILKIN	PRACTICES, LAND USE, CROPLAND, CONSERVATION TILLAGE, (EXCL NO-TILL) - NUMBER OF OPERATIONS	104
MINNESOTA	WILKIN	PRACTICES, LAND USE, CROPLAND, CONSERVATION TILLAGE, (EXCL NO-TILL) - ACRES	129,298
MINNESOTA	WILKIN	PRACTICES, LAND USE, CROPLAND, CONSERVATION TILLAGE, (EXCL NO-TILL) - AREA, MEASURED IN ACRES / OPERATION	1,243
MINNESOTA	WILKIN	PRACTICES, LAND USE, CROPLAND, CONVENTIONAL TILLAGE - NUMBER OF OPERATIONS	199
MINNESOTA	WILKIN	PRACTICES, LAND USE, CROPLAND, CONVENTIONAL TILLAGE - ACRES	250,641
MINNESOTA	WILKIN	PRACTICES, LAND USE, CROPLAND, CONVENTIONAL TILLAGE - AREA, MEASURED IN ACRES / OPERATION	1,260
MINNESOTA	WILKIN	PRACTICES, LAND USE, CROPLAND, COVER CROP PLANTED, (EXCL CRP) - NUMBER OF OPERATIONS	44
MINNESOTA	WILKIN	PRACTICES, LAND USE, CROPLAND, COVER CROP PLANTED, (EXCL CRP) - ACRES	16,957
MINNESOTA	WILKIN	PRACTICES, LAND USE, CROPLAND, COVER CROP PLANTED, (EXCL CRP) - AREA, MEASURED IN ACRES / OPERATION	385
MINNESOTA	WILKIN	LAND AREA, INCL NON-AG - ACRES	480,640
MINNESOTA	WILKIN	AG LAND, CROPLAND - NUMBER OF OPERATIONS	381
MINNESOTA	WILKIN	AG LAND, CROPLAND - ACRES	414,596
MINNESOTA	WILKIN	AG LAND, CROPLAND, HARVESTED - NUMBER OF OPERATIONS	298
MINNESOTA	WILKIN	AG LAND, CROPLAND, HARVESTED - ACRES	394,883
MINNESOTA	WILKIN	CORN, GRAIN - OPERATIONS WITH AREA HARVESTED	204
MINNESOTA	WILKIN	CORN, GRAIN - ACRES HARVESTED	115,407
MINNESOTA	WILKIN	CORN, GRAIN - PRODUCTION, MEASURED IN BU	21,100,394
MINNESOTA	WILKIN	CORN, GRAIN, IRRIGATED - OPERATIONS WITH AREA HARVESTED	5
MINNESOTA	WILKIN	CORN, GRAIN, IRRIGATED - ACRES HARVESTED	718
% Total Cropland Acreage that harvested corn		27.84	
% Total Corn Grain harvested was irrigated		0.62	

% Total Cropland Acreage using Conventional Tillage	60.45
% Total Cropland Acreage using Reduced Tillage	31.19
% Total Cropland Acreage using No Till	2.60
% of Total Farm Acreage Cover Crop Planted	4.09

AVG for Otter Tail and Wilkin County

% Total Cropland Acreage that harvested corn	28.53
% Total Corn Grain harvested was irrigated	9.62
% Total Cropland Acreage using Conventional Tillage	47.07
% Total Cropland Acreage using Reduced Tillage	33.37
% Total Cropland Acreage using No Till	4.21

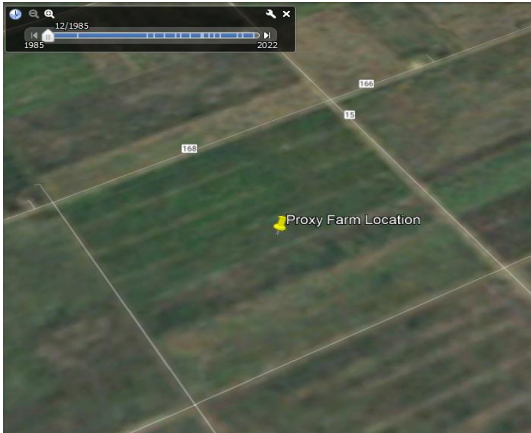
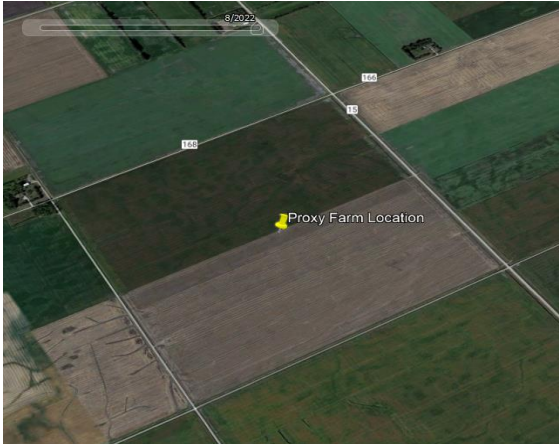
% of Total Farm
Acreage Cover
Crop Planted

3.74

**Agricultural Practices
Supplemental Information:
COMET Farm Model Assumptionss**

COMET-Farm Model Assumptions

Proxy Farm Parcel Locations

Farming Practice Type	Location	parcel size (acres)	Content/Notes	Reference(s)
Conventional Plot	Otter Tail County	0	45.7% of county covered by cropland - 168,402 acres of corn	https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Minnesota/cp27111.pdf
	Wilkin County	1000, 850,500,250	86.3% of county covered by cropland - 115,407 acres of corn	https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Minnesota/cp27167.pdf
	Location	parcel size (acres)	Content/Notes	Reference(s)
Alternative Plot	Otter Tail County	0	45.7% of county covered by cropland - 168,402 acres of corn	https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Minnesota/cp27111.pdf
	Wilkin County	0,250,500,750	86.3% of county covered by cropland - 115,407 acres of corn	https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Minnesota/cp27167.pdf
<div> <div> Point location chosen: 46.304064° N, 96.394091° W Municipality: Andrea Township, Wilkin County Evidence of land use change in past 10+ years: no LUC </div> <div>  Dec-85 </div> <div>  Aug-22 </div> </div>				

Conventional Plot

Model Input Field	Assumption	Content/Notes	Reference(s)
Historic Management (Pre-2000)			
Type (Upland or lowland):	upland	Upland is considered >660 ft above sea level. Wilkin County avg elevation above sea level is 1,050 ft Otter Tail County avg elevation above sea level is 1,355 ft	https://en.wikipedia.org/wiki/Upland_and_lowland Wilkin County topographic map, elevation, terrain (topographic-map.com) Otter Tail County topographic map, elevation, terrain (topographic-map.com)
Tillage:	Horse & Mule/Tractor plowing: Intensive Tilling	Historical research shows evidence of intensive tillage/plowing. Pre 1980 using disk chisel plow and after 1980 employing strip-till for corn and some no-till for soybeans. We will assume intensive tillage for pre 2000 by plow and disk chisel which is considered deep tillage (deeper than 10 inches) and soil inversion with less than 15% of soil surface protected from crop residue	https://extension.umn.edu/soil-management-and-health/tillage-implements-purpose-and-ideal-use#history-1202760
Irrigation:	none	approximately 1.5% cropland irrigated in 1997 approximately 1.4% cropland irrigated in 1992, 0.06% cropland irrigated in 1964	https://agcensus.library.cornell.edu/wp-content/uploads/1997-Minnesota- https://agcensus.library.cornell.edu/wp-content/uploads/1992-Minnesota-CHAPTER_1_State_Data-1569-Table-01.pdf

Conventional Plot

Model Input Field	Assumption	Content/Notes	Reference(s)
Baseline Management (2000-2022)			
Crop and Planting Date:	April 30th planting and October 30th harvest; 1	corn crop and planting data consistent each year and cannot overlap with seeding of cover crop	https://extension.umn.edu/corn-planting/planting-date-considerations-corn
Yield (bu/ac):	150	Based on average annual bushels per acre across Otter Tail and Wilkin counties for data spanning 2000-2022	see Baseline Corn Yield tab for calculations and data references
Residue Removal:	50%	Some researchers have previously recommended harvesting only about 30% under conventional tillage, while values up to 50% could be sustainably collected in no-till systems while others have estimated that up to 60% of corn stover could be sustainably removed	https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/CSES/CSES-180/CSES-180-PDF_rev2.pdf#:~:text=Some%20researchers%20have%20previously%20recommended%20harvesting%20only%20about,60%25%20of%20corn%20stover%20could%20be%20sustainably%20removed.
Irrigation:	None	Irrigation variable removed for simplification - assume well-watered. Data supports small number of corn farmers in Otter Tail and Wilkin County irrigate the farm (~9%)	see Farming Practice Estimation tab for calculations and data references

Conventional Plot

Model Input Field	Assumption	Content/Notes	Reference(s)
Manure/compost application:	Farmyard Manure, solid: 1 ton/acre resulting in 24 lbs N/acre in fall	Broadcasting manure onto the surface of a field is the oldest method of spreading. It is easy, cheap, and can be done during almost any season - using default 1 ton/acre application with C/N ratio 11.7 - high organic matter input user guide recommendations	https://extension.umn.edu/manure-management/manure-application-methods-and-nitrogen-losses
Fertilizer Application:	Nitrogen is added to fields	Nitrogen was applied to 99 percent of the total 1997 corn acreage in the ten States surveyed. South Dakota with 96 percent of the corn acreage treated was the lowest. The next lowest was Minnesota, where growers treated 97 percent of the planted corn acreage.	https://comet-farm.com/data/Cropland/FertilizerHelp.pdf https://www.nass.usda.gov/Statistics_by_State/Minnesota/Publications/Other_Press_Releases/2022/MN-Ag-Chem-Corn-2022.pdf
Element-N:	Element-N (N): 146 lbsN/acre Farmyard Manure, Solid: 24 lbsN/acre Total N: 170 lbsN/acre	Nitrogen was applied in spring. Combined Sources of Nitrogen inputs of Ammonia, Urea, Ammonium Nitrate, Ammonium Sulfate, Urea-ammonium nitrate solution. The same GREET derived default values are used in FD-CIC model as input parameters. Of the three primary macronutrients,	https://www.nass.usda.gov/Statistics_by_State/Minnesota/Publications/Other_Press_Releases/2022/MN-Ag-Chem-Corn-2022.pdf
Element-P (P):	0	not used for GHG calculations	https://www.nass.usda.gov/Statistics_by_State/Minnesota/Publications/Other_Press_Releases/2022/MN-Ag-Chem-Corn-2022.pdf

Conventional Plot

Model Input Field	Assumption	Content/Notes	Reference(s)
Liming	none	Few subsoils are acidic and require liming in Otter Tail and Wilkin Counties	https://extension.umn.edu/liming/lime-needs-minnesota#:~:text=When%20needed%2C%20liming%20materials%20are%20major%20inputs,acid%2C%20the%20are%20many%20benefits%20from%20liming.
Burning	none		
Future Scenario Management (2023-2033)			
Crop and Planting Date:	April 30th planting and October 30th harvest; 1 harvest per year	corn crop and planting data consistent each year and cannot overlap with seeding of cover crop	https://extension.umn.edu/corn-planting/planting-date-considerations-corn
Yield (bu/ac):	150	Based on average annual bushels per acre across Otter Tail and Wilkin counties	see Baseline Corn Yield tab for calculations and data references
Residue Removal:	50%	Some researchers have previously recommended harvesting only about 30% under conventional tillage, while values up to 50% could be sustainably collected in no-till systems while others have estimated that up to 60% of corn stover could be sustainably removed	https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/CSES/CSES-180/CSES-180-PDF_rev2.pdf#:~:text=Some%20researchers%20have%20previously%20recommended%20harvesting%20only%20about,60%25%20of%20corn%20stover%20could%20be%20sustainably%20removed.
Tillage:	Intensive	Intensive tillage in spring	https://extension.umn.edu/soil-management-and-health/tillage-implements-purpose-and-ideal-use#history-1202760

Conventional Plot

Model Input Field	Assumption	Content/Notes	Reference(s)
Irrigation:	None	Irrigation variable removed for simplification - assume well-watered. Data supports small number of corn farmers in Otter Tail and Wilkin County irrigate the farm (~9%)	see Farming Practice Estimation tab for calculations and data references
Manure/compost application:	Farmyard Manure, solid: 1 ton/acre resulting in 24 lbs N/acre in fall	Broadcasting manure onto the surface of a field is the oldest method of spreading. It is easy, cheap, and can be done during almost any season - using default 1 ton/acre application with C/N ratio 11.7 - high organic matter input	https://extension.umn.edu/manure-management/manure-application-methods-and-nitrogen-losses https://comet-farm.com/data/Cropland/FertilizerHelp.pdf
Fertilizer Application:	Nitrogen is added to fields	Nitrogen was applied to 99 percent of the total 1997 corn acreage in the ten States surveyed. South Dakota with 96 percent of the corn acreage treated was the lowest. The next lowest was Minnesota, where growers treated 97 percent of the planted corn acreage	https://www.nass.usda.gov/Statistics_by_State/Minnesota/Publications/Other_Press_Releases/2022/MN-Ag-Chem-Corn-2022.pdf
Element-N:	Element-N (N): 146 lbsN/acre Farmyard Manure, Solid: 24 lbsN/acre Total N: 170 lbsN/acre	Nitrogen was applied in spring. Combined Sources of Nitrogen inputs of Ammonia, Urea, Ammonium Nitrate, Ammonium Sulfate, Urea-ammonium nitrate solution. The same GREET derived default values are used in FD-CIC model as input parameters.	https://www.nass.usda.gov/Statistics_by_State/Minnesota/Publications/Other_Press_Releases/2022/MN-Ag-Chem-Corn-2022.pdf

Conventional Plot

Model Input Field	Assumption	Content/Notes	Reference(s)
		Of the three primary macronutrients, nitrogen (N) was the most widely used on corn. Minnesota farmers applied nitrogen to 98 percent of planted acres at an average rate of 146 pounds per acre per year. Macronutrients phosphate (P2O5) and potash (K2O) were applied to the majority of acres, at an average rate of 62 and 89 pounds per acre per year, respectively. The secondary macronutrient, sulfur (S), was applied to 28 percent of acres planted to corn.	https://www.nass.usda.gov/Statistics_by_State/Minnesota/Publications/Other_Press_Releases/2022/MN-Ag-Chem-Corn-2022.pdf
Element-P (P):	0	not used for GHG calculations	
Liming	none	Few subsoils are acidic and require liming in Otter Tail and Wilkin Counties	https://extension.umn.edu/liming/lime-needs-minnesota#:~:text=When%20needed%2C%20liming%20materials%20are%20major%20inputs,acid%2C%20the re%20are%20many%20benefits%20from%20liming.https://extension.umn.edu/corn-harvest/crop-residue-management
Burning	none	removed major source of GHG	
Cover Crop	none	no data to support wide range utilization of cover cropping practices for Green Plains Ethanol Plant corn producers	

Regenerative Plot

Model Input Field	Assumption	Content/Notes	Reference(s)
Historic Management (Pre-2000)			
Type (Upland or lowland):	upland	Upland is considered >660 ft above sea level. Wilkin County avg elevation above sea level is 1,050 ft Otter Tail County avg elevation above sea level is 1,355 ft	https://en.wikipedia.org/wiki/Upland_and_lowland Wilkin County topographic map, elevation, terrain (topographic-map.com) Otter Tail County topographic map, elevation, terrain (topographic-map.com)
Tillage:	Horse & Mule/Tractor plowing: Intensive Tilling	Historical research shows evidence of intensive tillage/plowing. Pre 1980 using disk chisel plow and after 1980 employing strip-till for corn and some no-till for soybeans. We will assume intensive tillage for pre 2000 by plow and disk chisel which is considered deep tillage (deeper than 10 inches) and soil inversion with less than 15% of soil surface protected from crop residue	https://extension.umn.edu/soil-management-and-health/tillage-implements-purpose-and-ideal-use#history-1202760
Irrigation:	none	approximately 1.5% cropland irrigated in 1997 approximately 1.4% cropland irrigated in 1992, 0.06% cropland irrigated in 1964	https://agcensus.library.cornell.edu/wp-content/uploads/1997-Minnesota-CHAPTER_1_State_Data-1599-Table-01.pdf https://agcensus.library.cornell.edu/wp-content/uploads/1992-Minnesota-CHAPTER_1_State_Data-1569-Table-01.pdf
Baseline Management (2000-2022)			
Crop and Planting Date:	April 30th planting and September 15th harvest; 1 harvest per year	corn crop and planting data consistent each year and cannot overlap with seeding of cover crop	University of Minnesota Extension - Planting date considerations for corn

Regenerative Plot

Model Input Field	Assumption	Content/Notes	Reference(s)
Tillage:	Intensive	Intensive tillage in spring	https://extension.umn.edu/soil-management-and-health/tillage-implements-purpose-and-ideal-use#history-1202760
Yield (bu/ac):	150	Based on average annual bushels per acre across Otter Tail and Wilkin counties for data spanning 2000-2022	see Baseline Corn Yield tab for calculations and data references
Residue Removal:	50%	n Minnesota, about 450,000 acres of aboveground residues are removed from the corn fields for forage for livestock, in addition to some unknown amount of other crop residues removed for hedding.	
Irrigation:	None	Irrigation variable removed for simplification - assume well-watered. Data supports small number of corn farmers in Otter Tail and Wilkin County irrigate the farm (~9%)	
Manure/compost application:	Farmyard Manure, solid: 1 ton/acre resulting in 24 lbs N/acre in fall	Broadcasting manure onto the surface of a field is the oldest method of spreading. It is easy, cheap, and can be done during almost any season - using default 1 ton/acre application with C/N ratio 11.7 - high organic matter input	https://extension.umn.edu/manure-management/manure-application-methods-and-nitrogen-losses

Regenerative Plot

Model Input Field	Assumption	Content/Notes	Reference(s)
Fertilizer Application:			https://comet-farm.com/data/Cropland/FertilizerHelp.pdf
	Nitrogen is added to fields	Nitrogen was applied to 99 percent of the total 1997 corn acreage in the ten States surveyed. South Dakota with 96 percent of the corn acreage treated was the lowest. The next lowest was Minnesota, where growers treated 97 percent of the planted corn acreage	https://www.nass.usda.gov/Statistics_by_State/Minnesota/Publications/Other_Press_Releases/2022/MN-Ag-Chem-Corn-2022.pdf
Element-N:	Element-N (N): 146 lbsN/acre Farmyard Manure, Solid: 24 lbsN/acre Total N: 170 lbsN/acre	Nitrogen was applied in spring. Combined Sources of Nitrogen inputs of Ammonia, Urea, Ammonium Nitrate, Ammonium Sulfate, Urea-ammonium nitrate solution. The same GREET derived default values are used in FD-CIC model as input parameters.	https://www.nass.usda.gov/Statistics_by_State/Minnesota/Publications/Other_Press_Releases/2022/MN-Ag-Chem-Corn-2022.pdf
Element-P (P):	0	not used for GHG calculations	
Liming:	none	Few subsoils are acidic and require liming in Otter Tail and Wilkin Counties	https://extension.umn.edu/liming/lime-needs-minnesota#:~:text=When%20needed%2C%20liming%20materials%20are%20major%20inputs,acid%2C%20there%20are%20many%20benefits%20from%20liming.https://extension.umn.edu/corn-harvest/crop-residue-management
Burning:	none	removed major source of GHG	
Cover Crop:	none	no data to support wide range utilization of cover cropping practices for Green Plains Ethanol Plant corn producers.	

Regenerative Plot

Model Input Field	Assumption	Content/Notes	Reference(s)
Future Scenario (2023-2033)			
Crop and Planting Date:	April 30th planting and October 30th harvest; 1 harvest per year	corn crop and planting data consistent each year and cannot overlap with seeding of cover crop	https://extension.umn.edu/corn-planting/planting-date-considerations-corn
Tillage:	No Tillage		
Yield (bu/ac):	150	Based on average annual bushels per acre across Otter Tail and Wilkin counties for data spanning 2000-2022	see Baseline Corn Yield tab for calculations and data references
Residue Removal:	50%	Some researchers have previously recommended harvesting only about 30% under conventional tillage, while values up to 50% could be sustainably collected in no-till systems while others have estimated that up to 60% of corn stover could be sustainably removed	https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/CSES/CSES-180/CSES-180-PDF_rev2.pdf#:~:text=Some%20researchers%20have%20previously%20recommended%20harvesting%20only%20about,60%25%20of%20corn%20stover%20could%20be%20sustainably%20removed.
Irrigation:	None	Irrigation variable removed for simplification - assume well-watered. Data supports small number of corn farmers in Otter Tail and Wilkin County irrigate the farm (~9%)	see Farming Practice Estimation tab for calculations and data references

Regenerative Plot

Model Input Field	Assumption	Content/Notes	Reference(s)
Manure/compost application:	Farmyard Manure, solid: 1 ton/acre resulting in 24 lbs N/acre in fall	Broadcasting manure onto the surface of a field is the oldest method of spreading. It is easy, cheap, and can be done during almost any season - using default 1 ton/acre application with C/N ratio 11.7 - high organic matter input	https://extension.umn.edu/manure-management/manure-application-methods-and-nitrogen-losses
Fertilizer Application:			
Element-N:	Element-N (N): 73 lbsN/acre Farmyard Manure, Solid: 24 lbsN/acre Total N: 97 lbsN/acre	50% reduction in synthetic nitrogen compared to conventional. Nitrogen was applied in spring. Combined Sources of Nitrogen inputs of Ammonia, Urea, Ammonium Nitrate, Ammonium Sulfate, Urea-ammonium nitrate solution. The same GREET derived default values are used in FD-CIC model as input parameters	https://www.nass.usda.gov/Statistics_by_State/Minnesota/Publications/Other_Press_Releases/2022/MN-Ag-Chem-Corn-2022.pdf
Element-P (P):	0	not used for GHG calculations	
Liming:	none	Few subsoils are acidic and require liming in Otter Tail and Wilkin Counties	https://extension.umn.edu/liming/lime-needs-minnesota#:~:text=When%20needed%2C%20liming%20materials%20are%20major%20inputs,acid%2C%20there%20are%20many%20benefits%20from%20liming.
Burning:	none	removed major source of GHG	https://extension.umn.edu/corn-harvest/crop-residue-management
Cover Crop:	clover planted after harvest	cover crop must be planted after corn harvest and before frost - ~ September 16th planting	https://extension.umn.edu/soil-and-water/cover-crops

**Agricultural Practices
Supplemental Information:
COMET Farm Guide**

January 8, 2024

HDR prepared this Step-By-Step Guide for the use of USDA's COMET-Farm process-based greenhouse gas (GHG) accounting system for the Otter Tail to Wilkin CO₂ Pipeline Project.

<https://comet-farm.com/>

COMET-Farm GHG accounting system works with user inputs and default values. Depending on available data, either custom inputs are provided, or default values can be chosen.

There are 3 steps in the COMET-Farm Tool:

Step 1 ACTIVITIES

Step 2 FIELD MANAGEMENT

Step 3 REPORT

This document describes how the COMET-Farm tool was used to determine an estimated change in greenhouse gas emissions associated with test case scenarios of corn feedstock producers implementing alternative agricultural practices within 40 miles of Fergus Falls, MN.

This document is a step-by-step guide detailing the process and assumed inputs into the COMET-Farm to best represent the test cases described in Chapter 6 Table 6-3. Each test case is shown with images to guide the user to recreate the same project description and results.

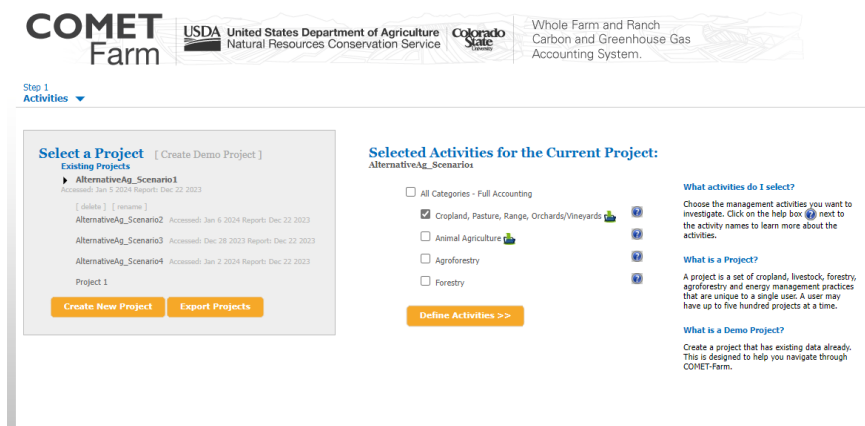
Test Case Inputs

AlternativeAg_Scenario 1

*1,000 acre parcel where there are no future changes in farming practices - a.k.a. business as usual (BAU) of conventional management

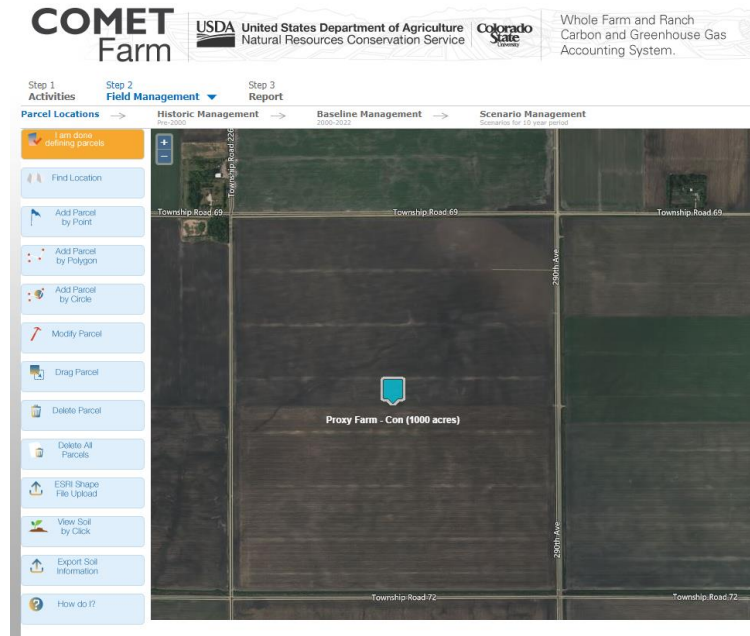
Step 1: ACTIVITIES

- Select the project file and select activities
 - choose Cropland



Step 2: FIELD MANAGEMENT

- Choose parcel location by point, polygon (if actual acreage is known), or circle
 - Choose a location by **Add Parcel by Point**



Parcel Location Attributes

Name: Conventional

Area(acres): 1000

Cancel Save Location

Soils data can be shown by choosing the soils option



When selected choose **I am done defining parcels**

- Define Historic Management (Pre-2000)
 - Choose
 - Pre-1980 Management: upland non-irrigated
 - CRP enrollment: no
 - 1980-2000 Management: Non-irrigated – Annual Crops in Rotation



Step 1 Activities | Step 2 **Field Management** | Step 3 Report

Parcel Locations → **Historic Management** → Baseline Management → Scenario Management

Pre-2000 | 2000-2022 | Scenarios for 10 year period

Select a parcel: Proxy Farm - Con

Proxy Farm - Con (1000 acres)

For parcel Proxy Farm - Con (selected at left) what was its historic management?

Pre-1980 Management: Upland Non-Irrigated (Pre 1980s)

Was this parcel enrolled in Conservation Reserve Program(CRP) at anytime before 2000? ☒ No ☐ Yes

1980-2000 Management: Non-Irrigated: Annual Crops in Rotation

1980-2000 Tillage: Intensive Tillage

<< Back | Copy | Next >>

Set Baseline Period

- Define Baseline Management (2000 - 2022)
 - Choose Crop and Planting Date
 - Annual Crop: Corn
 - Planting Date: 04/30/2000
 - Harvest Table
 - Harvest Date: 09/30/2000
 - Grain?: check
 - Yield (bu/ac): 150
 - Stover removal (% dry matter): 50%

United States Department of Agriculture
 Natural Resources Conservation Service

Whole Farm and Ranch
 Carbon and Greenhouse Gas
 Accounting System.

Step 1
 Activities

Step 2
 Field Management

Step 3
 Report

Parcel Locations

Historic Management
 Pre-2000

Baseline Management
 2000-2022

Scenario Management
 Scenarios for 10 year period

Select a parcel: Proxy Farm - Con

Data complete

Data incomplete

Selected

Parcel Management Summary
 [Delete Selected Crop]

Drag and Drop Crop Rotation

2000 Corn
 2001 Corn
 2002 Corn
 2003 Corn
 2004 Corn
 2005 Corn
 2006 Corn
 2007 Corn
 2008 Corn
 2009 Corn
 2010 Corn
 2011 Corn
 2012 Corn
 2013 Corn
 2014 Corn
 2015 Corn
 2016 Corn
 2017 Corn
 2018 Corn
 2019 Corn
 2020 Corn
 2021 Corn
 2022 Corn

Tillage, Implements, Manure/Compost Application
 Crop and Planting Date
 Irrigation
 Fertilizer Application
 Liming
 Burning

For Parcel Proxy Farm - Con in 2000 what crop did you plant, when did you plant, and when did you harvest?

What type of crop?:
☒ Annual Crop/Hay/Grass
 ☐ Seasonal Cover Crop
 ☐ Orchard/Vineyard Crop

Crop: Corn

Planting Date: 04/30/2000

Harvest Table
 Add New Harvest

Harvest Date	Grain / Fruit / Seed / Root / Tuber?	Yield (bu/ac)	Straw / Stover / Hay / Residue Removal (% dry matter)	Delete
09/30/2000	<input checked="" type="checkbox"/>	150	50	X

Grazing Table
 Add New Grazing Period

Start Dates	End Dates	Rest Period (days)	Daily Utilization %	Delete
No data to display				

<< Back

Save

Next >>

Skip Ahead >>

NEXT

- Choose Tillage, Implements, & Planting:
 - Implement Table:
 - Date Applied: 3/31/2000

- Implement Pass: Intensive Tillage

COMET Farm

United States Department of Agriculture
Natural Resources Conservation Service

Whole Farm
Carbon &
Account

Step 1
Activities

Step 2
Field Management

Step 3
Report

Parcel Locations

→

Historic Management
Pre-2000

→

Baseline Management
2000-2022

→

Scenario Management
Scenarios for 10 year period

Select a parcel: Proxy Farm - Con

Proxy Farm - Con (1000 acres)

Data complete

Data incomplete

Selected

Parcel Management Summary

[Delete Selected Crop]

Drag and Drop Crop Rotation

2000 Corn

2001 Corn

2002 Corn

2003 Corn

2004 Corn

2005 Corn

2006 Corn

2007 Corn

2008 Corn

2009 Corn

2010 Corn

2011 Corn

2012 Corn

2013 Corn

2014 Corn

2015 Corn

2016 Corn

2017 Corn

2018 Corn

2019 Corn

2020 Corn

2021 Corn

2022 Corn

Tillage, Implements, Manure/Compost Application, Liming

Crop and Planting Date, Irrigation, Fertilizer Application, Burning

For Parcel Proxy Farm - Con in 2000 what were the tillage practices?

Implement Table

+

Add New Tillage Application Practice

Date Applied	Implement Pass	Delete
3/31/2000	Intensive Tillage	X

<< Back

Save

Next >>

Skip Ahead >>

NEXT

- Irrigation: None

COMET Farm

United States Department of Agriculture
Natural Resources Conservation Service

Colorado State University

Whole Farm and Ranch
Carbon and Greenhouse Gas
Accounting System.

Step 1
Activities

Step 2
Field Management

Step 3
Report

Parcel Locations

→

Historic Management

→

Baseline Management

→

Scenario Management

Pre-2000

2000-2022

Scenarios for 10 year period

Tillage, Implements, & Planting

Manure/Compost Application

Liming

Crop and Planting Date

Irrigation

Fertilizer Application

Burning

For Parcel Proxy Farm - Con in 2000 what were the irrigation practices?

Irrigation Table

Add New Irrigation Application Practice

Irrigation Start Date	Irrigation End Date	Auto-Irrigate?	Field Available Water Holding Capacity (%)	Irrigation Amount (inches per application)	Days Between Irrigations	Delete
No data to display						

Drag and Drop Crop Rotation

2000 Corn

2001 Corn

2002 Corn

2003 Corn

2004 Corn

2005 Corn

2006 Corn

2007 Corn

2008 Corn

2009 Corn

2010 Corn

2011 Corn

2012 Corn

2013 Corn

2014 Corn

2015 Corn

2016 Corn

2017 Corn

2018 Corn

2019 Corn

2020 Corn

2021 Corn

2022 Corn

<< Back

Save

Next >>

Skip Ahead >>

NEXT

- Manure/Compost Application
 - Manure Table:
 - Date Applied: 10/1/2000
 - Manure Type: Farmyard Manure, Solid
 - Amount Applied: 1.00 tons/acre
 - Moisture (%): 45
 - Total Nitrogen (%): 1.20

- C/N Ratio: 11.7

United States Department of Agriculture
Natural Resources Conservation Service

Whole Farm and Ranch
Carbon and Greenhouse Gas
Accounting System.

Step 1
Activities

Step 2
Field Management

Step 3
Report

Parcel Locations → Historic Management → Baseline Management → Scenario Management

Select a parcel: Proxy Farm - Con

Data complete
Data incomplete
Selected

Parcel Management Summary

Drag and Drop Crop Rotation

Tillage, Implements, Manure/Compost Application

Crop and Planting Date
Irrigation
Fertilizer Application
Liming
Burning

For Parcel Proxy Farm - Con in 2000 what were the manure application practices?

Manure Table

View Details
Corn
Total N Applied(lbs/acre):170.0
Add New Manure Application Practice

Date Applied	Manure Type	Amount Applied	Moisture (%)	Total Nitrogen (%)	C/N Ratio	Delete
10/1/2000	Farmyard Manure, Solid	1.00 tons/acre	45	1.20	11.7	X

NEXT

- Fertilizer Application
 - Fertilizer Table:
 - Date Applied: 3/31/2000
 - Fertilizer Type: Element-N (N)
 - Total Fertilizer Applied (lbs Fertilizer/acre): 146.00
 - Total N Applied (lbs N/Acre): 146
 - Ammonium %: 0

United States Department of Agriculture
Natural Resources Conservation Service

Whole Farm and Ranch
Carbon and Greenhouse Gas
Accounting System.

Step 1
Activities

Step 2
Field Management

Step 3
Report

Parcel Locations → Historic Management → Baseline Management → Scenario Management

Select a parcel: Proxy Farm - Con

Data complete
Data incomplete
Selected

Parcel Management Summary

Drag and Drop Crop Rotation

Tillage, Implements, Manure/Compost Application

Crop and Planting Date
Irrigation
Fertilizer Application
Liming
Burning

For Parcel Proxy Farm - Con in 2000 what were the fertilizer application practices?

Fertilizer Table

View Details
Corn
Total N Applied(lbs/acre):170.0
Add New Fertilizer Application Practice

Date Applied	Fertilizer Type	Total Fertilizer Applied (lbs Fertilizer/acre)	Total N Applied (lbs N/acre)	Ammonium % (l)	Delete
03/31/2000	Element-N (N)	146.00	146	0	X

NEXT

- Liming: None

COMET Farm

USDA

United States Department of Agriculture
Natural Resources Conservation Service

Colorado State University

Whole Farm Carbon Accounting

Step 1
Activities

Step 2
Field Management

Step 3
Report

Parcel Locations

Historic Management
Pre-2000

Baseline Management
2000-2022

Scenario Management
Scenarios for 10 year period

Select a parcel: Proxy Farm - Con

Proxy Farm - Con (1000 acres)

Data complete

Data incomplete

Selected

Tillage, Implements, Manure/Compost Application

Liming

Crop and Planting Date

Irrigation

Fertilizer Application

Burning

For Parcel Proxy Farm - Con in 2000 what were the liming practices?

Liming Date

Liming Material

Amount Applied (tons/acre)

10/13/2001

None

0

NEXT

- Burning: None

COMET Farm

USDA

United States Department of Agriculture
Natural Resources Conservation Service

Colorado State University

Whole Farm Carbon Accounting

Step 1
Activities

Step 2
Field Management

Step 3
Report

Parcel Locations

Historic Management
Pre-2000

Baseline Management
2000-2022

Scenario Management
Scenarios for 10 year period

Select a parcel: Proxy Farm - Con

Proxy Farm - Con (1000 acres)

Data complete

Data incomplete

Selected

Tillage, Implements, Manure/Compost Application

Liming

Crop and Planting Date

Irrigation

Fertilizer Application

Burning

For Parcel Proxy Farm - Con in 2000 did you burn crop residue (not including orchards and vineyards)?

No burning

NEXT

NEW PROMPT

Add Additional Crop for same year?: No

Add Additional Crop?

Would you like to add an additional crop for the same year?

If you have a second crop that spans between calendar years (i.e. **winter wheat**), add it as an additional crop this year and set its harvest date to be in the following year.

Yes, add additional crop for the same year.

No Thanks, Continue >>

No Thanks, Continue

NEW PROMPT

Copy Crop?

Management for parcel Proxy Farm - Con for 2000 is complete.

If you would like to copy the management details to other parcels and/or years, select those parcel-years and click the Copy button.

2000

select

2001

select

2002

select

2003

select

2004

select

2005

select

2006

select

2007

select

2008

select

2009

select

2010

select

2011

select

2012

select

2013

select

2014

select

2015

select

2016

select

2017

select

2018

select

2019

select

2020

select

2021

select

2022

select

Proxy Farm - Con

select

✓

No, thanks>>

Copy & Continue >>

✓

Crop-Year to be copied

Crop-Year has data

Select all years

Copy Crop?

Management for parcel Proxy Farm - Con for 2000 is complete.

If you would like to copy the management details to other parcels and/or years, select those parcel-years and click the Copy button.

2000

select

2001

select

2002

select

2003

select

2004

select

2005

select

2006

select

2007

select

2008

select

2009

select

2010

select

2011

select

2012

select

2013

select

2014

select

2015

select

2016

select

2017

select

2018

select

2019

select

2020

select

2021

select

2022

select

Proxy Farm - Con

select

✓

No, thanks>>

Copy & Continue >>

Copy & Continue

NEW PROMPT

Continue to future management

All current management (2000-present) is defined for all parcels. You will now be taken to the Future Management page where you will define management scenarios to compare against your current management.

Keep editing >>

Continue to Future Management >>

Continue to Future Management

- Define Scenario Management – Scenarios for 10 year period (future)
 *All inputs for Scenario Management are the same as the Baseline Management (2000 - 2022) in the BAU Test Case

Step 1
Activities

Step 2
Field Management

Step 3
Report

Parcel Locations

Historic Management
Pre-2000

Baseline Management
2000-2022

Scenario Management
Scenarios for 10 year period

Selected Scenario [new]

► BAU - conventional [delete] [rename]

Select a parcel: Proxy Farm - Con [CPA]

Proxy Farm - Con (1000 acres)

Data complete

Data incomplete

Selected

Parcel Management Summary [Delete Selected Crop]

Drag and Drop Crop Rotation

2023 Corn

2024 Corn

2025 Corn

2026 Corn

2027 Corn

2028 Corn

2029 Corn

2030 Corn

2031 Corn

2032 Corn

Tillage, Implements, Manure/Compost
& Planting

Irrigation

Fertilizer
Application

Liming

Crop and
Planting Date

Burning

For Parcel Proxy Farm - Con in 2023 what crop will you plant, when will you plant, and when will you harvest?

What type of crop?:
☒ Annual Crop/Hay/Grass ☐ Seasonal Cover Crop ☐ Orchard/Vineyard Crop

Crop

Planting Date

Harvest Table

Add New Harvest

Harvest Date	Grain / Fruit / Seed / Root / Tuber?	Projected Yield (bu/ac)	Straw / Stover / Hay / Residue Removal (% dry matter)	Delete
09/30/2023	<input checked="" type="checkbox"/>	150	50	X

Grazing Table

Add New Grazing Period

Start Dates	End Dates	Rest Period (days)	Daily Utilization %	Delete
No data to display				

NEXT

Step 1
Activities

Step 2
Field Management

Step 3
Report

Parcel Locations

Historic Management
Pre-2000

Baseline Management
2000-2022

Scenario Management
Scenarios for 10 year period

Selected Scenario [new]

► BAU - conventional [delete] [rename]

Select a parcel: Proxy Farm - Con [CPA]

Proxy Farm - Con (1000 acres)

Data complete

Data incomplete

Selected

Parcel Management Summary [Delete Selected Crop]

Drag and Drop Crop Rotation

2023 Corn

2024 Corn

2025 Corn

2026 Corn

2027 Corn

2028 Corn

2029 Corn

2030 Corn

2031 Corn

2032 Corn

Tillage, Implements, Manure/Compost
& Planting

Irrigation

Fertilizer
Application

Liming

Crop and
Planting Date

Burning

For Parcel Proxy Farm - Con in 2023 what will be your tillage practices?

Implement Table

Add New Tillage Application Practice

Date Applied	Implement Pass	Delete
3/31/2023	Intensive Tillage	X

NEXT

Step 1
Activities

Step 2
Field Management

Step 3
Report

Parcel Locations

Historic Management
Pre-2000

Baseline Management
2000-2022

Scenario Management
Scenarios for 10 year period

Selected Scenario [new]
► BAU - conventional [delete] [rename]
Select a parcel: Proxy Farm - Con [CPA]

Data complete Data incomplete Selected
Parcel Management Summary
[Delete Selected Crop]
Drag and Drop Crop Rotation

Tillage, Implements, Manure/Compost & Planting Application Liming
Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - Con in 2023 what will be your irrigation practices?

Irrigation Table ?
Add New Irrigation Application Practice

Irrigation Start Date	Irrigation End Date	Auto-Irrigate?	Field Available Water Holding Capacity (%)	Irrigation Amount (inches per application)	Days Between Irrigations	Delete
No data to display						

NEXT

Step 1
Activities

Step 2
Field Management

Step 3
Report

Parcel Locations

Historic Management
Pre-2000

Baseline Management
2000-2022

Scenario Management
Scenarios for 10 year period

Selected Scenario [new]
► BAU - conventional [delete] [rename]
Select a parcel: Proxy Farm - Con [CPA]

Data complete Data incomplete Selected
Parcel Management Summary
[Delete Selected Crop]
Drag and Drop Crop Rotation
2023 Corn
2024 Corn

Tillage, Implements, Manure/Compost & Planting Application Liming
Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - Con in 2023 what will be your manure application practices?

Manure Table ?
View Details Corn Total N Applied(lbs/acre):170.0
Add New Manure Application Practice

Date Applied	Manure Type	Amount Applied	Moisture (%)	Total Nitrogen (%)	C/N Ratio	Delete
10/1/2023	Farmyard Manure, Solid	1.00 tons/acre	45	1.20	11.7	X

NEXT

Step 1

Activities

Step 2

Field Management

Step 3

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Selected Scenario

[new]

► BAU - conventional

[delete]

[rename]

Select a parcel:

Proxy Farm - Con

[CPA]

Proxy Farm - Con (1000 acres)

Data complete

Data incomplete

Selected

Tillage, Implements, Manure/Compost & Planting

Irrigation

Fertilizer Application

Liming

Burning

For Parcel Proxy Farm - Con in 2023 what will be your fertilizer application practices?

Fertilizer Table

View Details

Corn

Total N Applied(lbs/acre):170.0

Add New Fertilizer Application Practice

Date Applied	Fertilizer Type	Total Fertilizer Applied (lbs Fertilizer/acre)	Total N Applied (lbs N/acre)	Ammonium % (I)	Delete
03/31/2023	Element-N (N)	146.00	146	0	X

NEXT

Step 1

Activities

Step 2

Field Management

Step 3

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Selected Scenario

[new]

► BAU - conventional

[delete]

[rename]

Select a parcel:

Proxy Farm - Con

[CPA]

Proxy Farm - Con (1000 acres)

Data complete

Data incomplete

Selected

Tillage, Implements, Manure/Compost & Planting

Irrigation

Fertilizer Application

Liming

Burning

For Parcel Proxy Farm - Con in 2023 what will be your liming practices?

Liming Date

10/13/2001

Liming Material

None

Amount Applied (tons/acre)

0

NEXT

Step 1

Activities

Step 2

Field Management

Step 3

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Selected Scenario

[new]

► BAU - conventional

[delete]

[rename]

Select a parcel:

Proxy Farm - Con

[CPA]

Proxy Farm - Con (1000 acres)

Data complete

Data incomplete

Selected

Tillage, Implements, Manure/Compost & Planting

Irrigation

Fertilizer Application

Liming

Burning

For Parcel Proxy Farm - Con in 2023 will you burn crop residue (not including orchards and vineyards)?

No burning

NEXT

NEW PROMPT

Add Additional Crop?

Would you like to add an additional crop for the same year?

If you have a second crop that spans between calendar years (i.e. **winter wheat**), add it as an additional crop this year and set its harvest date to be in the following year.

Yes, add additional crop for the same year.

No Thanks, Continue >>

No Thanks, Continue

NEW PROMPT

Copy Crop?

Management for parcel Proxy Farm - Con for 2023 is complete.

If you would like to copy the management details to other parcels and/or years, select those parcel-years and click the Copy button.

☒ Crop-Year to be copied

☐ Crop-Year has data

2023
select

2024
select

2025
select

2026
select

2027
select

2028
select

2029
select

2030
select

2031
select

2032
select

Proxy Farm - Con

select

>

☒

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☐

No, thanks>>

Copy & Continue >>

- Copy crop data to all years

Copy Crop?

Management for parcel Proxy Farm - Con for 2023 is complete.

If you would like to copy the management details to other parcels and/or years, select those parcel-years and click the Copy button.

☒ Crop-Year to be copied

☐ Crop-Year has data

2023
select

2024
select

2025
select

2026
select

2027
select

2028
select

2029
select

2030
select

2031
select

2032
select

Proxy Farm - Con

select

>

☒

☒

☒

☒

☒

☒

☒

☒

☒

☒

No, thanks>>

Copy & Continue >>

Copy & Continue

NEW PROMPT

Future Management Scenarios

Are you ready to run your report?

Continue to Report >>

If Not...

Create New Scenario

Or

Keep Editing

Continue to Report

Step 3: Report

Step 1
Activities

Step 2
Field Management

Step 3
Report

Cropland, Pasture, Range, Orchards/Vineyards

Cropland Graphical Report

Available Water Holding Capacity

Report finished: 00:02:41 100% Complete

NAME: Danlyn Brennan
PROJECT: AlternativeAg_Scenario1
REPORTING YEARS: 2023 - 2032
Daycent Service Version: 30cm Daycent Service

JOBID: 32863_69782_272740
Time: Mon Jan 08 2024 12:46:00 GMT-0800 (Pacific Standard Time)
Version: appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)

USDA

United States Department
Natural Resources Conservation Service

Source	Baseline Emissions			BAU - conventional			
	Emissions	+/-	Emissions	+/-	Change	+/-	
Proxy Farm - Con (1000 acres - Corn)							
C (tonnes CO ₂ equiv./yr.)	-205.1	+0/-0	-205.1	+0/-0	0.0		+0/-0
Soil	-205.1	+0/-0	-205.1	+0/-0	0.0		+0/-0
CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0		+0/-0
CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0		+0/-0
N ₂ O (tonnes CO ₂ equiv./yr.)	1882.5	NR [†]	1882.5	NR [†]	0.0		NR [†]
Direct N ₂ O Emissions	1765.3	+0/-0	1765.3	+0/-0	0.0		+0/-0
Direct - Soil	1765.3	+0/-0	1765.3	+0/-0	0.0		+0/-0
Direct - Biomass Burning	0.0	+0/-0	0.0	+0/-0	0.0		+0/-0
Direct - Drained Organic Soil	0.0	+0/-0	0.0	+0/-0	0.0		+0/-0
Indirect N ₂ O Emissions	117.2	+185/-94.5	117.2	+185/-94.5	0.0		+0/-0
Indirect - Volatilization	117.2	+185/-94.5	117.2	+185/-94.5	0.0		+0/-0
Indirect - Leaching and Runoff	0.0	+0/-0	0.0	+0/-0	0.0		+0/-0
CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0		+0/-0
Total	1677.4	NR [†]	1677.4	NR [†]	0.0		NR [†]
Total (all parcels)	1677.4	NR [†]	1677.4	NR [†]	0.0		NR [†]

AlternativeAg_Scenario 2

*250 acres where a suite of alternative agricultural practices are implemented in the next 10 years and 750 acres where there are no future changes in farming practices a.k.a. business as usual (BAU) of conventional management

Step 1: ACTIVITIES

- Select the project file and select activities
 - choose Cropland

The screenshot shows the COMET Farm web application interface. At the top, there are logos for COMET Farm, USDA, United States Department of Agriculture, Natural Resources Conservation Service, Colorado State, and Whole Farm and Ranch Carbon and Greenhouse Gas Accounting System. Below the logos, there is a navigation bar with "Step 1 Activities" and a dropdown arrow. The main content area is divided into two panels. The left panel, titled "Select a Project", shows a list of existing projects: "AlternativeAg_Scenario1", "AlternativeAg_Scenario2" (selected), "AlternativeAg_Scenario3", and "AlternativeAg_Scenario4". Below the list are buttons for "Create New Project" and "Export Projects". The right panel, titled "Selected Activities for the Current Project: AlternativeAg_Scenario2", shows a list of activities with checkboxes: "All Categories - Full Accounting", "Cropland, Pasture, Range, Orchards/Vineyards" (checked), "Animal Agriculture", "Agroforestry", and "Forestry". Below the list is a button for "Define Activities >>". To the right of the activity list, there are three informational sections: "What activities do I select?", "What is a Project?", and "What is a Demo Project?".

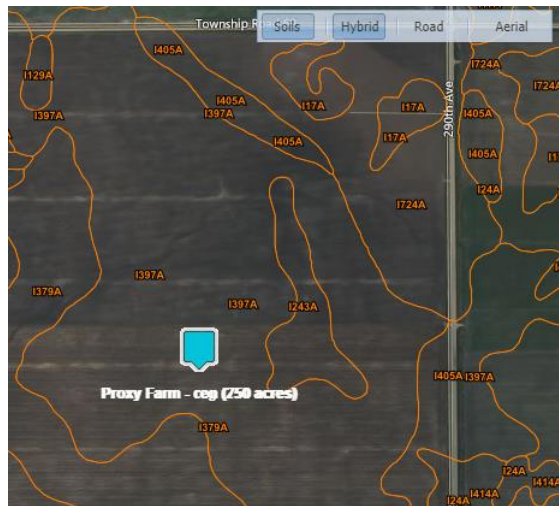
Define Activities

Step 2: FIELD MANAGEMENT

- Choose parcel location by point, polygon (if actual acreage is known), or circle
 - Choose point location and indicate total acres
 - Create two parcels at the same location to represent two different management choices; conventional and alternative/regenerative.

The screenshot shows the COMET Farm web application interface for Step 2: Field Management. The top navigation bar includes "Step 1 Activities", "Step 2 Field Management" (selected), and "Step 3 Report". Below the navigation bar, there are four tabs: "Parcel Locations", "Historic Management", "Baseline Management", and "Scenario Management". The "Parcel Locations" tab is active, showing a map of a field with various parcels outlined in orange. A blue square highlights a specific parcel labeled "Pruxy Farm - crop (250 acres)". On the left side of the map, there is a sidebar with a list of actions: "I got some existing parcels", "Find Location", "Add Parcel by Point", "Add Parcel by Polygon", "Add Parcel by Circle", "Modify Parcel", "Drag Parcel", "Delete Parcel", "Delete All Parcels", "ESRI Shape File Upload", "View Soil by Click", "Export Soil Information", and "How do I?".

- Ensure all test parcels are located at the same location and share the same soil data.



- When both parcels are created, select **I am done defining parcels**



- Select the parcel to define field management:
 - First, choose conventional parcel – this one will not change in the future. All inputs are the same as AlternativeAg_Scenario 1.
- Define Historic Management (Pre-2000)
 - Choose
 - Pre-1980 Management: upland non-irrigated
 - CRP enrollment: no
 - 1980-2000 Management: Non-irrigated – Annual Crops in Rotation

Step 1 Activities Step 2 **Field Management** Step 3 Report

Parcel Locations → **Historic Management** → Baseline Management → Scenario Management

Pre-2000 2000-2022 Scenarios for 10 year period

Select a parcel: Proxy Farm - reg

Proxy Farm - reg
Proxy Farm - con

Proxy Farm - con (250 acres)

Data complete Data incomplete Selected

For parcel Proxy Farm - reg (selected at left) what was its historic management?

Pre-1980 Management Lowland Non-Irrigated (Pre 1980s)

Was this parcel enrolled in Conservation Reserve Program(CRP) at anytime before 2000? ☒ No ☐ Yes

1980-2000 Management Non-Irrigated: Annual Crops in Rotation

1980-2000 Tillage Intensive Tillage

<< Back Copy Set Baseline

NEXT

- Define Baseline Management (2000 - 2022)
 - Choose Crop and Planting Date:
 - Annual Crop: Corn
 - Planting Date: 04/30/2000
 - Harvest Table:
 - Harvest Date: 09/30/2000
 - Grain?: check
 - Yield (bu/ac): 150
 - Stover removal (% dry matter): 50%

Step 1 Activities Step 2 **Field Management** Step 3 Report

Parcel Locations → Historic Management → **Baseline Management** → Scenario Management

Pre-2000 2000-2022 Scenarios for 10 year period

Select a parcel: Proxy Farm - con

Proxy Farm - con (250 acres)

Data complete Data incomplete Selected

Parcel Management Summary

Drag and Drop Crop Rotation

2000 Corn
2001 Corn
2002 Corn
2003 Corn
2004 Corn

Tillage, Implements, Manure/Compost Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - con in 2000 what crop did you plant, when did you plant, and when did you harvest?

What type of crop?: ☒ Annual Crop/Hay/Grass ☐ Seasonal Cover Crop ☐ Orchard/Vineyard Crop

Crop Corn

Planting Date 04/30/2000

Harvest Table

Add New Harvest

Harvest Date	Grain / Fruit / Seed / Root / Tuber?	Yield (bu/ac)	Straw / Stover / Hay / Residue Removal (% dry matter)	Delete
09/30/2000	<input checked="" type="checkbox"/>	150	50	X

NEXT

- Choose Tillage, Implements, & Planting
 - Implement Table:
 - Date Applied: 3/31/2000
 - Implement Pass: Intensive Tillage

Step 1 Activities Step 2 **Field Management** Step 3 Report

Parcel Locations → Historic Management → **Baseline Management** → Scenario Management

Pre-2000 2000-2022 Scenarios for 10 year period

Select a parcel: Proxy Farm - con

Proxy Farm - con (250 acres)

Data complete Data incomplete Selected

Parcel Management Summary

Tillage, Implements, Manure/Compost & Planting Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - con in 2000 what were the tillage practices?

Implement Table ?

+ Add New Tillage Application Practice

Date Applied	Implement Pass	Delete
3/31/2000	Intensive Tillage	X

NEXT

- Irrigation: None

Step 1 Activities Step 2 **Field Management** Step 3 Report

Parcel Locations → Historic Management → **Baseline Management** → Scenario Management

Pre-2000 2000-2022 Scenarios for 10 year period

Select a parcel: Proxy Farm - con

Proxy Farm - con (250 acres)

Data complete Data incomplete Selected

Parcel Management Summary

[Delete Selected Crop]

Drag and Drop Crop Rotation

2000 Corn

2001 Corn

Tillage, Implements, Manure/Compost & Planting Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - con in 2000 what were the irrigation practices?

Irrigation Table ?

+ Add New Irrigation Application Practice

Irrigation Start Date	Irrigation End Date	Auto-Irrigate?	Field Available Water Holding Capacity (%)	Irrigation Amount (inches per application)	Days Between Irrigations	Delete
No data to display						

NEXT

- Manure/Compost Application
 - Manure Table:
 - Date Applied: 10/1/2000
 - Manure Type: Farmyard Manure, Solid
 - Amount Applied: 1.00 tons/acre
 - Moisture (%): 45
 - Total Nitrogen (%): 1.20

Step 1 Activities Step 2 **Field Management** Step 3 Report

Parcel Locations → Historic Management → **Baseline Management** → Scenario Management

2000-2022

Tillage, Implements, Manure/Compost Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - con in 2000 what were the manure application practices?

Manure Table View Details Corn Total N Applied(lbs/acre):170.0 Add New Manure Application

Date Applied	Manure Type	Amount Applied	Moisture (%)	Total Nitrogen (%)	C/N Ratio	Delete
10/1/2000	Farmyard Manure, Solid	1.00 tons/acre	45	1.20	11.7	

Parcel Management Summary [Delete Selected Crop]

Drag and Drop Crop Rotation

2000 Corn

NEXT

- Fertilizer Application:
 - Fertilizer Table:
 - Date Applied: 3/31/2000
 - Fertilizer Type: Element-N (N)
 - Total Fertilizer Applied (lbs Fertilizer/acre): 146.00
 - Total N Applied (lbs N/Acre): 146
 - Ammonium %: 0

Step 1 Activities Step 2 **Field Management** Step 3 Report

Parcel Locations → Historic Management → **Baseline Management** → Scenario Management

2000-2022

Tillage, Implements, Manure/Compost Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - con in 2000 what were the fertilizer application practices?

Fertilizer Table View Details Corn Total N Applied(lbs/acre):170.0 Add New Fertilizer Application Practice

Date Applied	Fertilizer Type	Total Fertilizer Applied (lbs Fertilizer/acre)	Total N Applied (lbs N/acre)	Ammonium % (l)	Delete
03/31/2000	Element-N (N)	146.00	146	0	X

Parcel Management Summary [Delete Selected Crop]

Drag and Drop Crop Rotation

2000 Corn
2001 Corn

NEXT

- Liming: None

Step 1

Activities

Step 2

Field Management

Step 3

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Pre-2000

2000-2022

Scenarios for 10 year period

Select a parcel:

Proxy Farm - con

Data complete

Data incomplete

Selected

Tillage, Implements, Manure/Compost Application

Liming

Crop and Planting Date

Irrigation

Fertilizer Application

Burning

For Parcel Proxy Farm - con in 2000 what were the liming practices?

Liming Date

10/13/2001

Liming Material

None

Amount Applied (tons/acre)

0

NEXT

- Burning: None

Step 1

Activities

Step 2

Field Management

Step 3

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Pre-2000

2000-2022

Scenarios for 10 year period

Select a parcel:

Proxy Farm - con

Data complete

Data incomplete

Selected

Tillage, Implements, Manure/Compost Application

Liming

Crop and Planting Date

Irrigation

Fertilizer Application

Burning

For Parcel Proxy Farm - con in 2000 did you burn crop residue (not including orchards and vineyards)?

No burning

Parcel Management Summary

[Delete Selected Crop]

Drag and Drop Crop Rotation

2000 Corn

NEXT

NEW PROMPT

Add Additional Crop for same year?

No

Add Additional Crop?

Would you like to add an additional crop for the same year?

If you have a second crop that spans between calendar years (i.e. **winter wheat**), add it as an additional crop this year and set its harvest date to be in the following year.

Yes, add additional crop for the same year.

No Thanks, Continue >>

No Thanks, Continue

NEW PROMPT

Both parcels are available to copy to.

For the baseline management, copy the conventional practices that were just input to all baseline years for both conventional and alternative parcels.

Copy Crop?

Management for parcel Proxy Farm - con for 2000 is complete.

If you would like to copy the management details to other parcels and/or years, select those parcel-years and click the Copy button.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Proxy Farm - con	select → ✓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓
Proxy Farm - reg	select →	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓

[No, thanks>>](#) [Copy & Continue >>](#)

- Select all years for both parcels

Copy Crop?

Management for parcel Proxy Farm - con for 2000 is complete.

If you would like to copy the management details to other parcels and/or years, select those parcel-years and click the Copy button.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Proxy Farm - con	select → ✓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓
Proxy Farm - reg	select →	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓	select ↓

[No, thanks>>](#) [Copy & Continue >>](#)

Copy & Continue

NEW PROMPT

Continue to future management

All current management (2000-present) is defined for all parcels. You will now be taken to the Future Management page where you will define management scenarios to compare against your current management.

[Keep editing >>](#) [Continue to Future Management >>](#)

Continue to Future Management

- Define Scenario Management – Scenarios for 10 year period (future)
 - *All inputs for Scenario Management are the same as the Baseline Management (2000 - 2022) in the BAU Test Case
- Select the parcel to define field management
 - choose conventional parcel – All inputs are same as AlternativeAg_Scenario 1
 - Choose Crop and Planting Date
 - Annual Crop: Corn
 - Planting Date: 04/30/2023

- Harvest Table
 - Harvest Date: 09/30/2023
 - Grain?: check
 - Yield (bu/ac): 150
 - Stover removal (% dry matter): 50%

Step 1 Activities Step 2 **Field Management** Step 3 Report

Parcel Locations → Historic Management Pre-2000 → Baseline Management 2000-2022 → Scenario Management Scenarios for 10 year period

Selected Scenario [new]

► **Reduced Till & Cover Crop** [delete] [rename]

Select a parcel: Proxy Farm - con [CPA]

Proxy Farm - reg
Proxy Farm - con

Proxy Farm - con (2.50 acres)

Data complete Data incomplete Selected

Parcel Management Summary [Delete Selected Crop]

Drag and Drop Crop Rotation

2023 Corn

Tillage, Implements, Manure/Compost & Planting Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - con in 2023 what crop will you plant, when will you plant, and when will you harvest?

What type of crop?:
☒ Annual Crop/Hay/Grass ☐ Seasonal Cover Crop ☐ Orchard/Vineyard Crop

Crop: Corn

Planting Date: 04/30/2023

Harvest Table [Add New Harvest]

Harvest Date	Grain / Fruit / Seed / Root / Tuber?	Projected Yield (bu/ac)	Straw / Stover / Hay / Residue Removal (% dry matter)	Delete
09/30/2023	<input checked="" type="checkbox"/>	150	50	X

NEXT

- Choose Tillage, Implements, & Planting
 - Implement Table:
 - Date Applied: 3/31/2023
 - Implement Pass: Intensive Tillage

Step 1 Activities Step 2 **Field Management** Step 3 Report

Parcel Locations → Historic Management Pre-2000 → Baseline Management 2000-2022 → Scenario Management Scenarios for 10 year period

Selected Scenario [new]

► **Reduced Till & Cover Crop** [delete] [rename]

Select a parcel: Proxy Farm - con [CPA]

Proxy Farm - reg
Proxy Farm - con

Proxy Farm - con (2.50 acres)

Tillage, Implements, Manure/Compost & Planting Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - con in 2023 what will be your tillage practices?

Implement Table [Add New Tillage Application Practice]

Date Applied	Implement Pass	Delete
3/31/2023	Intensive Tillage	X

NEXT

- Irrigation: None

Step 1 Activities Step 2 Field Management Step 3 Report

Parcel Locations → Historic Management Pre-2000 → Baseline Management 2000-2022 → Scenario Management Scenarios for 10 year period

Selected Scenario [new]
 ▶ Reduced Till & Cover Crop [delete] [rename]

Select a parcel: Proxy Farm - con [CPA]

Proxy Farm - con (2.50 acres)

Data complete Data incomplete Selected

Parcel Management Summary
 [Delete Selected Crop]

Drag and Drop Crop Rotation

Tillage, Implements, Manure/Compost Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - con in 2023 what will be your irrigation practices?

Irrigation Table ?

+ Add New Irrigation Application Pr

Irrigation Start Date	Irrigation End Date	Auto-Irrigate?	Field Available Water Holding Capacity (%)	Irrigation Amount (inches per application)	Days Between Irrigations	Delete
No data to display						

NEXT

- Manure/Compost Application
 - Manure Table:
 - Date Applied: 10/1/2023
 - Manure Type: Farmyard Manure, Solid
 - Amount Applied: 1.00 tons/acre
 - Moisture (%): 45
 - Total Nitrogen (%): 1.20
 - C/N ratio: 11.7

Step 1 Activities Step 2 Field Management Step 3 Report

Parcel Locations → Historic Management Pre-2000 → Baseline Management 2000-2022 → Scenario Management Scenarios for 10 year period

Selected Scenario [new]
 ▶ Reduced Till & Cover Crop [delete] [rename]

Select a parcel: Proxy Farm - con [CPA]

Proxy Farm - con (2.50 acres)

Data complete Data incomplete Selected

Parcel Management Summary
 [Delete Selected Crop]

Tillage, Implements, Manure/Compost Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - con in 2023 what will be your manure application practices?

Manure Table ?

View Details Corn **Total N Applied(lbs/acre):170.0** + Add New Manure A

Date Applied	Manure Type	Amount Applied	Moisture (%)	Total Nitrogen (%)	C/N Ratio	Delete
10/1/2023	Farmyard Manure, Solid	1.00 tons/acre	45	1.20	11.7	

NEXT

- Fertilizer Application
 - Fertilizer Table:
 - Date Applied: 3/31/2023
 - Fertilizer Type: Element-N (N)
 - Total Fertilizer Applied (lbs Fertilizer/acre): 146.00
 - Total N Applied (lbs N/Acre): 146
 - Ammonium %: 0

Step 1 Activities Step 2 Field Management Step 3 Report

Parcel Locations → Historic Management → Baseline Management → Scenario Management

2000-2022

Tillage, Implements, Manure/Compost Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - con in 2023 what will be your fertilizer application practices?

Fertilizer Table View Details Corn Total N Applied(lbs/acre):170.0 Add New Fertilizer Application

Date Applied	Fertilizer Type	Total Fertilizer Applied (lbs Fertilizer/acre)	Total N Applied (lbs N/acre)	Ammonium % (i)	Delete
03/31/2023	Element-N (N)	146.00	146	0	

Selected Scenario [new]

► Reduced Till & Cover Crop [delete] [rename]

Select a parcel: Proxy Farm - con [CPA]

Proxy Farm - con (250 acres)

Data complete Data incomplete Selected

Parcel Management Summary [Delete Selected Crop]

NEXT

- Liming: None

Step 1 Activities Step 2 Field Management Step 3 Report

Parcel Locations → Historic Management → Baseline Management → Scenario Management

Pre-2000 2000-2022

Tillage, Implements, Manure/Compost Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - con in 2023 what will be your liming practices?

Liming Date 10/13/2024 Liming Material None Amount Applied (tons/acre) 0

Selected Scenario [new]

► Reduced Till & Cover Crop [delete] [rename]

Select a parcel: Proxy Farm - con [CPA]

Proxy Farm - con (250 acres)

Data complete Data incomplete Selected

NEXT

- Burning: None

Step 1

Activities

Step 2

Field Management

Step 3

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Manager

Selected Scenario

[new]

▶

Reduced Till & Cover Crop

[delete]

[rename]

Select a parcel:

Proxy Farm - con

CPA

Proxy Farm - con (202 acres)

Tillage, Implements, Manure/Compost Application

Liming

Crop and Planting Date

Irrigation

Fertilizer Application

Burning

For Parcel Proxy Farm - con in 2023 will you burn crop residue (not including orchards and vineyards)?

No burning

NEXT

NEW PROMPT

Copy Crop?

Management for parcel Proxy Farm - con for 2023 is complete.

If you would like to copy the management details to other parcels and/or years, select those parcel-years and click the Copy button.

✓ Crop-Year to be copied

☐ Crop-Year has data

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Proxy Farm - con	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proxy Farm - reg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

No, thanks>>

Copy & Continue >>

- Select all future years for conventional parcel only

Copy Crop?

Management for parcel Proxy Farm - con for 2023 is complete.

If you would like to copy the management details to other parcels and/or years, select those parcel-years and click the Copy button.

✓ Crop-Year to be copied

☐ Crop-Year has data

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Proxy Farm - con	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Proxy Farm - reg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

No, thanks>>

Copy & Continue >>

Copy & Continue

NEW PROMPT

Select **Keep Editing** to edit alternative parcel

Future Management Scenarios

Are you ready to run your report?

Continue to Report >>

If Not...

Create New Scenario

Or

Keep Editing

- Select the parcel to define field management
 - Next, choose the alternative parcel – this one will change to reflect implementation of alternative practices in the future


Step 1 Activities Step 2 **Field Management** Step 3 Report

Parcel Locations → Historic Management Pre-2000 → Baseline Management 2000-2022 → **Scenario Management** Scenarios for 10 year period

Selected Scenario [new]

▶ **Reduced Till & Cover Crop** [delete] [rename]

Select a parcel: Proxy Farm - reg [CPA]



Proxy Farm - reg (200 acres)

Data complete Data incomplete **Selected**

Parcel Management Summary [Delete Selected Crop]

Drag and Drop Crop Rotation

2023 Corn Clover
2024 Corn Clover
2025 Corn Clover
2026 Corn Clover

Tillage, Implements, Manure/Compost Application Liming

Crop and Planting Date Irrigation Fertilizer Application Burning

For Parcel Proxy Farm - reg in 2023 what crop will you plant, when will you plant, and when will you harvest?

What type of crop?:
☒ Annual Crop/Hay/Grass
 ☐ Seasonal Cover Crop
 ☐ Orchard/Vineyard Crop

Crop: Corn

Planting Date: 04/30/2023

⚠ Please ensure that you do not have more than one crop growing at a time and that your planting and harvest dates do not overlap. We can only model one crop growing at a time.

Harvest Table [Add New Harvest]

Harvest Date	Grain / Fruit / Seed / Root / Tuber?	Projected Yield (bu/ac)	Straw / Stover / Hay / Residue Removal (% dry matter)	Delete
09/15/2023	<input checked="" type="checkbox"/>	150	50	X

- Define Scenario Management - Scenarios for 10 year period (future)
 - Choose Crop and Planting Date
 - Annual Crop: Corn
 - Planting Date: 04/30/2023
 - Harvest Table
 - Harvest Date: 09/15/2023
 - Grain?: check
 - Yield (bu/ac): 150
 - Stover removal (% dry matter): 50%
 - Choose Cover Crop and Planting Date
 - Seasonal Cover Crop: Clover
 - Planting Date: 09/16/2023
 - Harvest Table: no harvest

Step 1

Step 2

Step 3

Activities

Field Management

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Selected Scenario [new]

Reduced Till & Cover Crop [delete] [rename]

Select a parcel: Proxy Farm - reg [CPA]

Proxy Farm - reg (2023 acres)

Data complete

Data incomplete

Selected

Parcel Management Summary [Delete Selected Crop]

Drag and Drop Crop Rotation

2023 Corn Clover

2024 Corn Clover

2025 Corn Clover

2026 Corn Clover

2027 Corn Clover

2028 Corn Clover

2029 Corn Clover

Tillage, Implements, Manure/Compost Application

Liming

Crop and Planting Date

Irrigation

Fertilizer Application

Burning

For Parcel Proxy Farm - reg in 2023 what crop will you plant, when will you plant, and when will you harvest?

What type of crop?:

Annual Crop/Hay/Grass

Seasonal Cover Crop

Orchard/Vineyard Crop

Seasonal Cover Crop Clover

Planting Date 09/16/2023

Please ensure that you do not have more than one crop growing at a time and that your planting and harvest dates do not overlap. We can only model one crop growing at a time.

Harvest Table

Add New Harvest

Harvest Date or Kill Date	Straw / Stover / Hay / Residue Removal (% dry matter)	Delete
No data to display		

Grazing Table

Add New Grazing Period

NEXT

- Choose Tillage, Implements, & Planting
 - Implement Table:
 - Date Applied: 3/31/2023
 - Implement Pass: No Tillage

Step 1

Step 2

Step 3

Activities

Field Management

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Selected Scenario [new]

Reduced Till & Cover Crop [delete] [rename]

Select a parcel: Proxy Farm - reg [CPA]

Proxy Farm - reg (2023 acres)

Data complete

Data incomplete

Selected

Tillage, Implements, Manure/Compost Application

Liming

Crop and Planting Date

Irrigation

Fertilizer Application

Burning

For Parcel Proxy Farm - reg in 2023 what will be your tillage practices?

Implement Table

Add New Tillage Application Practice

Date Applied	Implement Pass	Delete
3/31/2023	No Tillage	X

NEXT

- Irrigation: None

Step 1

Activities

Step 2

Field Management

Step 3

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Selected Scenario

Reduced Till & Cover Crop

Select a parcel: Proxy Farm - reg

Proxy Farm - reg

Data complete

Data incomplete

Selected

Parcel Management Summary

Drag and Drop Crop Rotation

Tillage, Implements, Manure/Compost & Planting

Irrigation

Fertilizer Application

Liming

Burning

For Parcel Proxy Farm - reg in 2023 what will be your irrigation practices?

Irrigation Table

Add New Irrigation Appl

Irrigation Start Date	Irrigation End Date	Auto-Irrigate?	Field Available Water Holding Capacity (%)	Irrigation Amount (inches per application)	Days Between Irrigations
No data to display					

NEXT

- Manure/Compost Application: no manure added to cover crop

Step 1

Activities

Step 2

Field Management

Step 3

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Selected Scenario

Reduced Till & Cover Crop

Select a parcel: Proxy Farm - reg

Proxy Farm - reg

Data complete

Data incomplete

Selected

Parcel Management Summary

Drag and Drop Crop Rotation

Tillage, Implements, Manure/Compost & Planting

Irrigation

Fertilizer Application

Liming

Burning

For Parcel Proxy Farm - reg in 2023 what will be your manure application practices?

Manure Table

View Details Clover

Total N Applied(lbs/acre):0.0

Add New Manure Application

Date Applied	Manure Type	Amount Applied	Moisture (%)	Total Nitrogen (%)	C/N Ratio	Delete
No data to display						

NEXT

- Fertilizer Application: no fertilizer added to cover crop

Step 1

Step 2

Step 3

Activities

Field Management

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Selected Scenario [new]

► Reduced Till & Cover Crop [delete] [rename]

Select a parcel: Proxy Farm - reg [CPA]

Data complete

Data incomplete

Selected

Parcel Management Summary

[Delete Selected Crop]

Drag and Drop Crop Rotation

2023 Corn Clover

Tillage, Implements, Manure/Compost & Planting

Irrigation

Fertilizer Application

Liming

Burning

Crop and Planting Date

Fertilizer Application

For Parcel Proxy Farm - reg in 2023 what will be your fertilizer application practices?

Fertilizer Table

View Details Clover

Total N Applied(lbs/acre):0.0

Add

Date Applied	Fertilizer Type	Total Fertilizer Applied (lbs Fertilizer/acre)	Total N Applied (lbs N/acre)
No data to display			

NEXT

- Liming: None

Step 1

Step 2

Step 3

Activities

Field Management

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Selected Scenario [new]

► Reduced Till & Cover Crop [delete] [rename]

Select a parcel: Proxy Farm - reg [CPA]

Data complete

Data incomplete

Selected

Parcel Management Summary

[Delete Selected Crop]

Drag and Drop Crop Rotation

2023 Corn Clover

Tillage, Implements, Manure/Compost & Planting

Irrigation

Fertilizer Application

Liming

Burning

Crop and Planting Date

Fertilizer Application

For Parcel Proxy Farm - reg in 2023 what will be your practices?

Liming Date

09/16/2023

Liming Material

None

NEXT

- Burning: None

Step 1

Activities

Step 2

Field Management

Step 3

Report

Parcel Locations

Historic Management

Baseline Management

Scenario Management

Selected Scenario [new]

Reduced Till & Cover Crop

[delete]

[rename]

Select a parcel:

Proxy Farm - reg

[CPA]

Data complete

Data incomplete

Selected

Parcel Management Summary

[Delete Selected Crop]

Drag and Drop Crop Rotation

2023 Corn Clover

2024 Corn Clover

Tillage, Implements, Manure/Compost Application

Liming

Crop and Planting Date

Irrigation

Fertilizer Application

Burning

For Parcel Proxy Farm - reg in 2023 will you burn crop residue (not including orchards and vineyards)?

No burning

NEXT

NEW PROMPT

Add Additional Crop for same year?

No

Add Additional Crop?

Would you like to add an additional crop for the same year?

If you have a second crop that spans between calendar years (i.e. **winter wheat**), add it as an additional crop this year and set its harvest date to be in the following year.

Yes, add additional crop for the same year.

No Thanks, Continue >>

No Thanks, Continue

NEW PROMPT

Copy Crop?

Management for parcel Proxy Farm - con for 2023 is complete.

If you would like to copy the management details to other parcels and/or years, select those parcel-years and click the Copy button.

✓ Crop-Year to be copied

☐ Crop-Year has data

2023

select

2024

select

2025

select

2026

select

2027

select

2028

select

2029

select

2030

select

2031

select

2032

select

Proxy Farm - con

select

✓

Proxy Farm - reg

select

No, thanks>>

Copy & Continue >>

- Select all future years for alternative (reg) parcel only

Copy Crop?

Management for parcel Proxy Farm - reg for 2023 is complete.

If you would like to copy the management details to other parcels and/or years, select those parcel-years and click the Copy button.

☒ Crop-Year to be copied

☐ Crop-Year has data

2023select

2024select

2025select

2026select

2027select

2028select

2029select

2030select

2031select

2032select

Proxy Farm - conselect

☐

☐

☐

☐

☐

☐

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☐

☐

☐

Proxy Farm - regselect

☒

☒

☒

☒

☒

☒

☒

☒

☒

☒

No, thanks>>

Copy & Continue >>

Copy & Continue

NEW PROMPT

Future Management Scenarios

Are you ready to run your report?

Continue to Report >>

If Not...

Create New ScenarioOrKeep Editing

Continue to Report

Step 1Activities

Step 2Field Management

Step 3Report

Cropland, Pasture, Range, Orchards/Vineyards

Cropland Graphical Report

Available Water Holding Capacity

Report finished: 00:03:38 100% Complete

NAME: Danlyn Brennan

PROJECT: AlternativeAg_Scenario2

REPORTING YEARS: 2023 - 2032

Daycent Service Version: 30cm Daycent Service

JOBID: 32863_70433_272736

Time: Mon Jan 08 2024 17:15:27 GMT-0800 (Pacific Standard Time)

Version: appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)

USDA

United States Department of Agriculture

Natural Resources Conservation Service

Source	Baseline Emissions			Reduced Till & Cover Crop			
	Emissions	+/-	Emissions	+/-	Change	+/-	
Proxy Farm - reg (250 acres - Corn, Clover)							
C (tonnes CO ₂ equiv./yr.)	-54.8	+0/-0	-186.4	+0/-0	-131.6	+0/-0	
CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0	
CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0	
N ₂ O (tonnes CO ₂ equiv./yr.)	563.7	NR	347.0	NR	-216.7	NR	
CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0	
Total	508.9	NR	160.5	NR	-348.4	NR	
Proxy Farm - con (750 acres - Corn)							
C (tonnes CO ₂ equiv./yr.)	-159.9	+0/-0	-159.9	+0/-0	0.0	+0/-0	
CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0	
CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0	
N ₂ O (tonnes CO ₂ equiv./yr.)	1529.5	NR	1529.5	NR	0.0	NR	
CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0	
Total	1369.5	NR	1369.5	NR	0.0	NR	
Total (all parcels)	1878.4	NR	1530.1	NR	-348.4	NR	

AlternativeAg_Scenario 3

*500 acres where a suite of alternative agricultural practices is implemented in the next 10 years and 500 acres where there are no future changes in farming practices a.k.a. business as usual (BAU) of conventional management

- Create two parcels at the same location to represent two different management choices; conventional and alternative/regenerative.

The screenshot shows the 'Parcel Location Attributes' dialog box in a software interface. The dialog has a 'Name' field with the text 'Proxy Farm - con', an 'Area(acres)' field with the value '500', and two buttons: 'Cancel' and 'Save Location'. The background of the interface shows a map with a yellow outline of a parcel labeled 'Proxy Farm - Reg (500 acres)'. The interface also has a sidebar with various options like 'Find Location', 'Add Parcel by Point', 'Add Parcel by Polygon', 'Add Parcel by Circle', 'Modify Parcel', and 'Drag Parcel'. At the top, there are tabs for 'Step 1 Activities', 'Step 2 Field Management', and 'Step 3 Report'.

*Follow the same steps for Historic, Baseline, and Scenario Management for AlternativeAg_Scenario 2. The only difference between inputs for test cases 2-4 is the acreage value for the parcel locations.

Report

Step 1 Activities		Step 2 Field Management		Step 3 Report	
Parcel Locations		Historic Management Pre-2000		Baseline Management 2000-2022	
Scenario Management Scenarios for 10 year period					
I am done defining parcels					
Find Location					
Add Parcel by Point					
Add Parcel by Polygon					
Add Parcel by Circle					
Modify Parcel					
Drag Parcel					

Report finished: 00:00:19 100% Complete

NAME: Danlyn Brennan
PROJECT: AlternativeAg_Scenario3
REPORTING YEARS: 2023 - 2032
Daycent Service Version: 30cm Daycent Service

JOBID: 32863_70474_272787
TIME: Fri Dec 22 2023 12:01:00 GMT-0800 (Pacific Standard Time)
Version: appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)

USDA United States Department of Natural Resources Conservation Service

Source	Baseline Emissions			Reduced Tillage		
	Emissions	+/-	Emissions	+/-	Change	+/-
Proxy Farm - Reg (500 acres - Corn, Clover)						
C (tonnes CO ₂ equiv./yr)	-106.9	+0/-0	-359.7	+0/-0	-252.8	+0/-0
CO ₂ (tonnes/yr)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
CO (tonnes CO ₂ equiv./yr)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
N ₂ O (tonnes CO ₂ equiv./yr)	1024.5	NR ¹	620.2	NR ¹	-404.3	NR ¹
CH ₄ (tonnes CO ₂ equiv./yr)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Total	917.6	NR¹	260.5	NR¹	-657.1	NR¹
Proxy Farm - con (500 acres - Corn)						
C (tonnes CO ₂ equiv./yr)	-106.9	+0/-0	-106.9	+0/-0	0.0	+0/-0
CO ₂ (tonnes/yr)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
CO (tonnes CO ₂ equiv./yr)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
N ₂ O (tonnes CO ₂ equiv./yr)	1024.6	NR ¹	1024.6	NR ¹	0.0	NR ¹
CH ₄ (tonnes CO ₂ equiv./yr)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Total	917.7	NR¹	917.7	NR¹	0.0	NR¹
Total (all parcels)	1835.3	NR¹	1178.2	NR¹	-657.1	NR¹

AlternativeAg_Scenario 4

*750 acres where a suite of alternative agricultural practices are implemented in the next 10 years and 250 acres where there are no future changes in farming practices a.k.a. business as usual (BAU) of conventional management

*Follow the same steps for Historic, Baseline, and Scenario Management for AlternativeAg_Scenario 2. The only difference between inputs for test cases 2-4 is the acreage value for the parcel locations.

Report

Step 1

Activities

Step 2

Field Management

Step 3

Report

Cropland, Pasture, Range, Orchards/Vineyards

Cropland Graphical Report

Available Water Holding Capacity

Report finished: 00:00:05 100% Complete

NAME: Danlyn Brennan

PROJECT: AlternativeAg_Scenario4

REPORTING YEARS: 2023 - 2032

Daycent Service Version: 30cm Daycent Service

JOBID: 32863_70520_272789

TIME: Fri Dec 22 2023 12:30:56 GMT-0800 (Pacific Standard Time)

Version: appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)

USDA

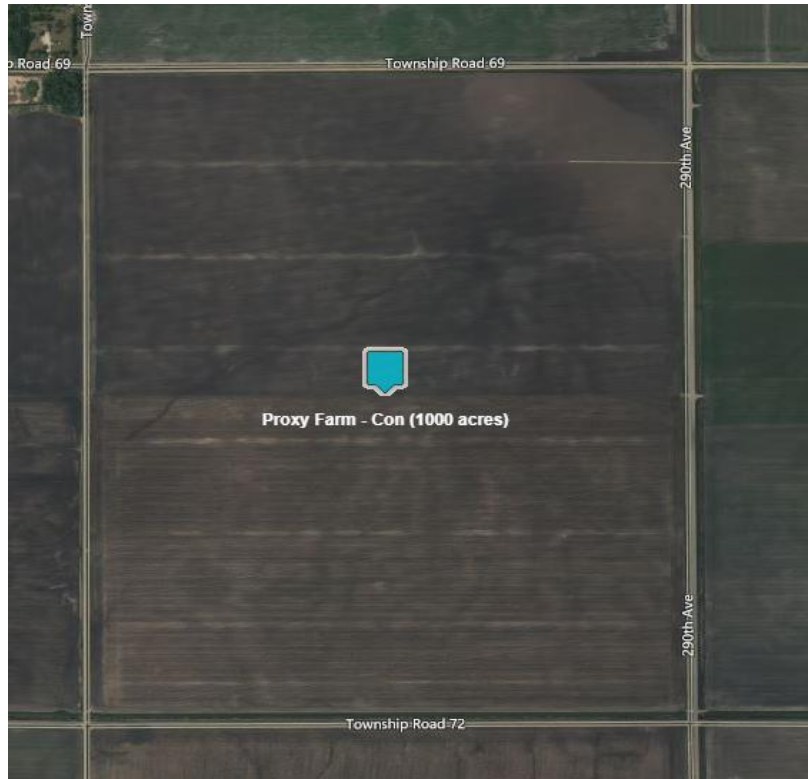
United States Department of Natural Resources

Source	Baseline Emissions		No Till			
	Emissions	+/-	Emissions	+/-	Change	+/-
Proxy Farm - reg (750 acres - Corn, Clover)						
C (tonnes CO ₂ equiv./yr.)	-155.8	+0/-0	-528.4	+0/-0	-372.6	+0/-0
CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
N ₂ O (tonnes CO ₂ equiv./yr.)	1454.1	NR ¹	876.7	NR ¹	-577.4	NR ¹
CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Total	1298.3	NR ¹	348.2	NR ¹	-950.0	NR ¹
Proxy Farm - con (250 acres - Corn)						
C (tonnes CO ₂ equiv./yr.)	-55.4	+0/-0	-55.4	+0/-0	0.0	+0/-0
CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
N ₂ O (tonnes CO ₂ equiv./yr.)	551.4	NR ¹	551.4	NR ¹	0.0	NR ¹
CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Total	496.0	NR ¹	496.0	NR ¹	0.0	NR ¹
Total (all parcels)						
	1794.2	NR ¹	844.2	NR ¹	-950.0	NR ¹

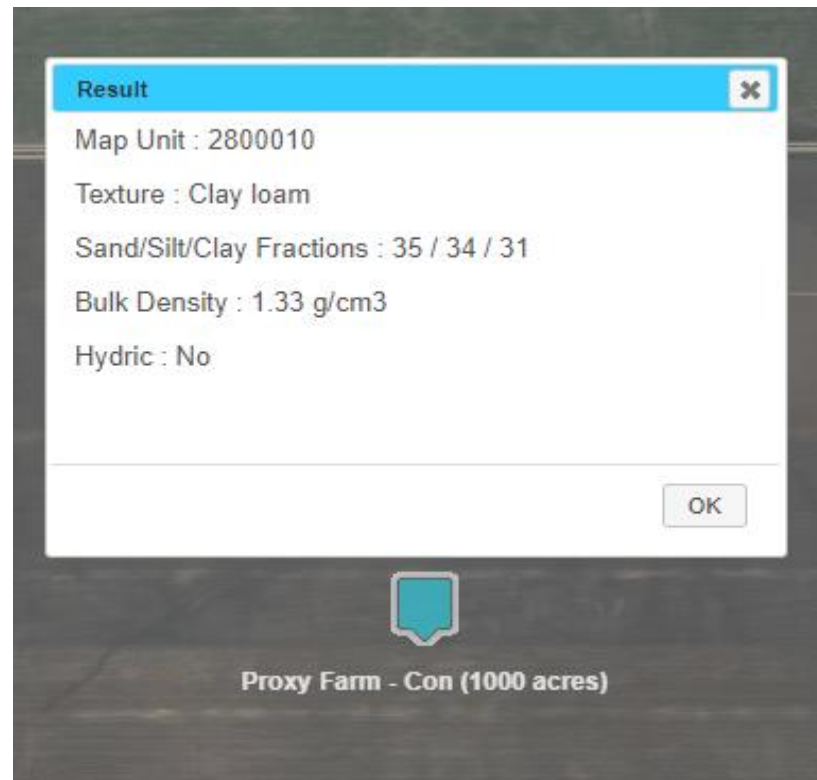
**Agricultural Practices
Supplemental Information:
COMET-Farm Results with
Scaled CI score**

Test Scenario #1 - 0%AltAgPrac

Proxy Farm Location








Soil Data Summary



NAME: Danlyn Brennan
 PROJECT: AlternativeAg_Scenario1
 REPORTING YEARS: 2023 - 2032
 Daycent Service Version: 30cm Daycent Service

JOBID: 32863_69782_272657
 Time: Fri Dec 22 2023 09:39:59 GMT-0800 (Pacific Standard Time)
 Version: appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)

Source	Baseline Emissions		BAU - conventional			
	Emissions	+/-	Emissions	+/-	Change	+/-
Proxy Farm - Con (1000 acres - Corn)						
<input type="checkbox"/> C (tonnes CO ₂ equiv./yr.)	-205.1	+0/-0	-205.1	+0/-0	0.0	+0/-0
Soil	-205.1	+0/-0	-205.1	+0/-0	0.0	+0/-0
<input type="checkbox"/> CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input type="checkbox"/> CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input type="checkbox"/> N ₂ O (tonnes CO ₂ equiv./yr.)	1882.5	NR ¹	1882.5	NR ¹	0.0	NR ¹
Direct N ₂ O Emissions	1765.3	+0/-0	1765.3	+0/-0	0.0	+0/-0
Direct - Soil	1765.3	+0/-0	1765.3	+0/-0	0.0	+0/-0
Direct - Biomass Burning	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Direct - Drained Organic Soil 	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Indirect N ₂ O Emissions	117.2	 +185/-94.5	117.2	 +185/-94.5	0.0	+0/-0
Indirect - Volatilization	117.2	 +185/-94.5	117.2	 +185/-94.5	0.0	+0/-0
Indirect - Leaching and Runoff	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input type="checkbox"/> CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Total	1677.4	NR¹	1677.4	NR¹	0.0	NR¹
Total (all parcels)	1677.4	NR¹	1677.4	NR¹	0.0	NR¹

CAUTION This
report is still
in

development * Yearly results
and the are unavailable
values within for categories period
may not which have averages are
reflect actual monte-carlo presented
values. uncertainty instead.

1. General Information

Report version appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)

Template vers [-] 1
Creation date [date] 12/22/2023
Name [-] Proxy Farm - Con
Area [acres] 1000
State [-] Minnesota
County [-] Wilkin County
Coordinates (N [-] POINT (-10730530.915146995 5829165.567618263)

Parcel Name: Proxy Farm - Con

TimeFrame	Parcel	acres	Scenario	Year	Crop 1	Crop 1 Yield	Crop1 Harvest	Soil Carbon Stock Change (tonnes CO2e/yr)	Soil Direct N2O (tonnes CO2e/yr)	N2O Indirect Emissions (tonnes CO2e/yr)*	GHG Balance Total (tonnes CO2e/yr)*
Current	Proxy Farm - Con	1000	Baseline	2000	Corn	150	(09/30/2000	-668.58734	80.20107	13.83833	-574.548
Current	Proxy Farm - Con	1000	Baseline	2001	Corn	150	(09/30/2001	-699.7072	2277.8572	13.83833	1591.9883
Current	Proxy Farm - Con	1000	Baseline	2002	Corn	150	(09/30/2002	-851.15784	1214.516	13.83833	377.19647
Current	Proxy Farm - Con	1000	Baseline	2003	Corn	150	(09/30/2003	-814.78986	201.1346	13.83833	-599.817

Current	Proxy Farm - Con	1000 Baseline	2004 Corn	150 (09/30/2004	-809.23083	361.6815	13.83833	-433.711
Current	Proxy Farm - Con	1000 Baseline	2005 Corn	150 (09/30/2005	-478.95654	467.37967	13.83833	2.2614565
Current	Proxy Farm - Con	1000 Baseline	2006 Corn	150 (09/30/2006	-683.59924	1207.4653	13.83833	537.7044
Current	Proxy Farm - Con	1000 Baseline	2007 Corn	150 (09/30/2007	-822.7576	244.71552	13.83833	-564.2038
Current	Proxy Farm - Con	1000 Baseline	2008 Corn	150 (09/30/2008	-504.42007	3194.6904	13.83833	2704.1086
Current	Proxy Farm - Con	1000 Baseline	2009 Corn	150 (09/30/2009	-474.63147	2352.9712	13.83833	1892.1781
Current	Proxy Farm - Con	1000 Baseline	2010 Corn	150 (09/30/2010	-391.28262	412.31073	13.83833	34.866436
Current	Proxy Farm - Con	1000 Baseline	2011 Corn	150 (09/30/2011	-342.9121	2408.2188	13.83833	2079.145
Current	Proxy Farm - Con	1000 Baseline	2012 Corn	150 (09/30/2012	-596.37836	330.66537	13.83833	-251.8747
Current	Proxy Farm - Con	1000 Baseline	2013 Corn	150 (09/30/2013	-617.8741	1901.4924	13.83833	1297.4568
Current	Proxy Farm - Con	1000 Baseline	2014 Corn	150 (09/30/2014	-421.02686	3852.3262	13.83833	3445.1377
Current	Proxy Farm - Con	1000 Baseline	2015 Corn	150 (09/30/2015	-437.77628	296.31628	13.83833	-127.6217
Current	Proxy Farm - Con	1000 Baseline	2016 Corn	150 (09/30/2016	-352.15503	445.4497	13.83833	107.13301
Current	Proxy Farm - Con	1000 Baseline	2017 Corn	150 (09/30/2017	-192.2129	295.88184	13.83833	117.50726
Current	Proxy Farm - Con	1000 Baseline	2018 Corn	150 (09/30/2018	-236.01862	6169.06	13.83833	5946.88
Current	Proxy Farm - Con	1000 Baseline	2019 Corn	150 (09/30/2019	-337.90442	3626.5195	13.83833	3302.4536
Current	Proxy Farm - Con	1000 Baseline	2020 Corn	150 (09/30/2020	-209.23682	187.68057	13.83833	-7.717914
Current	Proxy Farm - Con	1000 Baseline	2021 Corn	150 (09/30/2021	-574.1709	2043.347	13.83833	1483.0145
Current	Proxy Farm - Con	1000 Baseline	2022 Corn	150 (09/30/2022	-274.8919	3890.2104	13.83833	3629.157

AVG:	-512.6816913	1628.7866	13.83833	1129.9432
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Future	Proxy Farm - Con	1000 Baseline	2023 Corn	150 (09/30/2023	-297.68973	249.5622	117.17799	69.05046
Future	Proxy Farm - Con	1000 Baseline	2024 Corn	150 (09/30/2024	-221.77522	470.67017	117.17799	366.07294
Future	Proxy Farm - Con	1000 Baseline	2025 Corn	150 (09/30/2025	-68.72771	313.8534	117.17799	362.30368
Future	Proxy Farm - Con	1000 Baseline	2026 Corn	150 (09/30/2026	-118.63441	6233.786	117.17799	6232.33
Future	Proxy Farm - Con	1000 Baseline	2027 Corn	150 (09/30/2027	-227.0732	3675.0444	117.17799	3565.1492
Future	Proxy Farm - Con	1000 Baseline	2028 Corn	150 (09/30/2028	-108.37039	197.6201	117.17799	206.4277
Future	Proxy Farm - Con	1000 Baseline	2029 Corn	150 (09/30/2029	-478.84448	1750.8981	117.17799	1389.2316
Future	Proxy Farm - Con	1000 Baseline	2030 Corn	150 (09/30/2030	-185.80627	3936.2817	117.17799	3867.6536
Future	Proxy Farm - Con	1000 Baseline	2031 Corn	150 (09/30/2031	-211.72638	332.84744	117.17799	238.29906
Future	Proxy Farm - Con	1000 Baseline	2032 Corn	150 (09/30/2032	-131.85265	492.5601	117.17799	477.88544

AVG:	-205.050044	1765.3124	117.17799	1677.4404
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	Acres	125,000	209680
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Acres	150,000	251616
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Future	Proxy Farm - Con	1000 BAU - con\	2023 Corn	150 (09/30/2023	-297.68973	249.5622	117.17799	69.05046
Future	Proxy Farm - Con	1000 BAU - con\	2024 Corn	150 (09/30/2024	-221.77522	470.67017	117.17799	366.07294
Future	Proxy Farm - Con	1000 BAU - con\	2025 Corn	150 (09/30/2025	-68.72771	313.8534	117.17799	362.30368
Future	Proxy Farm - Con	1000 BAU - con\	2026 Corn	150 (09/30/2026	-118.63441	6233.786	117.17799	6232.33
Future	Proxy Farm - Con	1000 BAU - con\	2027 Corn	150 (09/30/2027	-227.0732	3675.0444	117.17799	3565.1492
Future	Proxy Farm - Con	1000 BAU - con\	2028 Corn	150 (09/30/2028	-108.37039	197.6201	117.17799	206.4277
Future	Proxy Farm - Con	1000 BAU - con\	2029 Corn	150 (09/30/2029	-478.84448	1750.8981	117.17799	1389.2316
Future	Proxy Farm - Con	1000 BAU - con\	2030 Corn	150 (09/30/2030	-185.80627	3936.2817	117.17799	3867.6536
Future	Proxy Farm - Con	1000 BAU - con\	2031 Corn	150 (09/30/2031	-211.72638	332.84744	117.17799	238.29906
Future	Proxy Farm - Con	1000 BAU - con\	2032 Corn	150 (09/30/2032	-131.85265	492.5601	117.17799	477.88544

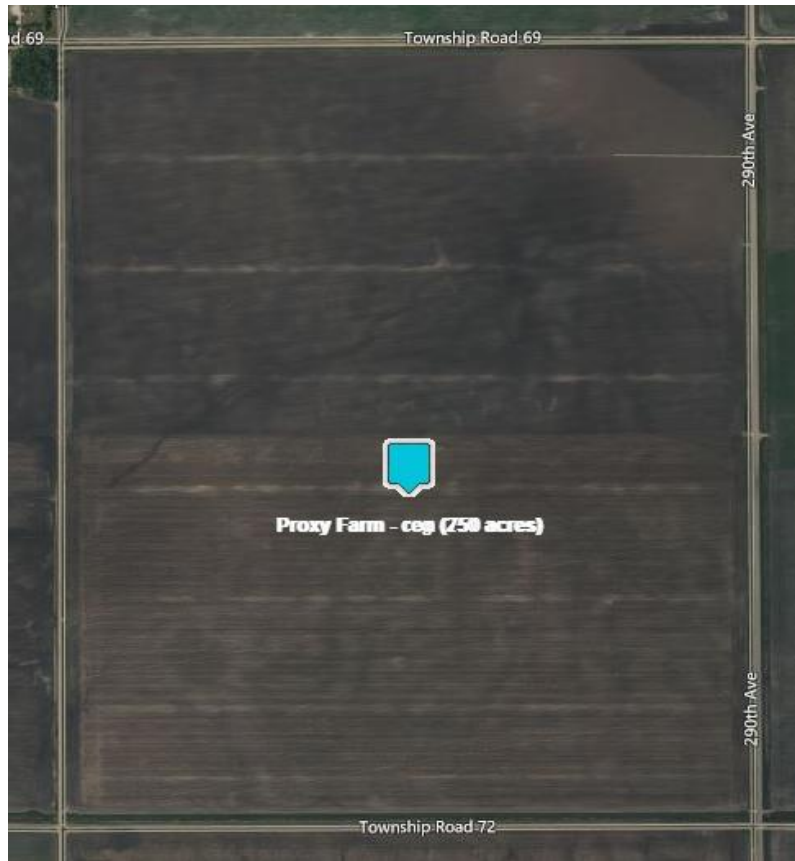
AVG:	-205.050044	1765.3124	117.17799	1677.4404
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Acres	125,000	209680
	150,000	251616
	Change	0

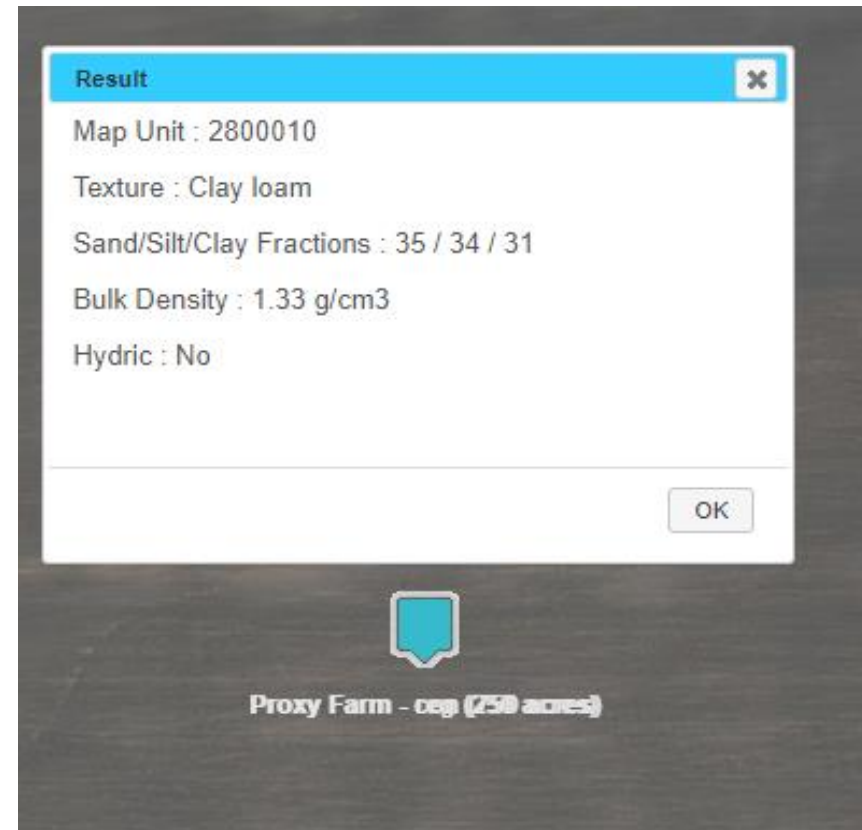
Scaled Emissions:	Acres	Scenario	Project Scale Emissions (tonnes)	CI score (gCO2e/MJ)
1000 acre proxy scaled by estimated total acres needed to supply the max feedstock required for maximum ethanol production	125,000	Baseline	209680	40.06
	150,000		251616	48.07
	125,000	Future	209680	40.06
	150,000		251616	48.07
	125,000	Change	0	0.00
	150,000		0	0.00

Test Scenario #2 - 25%AltAgPrac

Proxy Farm Location



Soil Data Summary



NAME: Danlyn Brennan
 PROJECT: AlternativeAg_Scenario2
 REPORTING YEARS: 2023 - 2032
 Daycent Service Version: 30cm Daycent Service

JOBID: 32863_70433_272736
 TIME: Thu Dec 21 2023 16:49:51 GMT-0800 (Pacific Standard Time)
 Version: appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)

Source	Baseline Emissions		Reduced Till & Cover Crop			
	Emissions	+/-	Emissions	+/-	Change	+/-
Proxy Farm - reg (250 acres - Corn, Clover)						
C (tonnes CO ₂ equiv./yr.)	-56.4	+0/-0	-186.9	+0/-0	-130.5	+0/-0
Soil	-56.4	+0/-0	-186.9	+0/-0	-130.5	+0/-0
CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
N ₂ O (tonnes CO ₂ equiv./yr.)	562.9	NR [†]	346.6	NR [†]	-216.3	NR [†]
CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Total	506.5	NR [†]	159.7	NR [†]	-346.8	NR [†]
Proxy Farm - con (750 acres - Corn)						
C (tonnes CO ₂ equiv./yr.)	-159.9	+0/-0	-159.9	+0/-0	0.0	+0/-0
CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
N ₂ O (tonnes CO ₂ equiv./yr.)	1529.5	NR [†]	1529.5	NR [†]	0.0	NR [†]
Direct N ₂ O Emissions	1441.6	+0/-0	1441.6	+0/-0	0.0	+0/-0
Direct - Soil	1441.6	+0/-0	1441.6	+0/-0	0.0	+0/-0
Direct - Biomass Burning	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Direct - Drained Organic Soil	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Indirect N ₂ O Emissions	87.9	+138.7/-70.9	87.9	+138.7/-70.9	0.0	+0/-0
Indirect - Volatilization	87.9	+138.7/-70.9	87.9	+138.7/-70.9	0.0	+0/-0
Indirect - Leaching and Runoff	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Total	1369.5	NR [†]	1369.5	NR [†]	0.0	NR [†]
Total (all parcels)	1876.0	NR [†]	1529.2	NR [†]	-346.8	NR [†]

CAUTION This report is still in development and the values within may not reflect actual values.

* Yearly results are unavailable for categories which have monte-carlo uncertainty

period averages are presented instead.

1. General Information

Report version appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)

Template version [-] 1

Creation date [date] 12/22/2023

Name [-] Proxy Farm - con

Area [acres] 750

State [-] Minnesota

County [-] Wilkin County

Coordinates (Mercator) [-] POINT (-10730516.224198114 5828979.39561049)

Parcel Name: Proxy Farm - con

TimeFrame	Parcel	acres	Scenario	Year	Crop1	Yield	Crop1 Harvest	Soil Carbon	Soil Direct	N2O	GHG
								Stock Change (tonnes CO2e/yr)	N2O (tonnes CO2e/yr)	Indirect Emissions (tonnes CO2e/yr)*	Balance Total (tonnes CO2e/yr)*
Current	Proxy Farm - con	750	Baseline	2000	Corn	150	(09/30/2000; 150	-546.9406	63.90022	10.37875	-472.662
Current	Proxy Farm - con	750	Baseline	2001	Corn	150	(09/30/2001; 150	-523.0107	1895.678	10.37875	1383.047
Current	Proxy Farm - con	750	Baseline	2002	Corn	150	(09/30/2002; 150	-664.2	998.0082	10.37875	344.187
Current	Proxy Farm - con	750	Baseline	2003	Corn	150	(09/30/2003; 150	-631.6164	160.1674	10.37875	-461.07
Current	Proxy Farm - con	750	Baseline	2004	Corn	150	(09/30/2004; 150	-622.3025	289.7942	10.37875	-322.13
Current	Proxy Farm - con	750	Baseline	2005	Corn	150	(09/30/2005; 150	-370.8524	376.2428	10.37875	15.76916
Current	Proxy Farm - con	750	Baseline	2006	Corn	150	(09/30/2006; 150	-533.0186	967.9932	10.37875	445.3533
Current	Proxy Farm - con	750	Baseline	2007	Corn	150	(09/30/2007; 150	-641.4052	192.3129	10.37875	-438.714
Current	Proxy Farm - con	750	Baseline	2008	Corn	150	(09/30/2008; 150	-411.729	2608.098	10.37875	2206.748

Current	Proxy Farm - con	750 Baseline	2009 Corn	150 (09/30/2009;	-363.5001	1956.988	10.37875	1603.867
Current	Proxy Farm - con	750 Baseline	2010 Corn	150 (09/30/2010;	-303.8266	317.1204	10.37875	23.67257
Current	Proxy Farm - con	750 Baseline	2011 Corn	150 (09/30/2011;	-268.7345	2002.407	10.37875	1744.052
Current	Proxy Farm - con	750 Baseline	2012 Corn	150 (09/30/2012;	-452.2901	268.2908	10.37875	-173.621
Current	Proxy Farm - con	750 Baseline	2013 Corn	150 (09/30/2013;	-484.4534	1531.443	10.37875	1057.369
Current	Proxy Farm - con	750 Baseline	2014 Corn	150 (09/30/2014;	-343.0878	3163.117	10.37875	2830.408
Current	Proxy Farm - con	750 Baseline	2015 Corn	150 (09/30/2015;	-338.822	236.5903	10.37875	-91.853
Current	Proxy Farm - con	750 Baseline	2016 Corn	150 (09/30/2016;	-271.3613	350.465	10.37875	89.48241
Current	Proxy Farm - con	750 Baseline	2017 Corn	150 (09/30/2017;	-151.7033	234.6889	10.37875	93.3643
Current	Proxy Farm - con	750 Baseline	2018 Corn	150 (09/30/2018;	-182.8937	5036.145	10.37875	4863.63
Current	Proxy Farm - con	750 Baseline	2019 Corn	150 (09/30/2019;	-262.9429	3021.95	10.37875	2769.386
Current	Proxy Farm - con	750 Baseline	2020 Corn	150 (09/30/2020;	-158.8199	147.3283	10.37875	-1.11283
Current	Proxy Farm - con	750 Baseline	2021 Corn	150 (09/30/2021;	-447.6309	1702.078	10.37875	1264.826
Current	Proxy Farm - con	750 Baseline	2022 Corn	150 (09/30/2022;	-229.9857	3194.258	10.37875	2974.651
AVG:					-400.2229	1335.438	10.37875	945.5935

Future	Proxy Farm - con	750 Baseline	2023 Corn	150 (09/30/2023;	-228.9953	195.8785	87.88349	54.76664
Future	Proxy Farm - con	750 Baseline	2024 Corn	150 (09/30/2024;	-170.0086	370.3333	87.88349	288.2081
Future	Proxy Farm - con	750 Baseline	2025 Corn	150 (09/30/2025;	-56.00983	249.0266	87.88349	280.9002
Future	Proxy Farm - con	750 Baseline	2026 Corn	150 (09/30/2026;	-91.9253	5090.016	87.88349	5085.974
Future	Proxy Farm - con	750 Baseline	2027 Corn	150 (09/30/2027;	-177.0914	3062.04	87.88349	2972.832
Future	Proxy Farm - con	750 Baseline	2028 Corn	150 (09/30/2028;	-80.38798	155.1263	87.88349	162.6218
Future	Proxy Farm - con	750 Baseline	2029 Corn	150 (09/30/2029;	-373.4686	1407.736	87.88349	1122.151
Future	Proxy Farm - con	750 Baseline	2030 Corn	150 (09/30/2030;	-160.2695	3232.032	87.88349	3159.646
Future	Proxy Farm - con	750 Baseline	2031 Corn	150 (09/30/2031;	-161.1161	265.9503	87.88349	192.7177
Future	Proxy Farm - con	750 Baseline	2032 Corn	150 (09/30/2032;	-100.1578	387.8811	87.88349	375.6068
AVG:					-159.943	1441.602	87.88349	1369.542
					Scaled Emissions	Acres	125,000	171193
							150,000	205431

Future	Proxy Farm - con	750 Reduced Ti	2023 Corn	150 (09/30/2023;	-228.9953	195.8785	87.88349	54.76664
Future	Proxy Farm - con	750 Reduced Ti	2024 Corn	150 (09/30/2024;	-170.0086	370.3333	87.88349	288.2081
Future	Proxy Farm - con	750 Reduced Ti	2025 Corn	150 (09/30/2025;	-56.00983	249.0266	87.88349	280.9002

Future	Proxy Farm - con	750 Reduced Ti	2026 Corn	150 (09/30/2026;	-91.9253	5090.016	87.88349	5085.974
Future	Proxy Farm - con	750 Reduced Ti	2027 Corn	150 (09/30/2027;	-177.0914	3062.04	87.88349	2972.832
Future	Proxy Farm - con	750 Reduced Ti	2028 Corn	150 (09/30/2028;	-80.38798	155.1263	87.88349	162.6218
Future	Proxy Farm - con	750 Reduced Ti	2029 Corn	150 (09/30/2029;	-373.4686	1407.736	87.88349	1122.151
Future	Proxy Farm - con	750 Reduced Ti	2030 Corn	150 (09/30/2030;	-160.2695	3232.032	87.88349	3159.646
Future	Proxy Farm - con	750 Reduced Ti	2031 Corn	150 (09/30/2031;	-161.1161	265.9503	87.88349	192.7177
Future	Proxy Farm - con	750 Reduced Ti	2032 Corn	150 (09/30/2032;	-100.1578	387.8811	87.88349	375.6068

AVG:	-159.943	1441.602	87.88349	1369.542
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Scaled	Acres	125,000	171193
Emissions		150,000	205431
		Change:	0

1. General Information

Report version	appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)		
Template version	[-]	1	
Creation date	[date]	12/22/2023	
Name	[-]	Proxy Farm - reg	
Area	[acres]	250	
State	[-]	Minnesota	
County	[-]	Wilkin County	
Coordinates (Mercator)	[-]	POINT (-10730517.09438146 5828979.75918612)	

Parcel Name: Proxy Farm - reg

TimeFrame	Parcel	acres	Scenario	Year	Crop1	Crop1 Yield	Crop1 Harvest	Soil Carbon Stock Change (tonnes CO2e/yr)	Soil Direct N2O (tonnes CO2e/yr)	N2O Indirect Emissions (tonnes CO2e/yr)*	GHG Balance Total (tonnes CO2e/yr)*
Current	Proxy Farm - reg	250	Baseline	2000	Corn	150 (09/30/2000;		-205.1363	23.31297	3.459583	-178.364
Current	Proxy Farm - reg	250	Baseline	2001	Corn	150 (09/30/2001;		-173.0081	724.3635	3.459583	554.8149
Current	Proxy Farm - reg	250	Baseline	2002	Corn	150 (09/30/2002;		-233.8227	376.8276	3.459583	146.4644
Current	Proxy Farm - reg	250	Baseline	2003	Corn	150 (09/30/2003;		-220.5902	58.13047	3.459583	-159

Current	Proxy Farm - reg	250 Baseline	2004 Corn	150 (09/30/2004;	-215.1007	104.996	3.459583	-106.645
Current	Proxy Farm - reg	250 Baseline	2005 Corn	150 (09/30/2005;	-129.4392	137.3425	3.459583	11.3629
Current	Proxy Farm - reg	250 Baseline	2006 Corn	150 (09/30/2006;	-187.266	345.8634	3.459583	162.057
Current	Proxy Farm - reg	250 Baseline	2007 Corn	150 (09/30/2007;	-225.5425	69.79719	3.459583	-152.286
Current	Proxy Farm - reg	250 Baseline	2008 Corn	150 (09/30/2008;	-153.5757	963.6422	3.459583	813.5261
Current	Proxy Farm - reg	250 Baseline	2009 Corn	150 (09/30/2009;	-125.1124	746.8815	3.459583	625.2287
Current	Proxy Farm - reg	250 Baseline	2010 Corn	150 (09/30/2010;	-106.3904	109.627	3.459583	6.696185
Current	Proxy Farm - reg	250 Baseline	2011 Corn	150 (09/30/2011;	-95.27042	763.9717	3.459583	672.1609
Current	Proxy Farm - reg	250 Baseline	2012 Corn	150 (09/30/2012;	-153.1917	99.66023	3.459583	-50.0719
Current	Proxy Farm - reg	250 Baseline	2013 Corn	150 (09/30/2013;	-172.1326	546.2211	3.459583	377.5481
Current	Proxy Farm - reg	250 Baseline	2014 Corn	150 (09/30/2014;	-127.7848	1188.359	3.459583	1064.034
Current	Proxy Farm - reg	250 Baseline	2015 Corn	150 (09/30/2015;	-117.9576	86.02016	3.459583	-28.4779
Current	Proxy Farm - reg	250 Baseline	2016 Corn	150 (09/30/2016;	-94.33585	124.8384	3.459583	33.96214
Current	Proxy Farm - reg	250 Baseline	2017 Corn	150 (09/30/2017;	-54.51491	84.96592	3.459583	33.91059
Current	Proxy Farm - reg	250 Baseline	2018 Corn	150 (09/30/2018;	-63.791	1845.322	3.459583	1784.991
Current	Proxy Farm - reg	250 Baseline	2019 Corn	150 (09/30/2019;	-92.37151	1157.503	3.459583	1068.591
Current	Proxy Farm - reg	250 Baseline	2020 Corn	150 (09/30/2020;	-53.93921	52.55088	3.459583	2.07125
Current	Proxy Farm - reg	250 Baseline	2021 Corn	150 (09/30/2021;	-157.6322	652.4096	3.459583	498.237
Current	Proxy Farm - reg	250 Baseline	2022 Corn	150 (09/30/2022;	-88.37473	1199.918	3.459583	1115.003
AVG:					-141.1426	498.3706	3.459583	360.6876

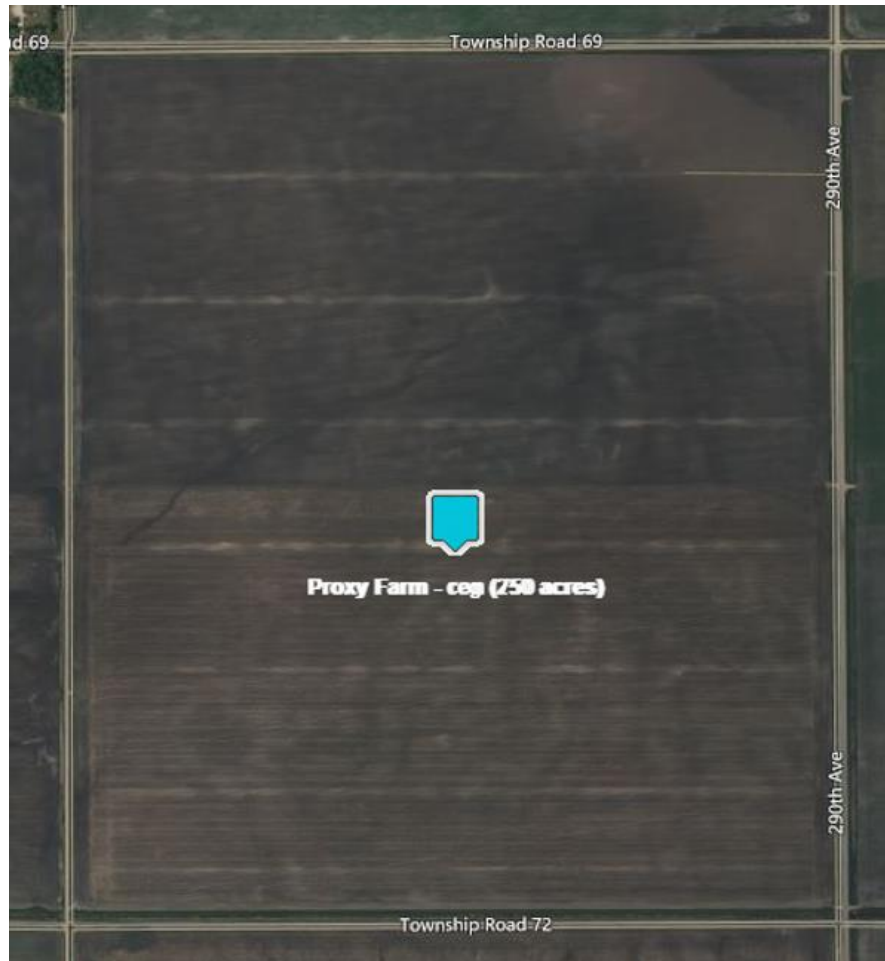
Future	Proxy Farm - reg	250 Baseline	2023 Corn	150 (09/30/2023;	-79.09055	69.63326	29.2945	19.8372
Future	Proxy Farm - reg	250 Baseline	2024 Corn	150 (09/30/2024;	-58.76355	131.9421	29.2945	102.473
Future	Proxy Farm - reg	250 Baseline	2025 Corn	150 (09/30/2025;	-21.11107	90.18942	29.2945	98.37285
Future	Proxy Farm - reg	250 Baseline	2026 Corn	150 (09/30/2026;	-32.03272	1866.176	29.2945	1863.438
Future	Proxy Farm - reg	250 Baseline	2027 Corn	150 (09/30/2027;	-62.41854	1172.689	29.2945	1139.565
Future	Proxy Farm - reg	250 Baseline	2028 Corn	150 (09/30/2028;	-26.4187	55.32817	29.2945	58.20397
Future	Proxy Farm - reg	250 Baseline	2029 Corn	150 (09/30/2029;	-131.604	500.8962	29.2945	398.5867
Future	Proxy Farm - reg	250 Baseline	2030 Corn	150 (09/30/2030;	-63.72097	1214.023	29.2945	1179.596
Future	Proxy Farm - reg	250 Baseline	2031 Corn	150 (09/30/2031;	-54.83438	96.75941	29.2945	71.21953
Future	Proxy Farm - reg	250 Baseline	2032 Corn	150 (09/30/2032;	-34.28297	138.3672	29.2945	133.3787
AVG:					-56.42774	533.6003	29.2945	506.4671
					Scaled	Across	125,000	63308

						Emissions	Acres	150,000	75970
Future	Proxy Farm - reg	250 Reduced Ti	2023 Corn	150 (09/15/2023;		-117.6406	56.92877	17.92232	-42.7895
Future	Proxy Farm - reg	250 Reduced Ti	2024 Corn	150 (09/15/2024;		-133.7022	94.54151	17.92232	-21.2384
Future	Proxy Farm - reg	250 Reduced Ti	2025 Corn	150 (09/15/2025;		-155.6002	68.40384	17.92232	-69.2741
Future	Proxy Farm - reg	250 Reduced Ti	2026 Corn	150 (09/15/2026;		-177.5272	1139.226	17.92232	979.6213
Future	Proxy Farm - reg	250 Reduced Ti	2027 Corn	150 (09/15/2027;		-198.8526	615.114	17.92232	434.1838
Future	Proxy Farm - reg	250 Reduced Ti	2028 Corn	150 (09/15/2028;		-165.9421	35.9631	17.92232	-112.057
Future	Proxy Farm - reg	250 Reduced Ti	2029 Corn	150 (09/15/2029;		-287.7827	331.3943	17.92232	61.53386
Future	Proxy Farm - reg	250 Reduced Ti	2030 Corn	150 (09/15/2030;		-197.6753	797.1423	17.92232	617.3892
Future	Proxy Farm - reg	250 Reduced Ti	2031 Corn	150 (09/15/2031;		-217.1732	66.04348	17.92232	-133.207
Future	Proxy Farm - reg	250 Reduced Ti	2032 Corn	150 (09/15/2032;		-217.133	81.96846	17.92232	-117.242
AVG:						-186.9029	328.6726	17.92232	159.692
						Scaled Emissions	Acres	125,000	19961
								150,000	23954
								Change:	-347

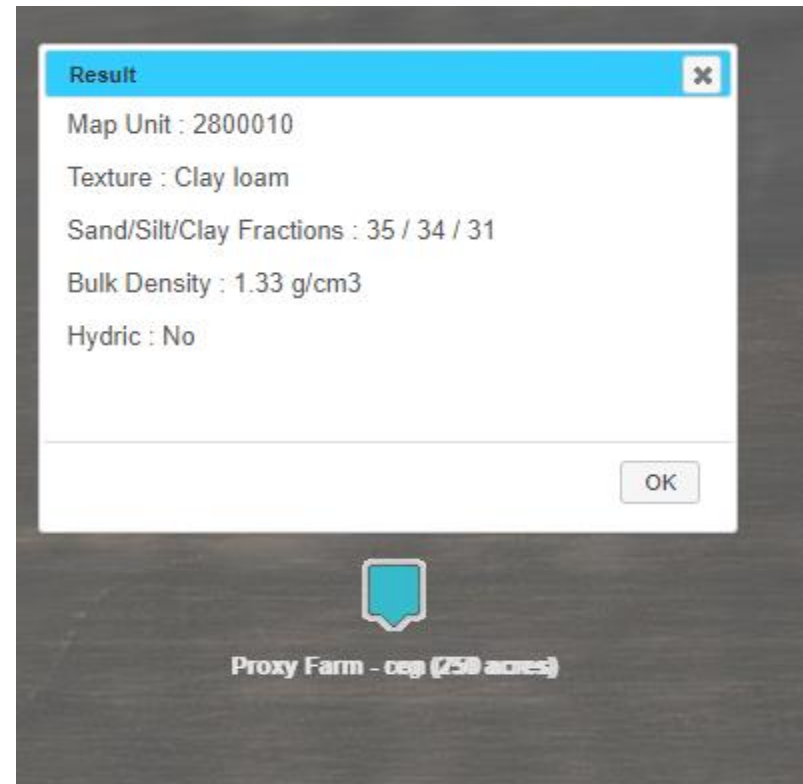
Scaled Emissions:	Acres	Scenario	Project Scale Emissions (tonnes CO2e/year)	CI score (gCO2e/MJ)
1000 acre proxy scaled by estimated total acres needed to supply the max feedstock required for maximum ethanol production	125,000	Baseline	234501	44.80
	150,000		281401	53.76
	125,000	Future	191154	36.52
	150,000		229385	43.82
	125,000	Change	-43347	-8.28
	150,000		-52016	-9.94
	125,000	Con	0	-
	150,000		0	-
	125,000	AltAg	-43347	-
	150,000		-52016	-

Test Scenario #3 - 50%AltAgPrac

Proxy Farm Location



Soil Data Summary



NAME: Danlyn Brennan
 PROJECT: AlternativeAg_Scenario3
 REPORTING YEARS: 2023 - 2032
 Daycent Service Version: 30cm Daycent Service

JOBID: 32863_70474_272787
 TIME: Fri Dec 22 2023 12:01:00 GMT-0800 (Pacific Standard Time)
 Version: appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)

Source	Baseline Emissions		Reduced Tillage			
	Emissions	+/-	Emissions	+/-	Change	+/-
Proxy Farm - con (500 acres - Corn)						
<input type="checkbox"/> C (tonnes CO ₂ equiv./yr.)	-106.9	+0/-0	-106.9	+0/-0	0.0	+0/-0
Soil	-106.9	+0/-0	-106.9	+0/-0	0.0	+0/-0
<input checked="" type="checkbox"/> CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input checked="" type="checkbox"/> CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input type="checkbox"/> N ₂ O (tonnes CO ₂ equiv./yr.)	1024.6	NR ¹	1024.6	NR ¹	0.0	NR ¹
Direct N ₂ O Emissions	966.0	+0/-0	966.0	+0/-0	0.0	+0/-0
Direct - Soil	966.0	+0/-0	966.0	+0/-0	0.0	+0/-0
Direct - Biomass Burning	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Direct - Drained Organic Soil	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Indirect N ₂ O Emissions	58.6	+92.5/-47.3	58.6	+92.5/-47.3	0.0	+0/-0
Indirect - Volatilization	58.6	+92.5/-47.3	58.6	+92.5/-47.3	0.0	+0/-0
Indirect - LeachingandRunoff	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input checked="" type="checkbox"/> CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Total	917.7	NR ¹	917.7	NR ¹	0.0	NR ¹
Proxy Farm - Reg (500 acres - Corn, Clover)						
<input type="checkbox"/> C (tonnes CO ₂ equiv./yr.)	-106.9	+0/-0	-359.7	+0/-0	-252.8	+0/-0
Soil	-106.9	+0/-0	-359.7	+0/-0	-252.8	+0/-0
<input checked="" type="checkbox"/> CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input checked="" type="checkbox"/> CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input type="checkbox"/> N ₂ O (tonnes CO ₂ equiv./yr.)	1024.5	NR ¹	620.2	NR ¹	-404.3	NR ¹
Direct N ₂ O Emissions	966.0	+0/-0	584.4	+0/-0	-381.6	+0/-0
Direct - Soil	966.0	+0/-0	584.4	+0/-0	-381.6	+0/-0
Direct - Biomass Burning	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Direct - Drained Organic Soil	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Indirect N ₂ O Emissions	58.6	+92.5/-47.3	35.8	+53.8/-28.6	-22.7	+18.9/-40.3
Indirect - Volatilization	58.6	+92.5/-47.3	35.8	+53.8/-28.6	-22.7	+18.9/-40.3
Indirect - LeachingandRunoff	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input checked="" type="checkbox"/> CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Total	917.6	NR ¹	260.5	NR ¹	-657.1	NR ¹
Total (all parcels)	1835.3	NR ¹	1178.2	NR ¹	-657.1	NR ¹

CAUTION This report is still in development and the values within may not reflect actual values.

* Yearly results are unavailable for categories which have monte-carlo uncertainty period averages are presented instead.

1. General Information

Report version appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)
 Template version [-] 1
 Creation date [date] 12/22/2023
 Name [-] Proxy Farm - con
 Area [acres] 500
 State [-] Minnesota
 County [-] Wilkin County
 Coordinates (Mercator) [-] POINT (-10730568.275822932 5829200.427514785)

Parcel Name: Proxy Farm - con

TimeFrame	Parcel	acres	Scenario	Year	Crop1	Crop 1 Yield	Crop1 Harvest	Soil Carbon Stock Change (tonnes CO2e/yr)	Soil Direct N2O (tonnes CO2e/yr)	N2O Indirect Emissions (tonnes CO2e/yr)*	GHG Balance Total (tonnes CO2e/yr)*
Current	Proxy Farm - con	500	Baseline	2000	Corn	150	(09/30/2000;	-365.675	42.6436	6.919165	-316.112
Current	Proxy Farm - con	500	Baseline	2001	Corn	150	(09/30/2001;	-348.505	1265.893	6.919165	924.3064
Current	Proxy Farm - con	500	Baseline	2002	Corn	150	(09/30/2002;	-444.492	665.2873	6.919165	227.7148
Current	Proxy Farm - con	500	Baseline	2003	Corn	150	(09/30/2003;	-422.138	106.8036	6.919165	-308.415
Current	Proxy Farm - con	500	Baseline	2004	Corn	150	(09/30/2004;	-415.501	193.6464	6.919165	-214.935
Current	Proxy Farm - con	500	Baseline	2005	Corn	150	(09/30/2005;	-248.012	251.7507	6.919165	10.65748
Current	Proxy Farm - con	500	Baseline	2006	Corn	150	(09/30/2006;	-356.289	649.7017	6.919165	300.3318
Current	Proxy Farm - con	500	Baseline	2007	Corn	150	(09/30/2007;	-428.446	127.8407	6.919165	-293.687
Current	Proxy Farm - con	500	Baseline	2008	Corn	150	(09/30/2008;	-275.913	1744.867	6.919165	1475.872

Current	Proxy Farm - con	500 Baseline	2009 Corn	150 (09/30/2009;	-242.605	1306.56	6.919165	1070.874
Current	Proxy Farm - con	500 Baseline	2010 Corn	150 (09/30/2010;	-203.134	211.6548	6.919165	15.4401
Current	Proxy Farm - con	500 Baseline	2011 Corn	150 (09/30/2011;	-179.333	1337.464	6.919165	1165.05
Current	Proxy Farm - con	500 Baseline	2012 Corn	150 (09/30/2012;	-301.951	180.0007	6.919165	-115.031
Current	Proxy Farm - con	500 Baseline	2013 Corn	150 (09/30/2013;	-323.856	1033.34	6.919165	716.4023
Current	Proxy Farm - con	500 Baseline	2014 Corn	150 (09/30/2014;	-230.042	2114.771	6.919165	1891.648
Current	Proxy Farm - con	500 Baseline	2015 Corn	150 (09/30/2015;	-226.414	159.2252	6.919165	-60.2697
Current	Proxy Farm - con	500 Baseline	2016 Corn	150 (09/30/2016;	-182.067	234.3741	6.919165	59.2259
Current	Proxy Farm - con	500 Baseline	2017 Corn	150 (09/30/2017;	-101.56	156.2923	6.919165	61.65142
Current	Proxy Farm - con	500 Baseline	2018 Corn	150 (09/30/2018;	-121.732	3388.735	6.919165	3273.922
Current	Proxy Farm - con	500 Baseline	2019 Corn	150 (09/30/2019;	-175.386	2016.405	6.919165	1847.938
Current	Proxy Farm - con	500 Baseline	2020 Corn	150 (09/30/2020;	-105.636	98.3297	6.919165	-0.38717
Current	Proxy Farm - con	500 Baseline	2021 Corn	150 (09/30/2021;	-299.139	1139.231	6.919165	847.011
Current	Proxy Farm - con	500 Baseline	2022 Corn	150 (09/30/2022;	-154.493	2135.367	6.919165	1987.793
AVG:					-267.492	893.9209	6.919165	633.3479

Future	Proxy Farm - con	500 Baseline	2023 Corn	150 (09/30/2023;	-152.957	131.0568	58.588997	36.68874
Future	Proxy Farm - con	500 Baseline	2024 Corn	150 (09/30/2024;	-114.131	247.716	58.588997	192.1735
Future	Proxy Farm - con	500 Baseline	2025 Corn	150 (09/30/2025;	-37.5958	165.8097	58.588997	186.8029
Future	Proxy Farm - con	500 Baseline	2026 Corn	150 (09/30/2026;	-60.9312	3424.444	58.588997	3422.102
Future	Proxy Farm - con	500 Baseline	2027 Corn	150 (09/30/2027;	-118.01	2043.18	58.588997	1983.759
Future	Proxy Farm - con	500 Baseline	2028 Corn	150 (09/30/2028;	-53.1754	103.5485	58.588997	108.9621
Future	Proxy Farm - con	500 Baseline	2029 Corn	150 (09/30/2029;	-249.566	945.2569	58.588997	754.2802
Future	Proxy Farm - con	500 Baseline	2030 Corn	150 (09/30/2030;	-107.84	2160.582	58.588997	2111.331
Future	Proxy Farm - con	500 Baseline	2031 Corn	150 (09/30/2031;	-107.524	179.0109	58.588997	130.0759
Future	Proxy Farm - con	500 Baseline	2032 Corn	150 (09/30/2032;	-67.4341	259.45	58.588997	250.6049
AVG:					-106.916	966.0053	58.588997	917.678
							Acres	125,000
								114710
								150,000
								137652

Future	Proxy Farm - con	500 Reduced Ti	2023 Corn	150 (09/30/2023;	-152.957	131.0568	58.588997	36.68874
Future	Proxy Farm - con	500 Reduced Ti	2024 Corn	150 (09/30/2024;	-114.131	247.716	58.588997	192.1735
Future	Proxy Farm - con	500 Reduced Ti	2025 Corn	150 (09/30/2025;	-37.5958	165.8097	58.588997	186.8029

Future	Proxy Farm - con	500 Reduced Ti 2026 Corn	150 (09/30/2026;	-60.9312	3424.444	58.588997	3422.102
Future	Proxy Farm - con	500 Reduced Ti 2027 Corn	150 (09/30/2027;	-118.01	2043.18	58.588997	1983.759
Future	Proxy Farm - con	500 Reduced Ti 2028 Corn	150 (09/30/2028;	-53.1754	103.5485	58.588997	108.9621
Future	Proxy Farm - con	500 Reduced Ti 2029 Corn	150 (09/30/2029;	-249.566	945.2569	58.588997	754.2802
Future	Proxy Farm - con	500 Reduced Ti 2030 Corn	150 (09/30/2030;	-107.84	2160.582	58.588997	2111.331
Future	Proxy Farm - con	500 Reduced Ti 2031 Corn	150 (09/30/2031;	-107.524	179.0109	58.588997	130.0759
Future	Proxy Farm - con	500 Reduced Ti 2032 Corn	150 (09/30/2032;	-67.4341	259.45	58.588997	250.6049

AVG:	-106.916	966.0053	58.588997	917.678
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Acres	125,000	114710
	150,000	137652
Change	0	

1. General Information

Report version	appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)	
Template version	[-]	1
Creation date	[date]	12/22/2023
Name	[-]	Proxy Farm - Reg
Area	[acres]	500
State	[-]	Minnesota
County	[-]	Wilkin County
Coordinates (Mercator)	[-]	POINT (-10730568.211665994 5829200.590476191)

Parcel Name: Proxy Farm - Reg

TimeFrame	Parcel	acres	Scenario	Year	Crop1	Crop 1 Yield	Crop1 Harvest	Soil Carbon Stock Change (tonnes CO2e/yr)	Soil Direct N2O (tonnes CO2e/yr)	N2O Indirect Emissions (tonnes CO2e/yr)*	GHG Balance Total (tonnes CO2e/yr)*
Current	Proxy Farm - Reg	500	Baseline	2000	Corn	150	(09/30/2000;	-365.654	42.64185	6.919165	-316.093
Current	Proxy Farm - Reg	500	Baseline	2001	Corn	150	(09/30/2001;	-348.507	1265.806	6.919165	924.218
Current	Proxy Farm - Reg	500	Baseline	2002	Corn	150	(09/30/2002;	-444.48	665.2464	6.919165	227.6856
Current	Proxy Farm - Reg	500	Baseline	2003	Corn	150	(09/30/2003;	-422.128	106.7993	6.919165	-308.41
Current	Proxy Farm - Reg	500	Baseline	2004	Corn	150	(09/30/2004;	-415.494	193.6378	6.919165	-214.937

Future	Proxy Farm - Reg	500 Reduced Ti 2023 Corn	150 (09/15/2023;	-227.392	105.5032	35.84464	-86.0441
Future	Proxy Farm - Reg	500 Reduced Ti 2024 Corn	150 (09/15/2024;	-254.581	178.9354	35.84464	-39.8012
Future	Proxy Farm - Reg	500 Reduced Ti 2025 Corn	150 (09/15/2025;	-296.936	125.9574	35.84464	-135.133
Future	Proxy Farm - Reg	500 Reduced Ti 2026 Corn	150 (09/15/2026;	-340.97	2030.42	35.84464	1725.295
Future	Proxy Farm - Reg	500 Reduced Ti 2027 Corn	150 (09/15/2027;	-384.545	1066.449	35.84464	717.7487
Future	Proxy Farm - Reg	500 Reduced Ti 2028 Corn	150 (09/15/2028;	-322.019	67.43733	35.84464	-218.737
Future	Proxy Farm - Reg	500 Reduced Ti 2029 Corn	150 (09/15/2029;	-554.783	566.5681	35.84464	47.62943
Future	Proxy Farm - Reg	500 Reduced Ti 2030 Corn	150 (09/15/2030;	-374.926	1422.37	35.84464	1083.289
Future	Proxy Farm - Reg	500 Reduced Ti 2031 Corn	150 (09/15/2031;	-420.991	121.1792	35.84464	-263.967
Future	Proxy Farm - Reg	500 Reduced Ti 2032 Corn	150 (09/15/2032;	-419.765	158.8046	35.84464	-225.116

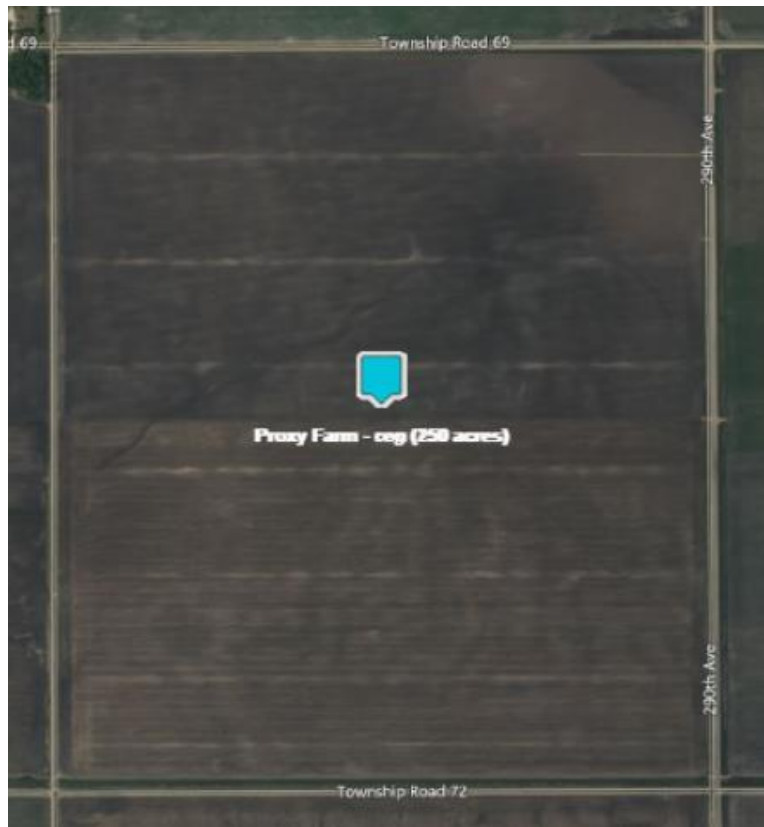
AVG:	-359.691	584.3624	35.84464	260.5163
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Acres	125,000	32565
	150,000	39077
	Change	-657.1

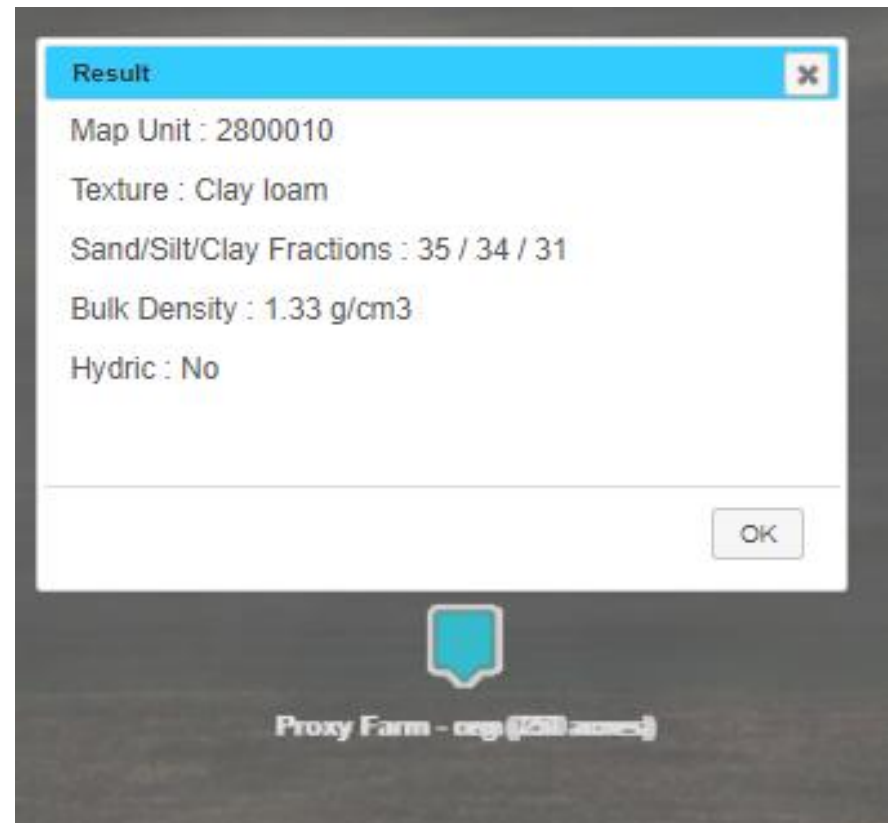
Scaled Emissions:	Acres	Scenario	Project Scale Emissions (tonnes CO2e/year)	CI score (gCO2e/MJ)
1000 acre proxy scaled by estimated total acres needed to supply the max feedstock required for maximum ethanol production	125,000	Baseline	229413	43.83
	150,000		275296	52.59
	125,000	Future	147274	28.14
	150,000		176729	33.76
	125,000	Change	-82139	-15.69
	150,000		-98566	-18.83
	125,000	Con	0	-
	150,000		0	-
	125,000	AltAg	-82139	-
	150,000		-98566	-

Test Scenario #4 - 75%AltAgPrac

Proxy Farm Location



Soil Data Summary



NAME: Danlyn Brennan
 PROJECT: AlternativeAg_Scenario4
 REPORTING YEARS: 2023 - 2032
 Daycent Service Version: 30cm Daycent Service

JOBID: 32863_70520_271213
 Time: Fri Dec 22 2023 12:30:49 GMT-0800 (Pacific Standard Time)
 Version: appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)

USDA United States Department of Agriculture
 Natural Resources Conservation Service



Source	Baseline Emissions		No Till			
	Emissions	+/-	Emissions	+/-	Change	+/-
Proxy Farm - con (250 acres - Corn)						
<input type="checkbox"/> C (tonnes CO ₂ equiv./yr.)	-55.4	+0/-0	-55.4	+0/-0	0.0	+0/-0
Soil	-55.4	+0/-0	-55.4	+0/-0	0.0	+0/-0
<input checked="" type="checkbox"/> CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input checked="" type="checkbox"/> CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input type="checkbox"/> N ₂ O (tonnes CO ₂ equiv./yr.)	551.4	NR [†]	551.4	NR [†]	0.0	NR [†]
Direct N ₂ O Emissions	522.1	+0/-0	522.1	+0/-0	0.0	+0/-0
Direct - Soil	522.1	+0/-0	522.1	+0/-0	0.0	+0/-0
Direct - Biomass Burning	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Direct - Drained Organic Soil	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Indirect N ₂ O Emissions	29.3	+46.2/-23.6	29.3	+46.2/-23.6	0.0	+0/-0
Indirect - Volatilization	29.3	+46.2/-23.6	29.3	+46.2/-23.6	0.0	+0/-0
Indirect - LeachingandRunoff	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input checked="" type="checkbox"/> CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Total	496.0	NR[†]	496.0	NR[†]	0.0	NR[†]
Proxy Farm - reg (750 acres - Corn, Clover)						
<input type="checkbox"/> C (tonnes CO ₂ equiv./yr.)	-155.8	+0/-0	-528.4	+0/-0	-372.6	+0/-0
Soil	-155.8	+0/-0	-528.4	+0/-0	-372.6	+0/-0
<input checked="" type="checkbox"/> CO ₂ (tonnes/yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input checked="" type="checkbox"/> CO (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input type="checkbox"/> N ₂ O (tonnes CO ₂ equiv./yr.)	1454.1	NR [†]	876.7	NR [†]	-577.4	NR [†]
Direct N ₂ O Emissions	1366.2	+0/-0	822.9	+0/-0	-543.3	+0/-0
Direct - Soil	1366.2	+0/-0	822.9	+0/-0	-543.3	+0/-0
Direct - Biomass Burning	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Direct - Drained Organic Soil	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Indirect N ₂ O Emissions	87.9	+138.7/-70.9	53.8	+80.7/-42.9	-34.1	+28.4/-60.5
Indirect - Volatilization	87.9	+138.7/-70.9	53.8	+80.7/-42.9	-34.1	+28.4/-60.5
Indirect - LeachingandRunoff	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
<input checked="" type="checkbox"/> CH ₄ (tonnes CO ₂ equiv./yr.)	0.0	+0/-0	0.0	+0/-0	0.0	+0/-0
Total	1298.3	NR[†]	348.2	NR[†]	-950.0	NR[†]

CAUTION This report is still in development and the values within may not reflect actual values.

* Yearly results are unavailable for categories which have monte-carlo uncertainty period averages are presented instead.

1. General Information

Report version appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)

Template version [-] 1

Creation date [date] #####

Name [-] Proxy Farm - reg

Area [acres] 750

State [-] Minnesota

County [-] Wilkin County

Coordinates (Mercator) [-] POINT (-10730526.35042785 5829202.949337069)

Parcel Name: Proxy Farm - reg

TimeFrame	Parcel	acres	Scenario	Year	Crop1	Crop 1 Yield	Crop1 Harvest	Soil Carbon Stock Change (tonnes CO2e/yr)	Soil Direct N2O (tonnes CO2e/yr)	N2O Indirect Emissions (tonnes CO2e/yr)*	GHG Balance Total (tonnes CO2e/yr)*
Current	Proxy Farm - reg	750	Baseline	2000	Corn	150	(09/30/2000;	-516.349	61.23182	10.378748	-444.739
Current	Proxy Farm - reg	750	Baseline	2001	Corn	150	(09/30/2001;	-524.772	1768.953	10.378748	1254.561
Current	Proxy Farm - reg	750	Baseline	2002	Corn	150	(09/30/2002;	-647.567	937.2529	10.378748	300.065
Current	Proxy Farm - reg	750	Baseline	2003	Corn	150	(09/30/2003;	-618.118	153.7268	10.378748	-454.013
Current	Proxy Farm - reg	750	Baseline	2004	Corn	150	(09/30/2004;	-612.188	277.8552	10.378748	-323.954
Current	Proxy Farm - reg	750	Baseline	2005	Corn	150	(09/30/2005;	-363.296	359.6308	10.378748	6.713129
Current	Proxy Farm - reg	750	Baseline	2006	Corn	150	(09/30/2006;	-519.907	930.7513	10.378748	421.223
Current	Proxy Farm - reg	750	Baseline	2007	Corn	150	(09/30/2007;	-625.497	185.4029	10.378748	-429.715
Current	Proxy Farm - reg	750	Baseline	2008	Corn	150	(09/30/2008;	-389.675	2471.782	10.378748	2092.486
Current	Proxy Farm - reg	750	Baseline	2009	Corn	150	(09/30/2009;	-358.471	1826.9	10.378748	1478.808

Current	Proxy Farm - reg	750 Baseline	2010 Corn	150 (09/30/2010;	-296.887	311.9033	10.378748	25.39544
Current	Proxy Farm - reg	750 Baseline	2011 Corn	150 (09/30/2011;	-260.928	1869.914	10.378748	1619.365
Current	Proxy Farm - reg	750 Baseline	2012 Corn	150 (09/30/2012;	-449.051	254.5214	10.378748	-184.151
Current	Proxy Farm - reg	750 Baseline	2013 Corn	150 (09/30/2013;	-470.545	1470.855	10.378748	1010.689
Current	Proxy Farm - reg	750 Baseline	2014 Corn	150 (09/30/2014;	-325.167	2979.589	10.378748	2664.8
Current	Proxy Farm - reg	750 Baseline	2015 Corn	150 (09/30/2015;	-332.1	227.1238	10.378748	-94.5973
Current	Proxy Farm - reg	750 Baseline	2016 Corn	150 (09/30/2016;	-266.38	339.6852	10.378748	83.68404
Current	Proxy Farm - reg	750 Baseline	2017 Corn	150 (09/30/2017;	-146.49	225.612	10.378748	89.50086
Current	Proxy Farm - reg	750 Baseline	2018 Corn	150 (09/30/2018;	-178.902	4790.992	10.378748	4622.469
Current	Proxy Farm - reg	750 Baseline	2019 Corn	150 (09/30/2019;	-256.47	2815.33	10.378748	2569.239
Current	Proxy Farm - reg	750 Baseline	2020 Corn	150 (09/30/2020;	-157.401	142.7325	10.378748	-4.28977
Current	Proxy Farm - reg	750 Baseline	2021 Corn	150 (09/30/2021;	-436.363	1589.524	10.378748	1163.54
Current	Proxy Farm - reg	750 Baseline	2022 Corn	150 (09/30/2022;	-214.406	3008.988	10.378748	2804.96
AVG:					-389.866	1260.881	10.378748	881.3931

Future	Proxy Farm - reg	750 Baseline	2023 Corn	150 (09/30/2023;	-225.377	189.995	87.88349	52.50192	
Future	Proxy Farm - reg	750 Baseline	2024 Corn	150 (09/30/2024;	-167.382	358.9046	87.88349	279.4062	
Future	Proxy Farm - reg	750 Baseline	2025 Corn	150 (09/30/2025;	-52.8255	239.3423	87.88349	274.4002	
Future	Proxy Farm - reg	750 Baseline	2026 Corn	150 (09/30/2026;	-89.8676	4840.877	87.88349	4838.893	
Future	Proxy Farm - reg	750 Baseline	2027 Corn	150 (09/30/2027;	-172.417	2852.912	87.88349	2768.379	
Future	Proxy Farm - reg	750 Baseline	2028 Corn	150 (09/30/2028;	-80.8147	150.2921	87.88349	157.3609	
Future	Proxy Farm - reg	750 Baseline	2029 Corn	150 (09/30/2029;	-363.963	1353.883	87.88349	1077.804	
Future	Proxy Farm - reg	750 Baseline	2030 Corn	150 (09/30/2030;	-146.595	3044.66	87.88349	2985.949	
Future	Proxy Farm - reg	750 Baseline	2031 Corn	150 (09/30/2031;	-159.718	255.2111	87.88349	183.3765	
Future	Proxy Farm - reg	750 Baseline	2032 Corn	150 (09/30/2032;	-99.1336	375.6885	87.88349	364.4384	
					AVG:	-155.809	1366.177	87.88349	1298.251
						Acres	125,000	162281	
							150,000	194738	

Future	Proxy Farm - reg	750 No Till	2023 Corn	150 (09/15/2023;	-334.931	151.8698	53.76696	-129.294
Future	Proxy Farm - reg	750 No Till	2024 Corn	150 (09/15/2024;	-370.998	261.4365	53.76696	-55.7944
Future	Proxy Farm - reg	750 No Till	2025 Corn	150 (09/15/2025;	-434.057	182.4637	53.76696	-197.827
Future	Proxy Farm - reg	750 No Till	2026 Corn	150 (09/15/2026;	-500.783	2846.786	53.76696	2399.77

Future	Proxy Farm - reg	750 No Till	2027 Corn	150 (09/15/2027;	-566.55	1486.357	53.76696	973.5741
Future	Proxy Farm - reg	750 No Till	2028 Corn	150 (09/15/2028;	-475.516	98.03682	53.76696	-323.713
Future	Proxy Farm - reg	750 No Till	2029 Corn	150 (09/15/2029;	-815.469	789.5477	53.76696	27.84563
Future	Proxy Farm - reg	750 No Till	2030 Corn	150 (09/15/2030;	-546.717	2004.232	53.76696	1511.282
Future	Proxy Farm - reg	750 No Till	2031 Corn	150 (09/15/2031;	-621.592	173.6302	53.76696	-394.195
Future	Proxy Farm - reg	750 No Till	2032 Corn	150 (09/15/2032;	-617.615	234.5631	53.76696	-329.285

AVG:	-528.423	822.8923	53.76696	348.2365
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Acres	125,000	43530
	150,000	52235
Change:		-950.014

1. General Information

Report version	appengine cometfarm v0-10 build 4.1.8753.32391 (12/19/2023 17:59:47)	
Template version	[-]	1
Creation date	[date]	#####
Name	[-]	Proxy Farm - con
Area	[acres]	250
State	[-]	Minnesota
County	[-]	Wilkin County
Coordinates (Mercator)	[-]	POINT (-10730525.604074221 5829202.799944259)

Parcel Name: Proxy Farm - con

TimeFrame	Parcel	acres	Scenario	Year	Crop1	Crop 1 Yield	Crop1 Harvest	Soil Carbon Stock Change (tonnes CO2e/yr)	Soil Direct N2O (tonnes CO2e/yr)	N2O Indirect Emissions (tonnes CO2e/yr)*	GHG Balance Total (tonnes CO2e/yr)*
Current	Proxy Farm - con	250	Baseline	2000	Corn	150	(09/30/2000;	-197.143	22.46865	3.4595826	-171.215
Current	Proxy Farm - con	250	Baseline	2001	Corn	150	(09/30/2001;	-173.523	693.248	3.4595826	523.1844
Current	Proxy Farm - con	250	Baseline	2002	Corn	150	(09/30/2002;	-230.299	360.839	3.4595826	134
Current	Proxy Farm - con	250	Baseline	2003	Corn	150	(09/30/2003;	-217.571	56.35991	3.4595826	-157.752
Current	Proxy Farm - con	250	Baseline	2004	Corn	150	(09/30/2004;	-212.323	102.9484	3.4595826	-105.915

Future	Proxy Farm - con	250 No Till	2023 Corn	150 (09/30/2023;	-78.1748	68.23634	29.294498	19.356
Future	Proxy Farm - con	250 No Till	2024 Corn	150 (09/30/2024;	-58.2184	129.37	29.294498	100.4462
Future	Proxy Farm - con	250 No Till	2025 Corn	150 (09/30/2025;	-20.0505	87.21259	29.294498	96.45657
Future	Proxy Farm - con	250 No Till	2026 Corn	150 (09/30/2026;	-31.6341	1853.846	29.294498	1851.507
Future	Proxy Farm - con	250 No Till	2027 Corn	150 (09/30/2027;	-61.3313	1120.023	29.294498	1087.986
Future	Proxy Farm - con	250 No Till	2028 Corn	150 (09/30/2028;	-26.4893	53.90636	29.294498	56.7116
Future	Proxy Farm - con	250 No Till	2029 Corn	150 (09/30/2029;	-129.159	507.5874	29.294498	407.7225
Future	Proxy Farm - con	250 No Till	2030 Corn	150 (09/30/2030;	-60.3742	1170.486	29.294498	1139.406
Future	Proxy Farm - con	250 No Till	2031 Corn	150 (09/30/2031;	-54.3613	94.30614	29.294498	69.23938
Future	Proxy Farm - con	250 No Till	2032 Corn	150 (09/30/2032;	-34.0984	135.5927	29.294498	130.7888

AVG: -55.3892				522.0566	29.294498	495.962
	Acres	125,000		61995		
		150,000		74394		
		Change:		0		

Scaled Emissions:	Acres	Scenario	Project Scale Emissions (tonnes CO2e/year)	CI score (gCO2e/M J)
1000 acre proxy scaled by estimated total acres needed to supply the max feedstock required for maximum ethanol production	125,000	Baseline	224277	42.85
	150,000		269132	51.42
	125,000	Future	105525	20.16
	150,000		126630	24.19
	125,000	Change	-118752	-22.69
	150,000		-142502	-27.22
	125,000	Con	0	-
	150,000		0	-
	125,000	AltAg	-118752	-
	150,000		-142502	-

**Energy and Energy Efficiencies
Supplemental Information:
Energy Projections**

Operational Energy Scenario Comparison

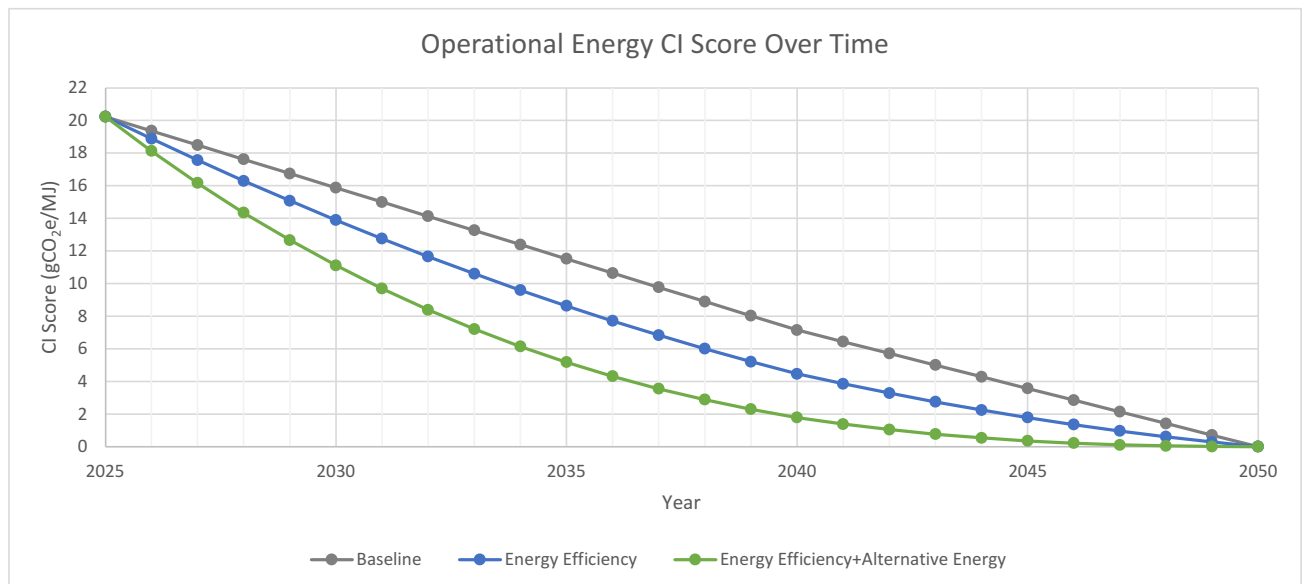
Year	Electricity Emissions Rate (lbs CO ₂ e/MWh)	Natural Gas Emissions Rate (lbs CO ₂ e/MWh)	Baseline Scenario			
			Electric Energy Consumption (MWh/year)	Natural Gas Consumption (MWh/year)	CO ₂ e (Metric Ton)	CI (gCO ₂ e/MJ)
2023	684.35	398.00	38064	473808	97353	22.0
2024	644.09	383.26	38064	473808	93490	21.1
2025	603.84	368.52	38064	473808	89627	20.2
2026	563.58	353.78	38064	473808	85764	19.4
2027	523.33	339.04	38064	473808	81901	18.5
2028	483.07	324.30	38064	473808	78038	17.6
2029	442.81	309.56	38064	473808	74175	16.7
2030	402.56	294.81	38064	473808	70311	15.9
2031	362.30	280.07	38064	473808	66448	15.0
2032	322.05	265.33	38064	473808	62585	14.1
2033	281.79	250.59	38064	473808	58722	13.3
2034	241.54	235.85	38064	473808	54859	12.4
2035	201.28	221.11	38064	473808	50996	11.5
2036	161.02	206.37	38064	473808	47133	10.6
2037	120.77	191.63	38064	473808	43270	9.8
2038	80.51	176.89	38064	473808	39407	8.9
2039	40.26	162.15	38064	473808	35544	8.0
2040	0.00	147.41	38064	473808	31680	7.2
2041	0.00	132.67	38064	473808	28512	6.4
2042	0.00	117.93	38064	473808	25344	5.7
2043	0.00	103.19	38064	473808	22176	5.0
2044	0.00	88.44	38064	473808	19008	4.3
2045	0.00	73.70	38064	473808	15840	3.6
2046	0.00	58.96	38064	473808	12672	2.9
2047	0.00	44.22	38064	473808	9504	2.1
2048	0.00	29.48	38064	473808	6336	1.4
2049	0.00	14.74	38064	473808	3168	0.7
2050	0.00	0.00	38064	473808	0	0.0

Year	Electricity Emissions Rate (lbs CO ₂ e/MWh)	Natural Gas Emissions Rate (lbs CO ₂ e/MWh)	Energy Efficiency Scenario			
			Electric Energy Consumption ¹ (MWh/year)	Natural Gas Consumption ² (MWh/year)	CO ₂ e (Metric Ton)	CI (gCO ₂ e/MJ)
2023	684.35	398.00	38064	473808	97353	22.0
2024	644.09	383.26	38064	473808	93490	21.1
2025	603.84	368.52	38064	473808	89627	20.2
2026	563.58	353.78	37112.4	461962.8	83620	18.9
2027	523.33	339.04	36160.8	450117.6	77806	17.6
2028	483.07	324.30	35209.2	438272.4	72185	16.3
2029	442.81	309.56	34257.6	426427.2	66757	15.1
2030	402.56	294.81	33306	414582	61523	13.9
2031	362.30	280.07	32354.4	402736.8	56481	12.8
2032	322.05	265.33	31402.8	390891.6	51633	11.7
2033	281.79	250.59	30451.2	379046.4	46978	10.6
2034	241.54	235.85	29499.6	367201.2	42516	9.6
2035	201.28	221.11	28548	355356	38247	8.6
2036	161.02	206.37	27596.4	343510.8	34171	7.7
2037	120.77	191.63	26644.8	331665.6	30289	6.8
2038	80.51	176.89	25693.2	319820.4	26600	6.0
2039	40.26	162.15	24741.6	307975.2	23103	5.2
2040	0.00	147.41	23790	296130	19800	4.5
2041	0.00	132.67	22838.4	284284.8	17107	3.9
2042	0.00	117.93	21886.8	272439.6	14573	3.3
2043	0.00	103.19	20935.2	260594.4	12197	2.8
2044	0.00	88.44	19983.6	248749.2	9979	2.3
2045	0.00	73.70	19032	236904	7920	1.8
2046	0.00	58.96	18080.4	225058.8	6019	1.4
2047	0.00	44.22	17128.8	213213.6	4277	1.0
2048	0.00	29.48	16177.2	201368.4	2693	0.6
2049	0.00	14.74	15225.6	189523.2	1267	0.3
2050	0.00	0.00	14274	177678	0	0.0

1. Energy Reduction for electricity is based on achieving 62.5% reduction over the 25 year period. This results in a 2.5% reduction each year. 62.5% is the mid-point between the estimated reduction range of 50-75%.

2. Energy Reduction for natural gas is based on achieving 62.5% reduction over the 25 year period. This results in a 2.5% reduction each year. 62.5% is the mid-point between the estimated reduction range of 50-75%.

			Energy Efficiency and Alternative Energy Scenario			
Year	Electricity Emissions Rate (lbs CO ₂ e/MWh)	Natural Gas Emissions Rate (lbs CO ₂ e/MWh)	Electric Energy Consumption (MWh/year)	Natural Gas Consumption (MWh/year)	CO ₂ e (Metric Ton)	CI (gCO ₂ e/MJ)
2023	684.35	398.00	38064	473808	97353	22.0
2024	644.09	383.26	38064	473808	93490	21.1
2025	603.84	368.52	38064	473808	89627	20.2
2026	563.58	353.78	35628	443484	80275	18.1
2027	523.33	339.04	33268	414108	71581	16.2
2028	483.07	324.30	30984	385680	63523	14.3
2029	442.81	309.56	28776	358199	56076	12.7
2030	402.56	294.81	26645	331666	49218	11.1
2031	362.30	280.07	24589	306080	42926	9.7
2032	322.05	265.33	22610	281442	37176	8.4
2033	281.79	250.59	20707	257752	31945	7.2
2034	241.54	235.85	18880	235009	27210	6.1
2035	201.28	221.11	17129	213214	22948	5.2
2036	161.02	206.37	15454	192366	19136	4.3
2037	120.77	191.63	13855	172466	15750	3.6
2038	80.51	176.89	12333	153514	12768	2.9
2039	40.26	162.15	10886	135509	10165	2.3
2040	0.00	147.41	9516	118452	7920	1.8
2041	0.00	132.67	8222	102343	6159	1.4
2042	0.00	117.93	7004	87181	4663	1.1
2043	0.00	103.19	5862	72966	3415	0.8
2044	0.00	88.44	4796	59700	2395	0.5
2045	0.00	73.70	3806	47381	1584	0.4
2046	0.00	58.96	2893	36009	963	0.2
2047	0.00	44.22	2055	25586	513	0.1
2048	0.00	29.48	1294	16109	215	0.0
2049	0.00	14.74	609	7581	51	0.0
2050	0.00	0.00	0	0	0	0.0



**Energy and Energy Efficiencies
Supplemental Information:
PVWatts
Energy Projections**



Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at [/sam.nrel.gov](https://sam.nrel.gov)) that allow for more precise and complex modeling of PV systems.

The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NREL report: The Error Report.

Disclaimer: The PVWatts® Model ("Model") is provided by the National Renewable Energy Laboratory ("NREL"), which is operated by the Alliance for Sustainable Energy, LLC ("Alliance") for the U.S. Department of Energy ("DOE") and may be used for any purpose whatsoever.

The names DOE/NREL/ALLIANCE shall not be used in any representation, advertising, publicity or other manner whatsoever to endorse or promote any entity that adopts or uses the Model. DOE/NREL/ALLIANCE shall not provide any support, consulting, training or assistance of any kind with regard to the use of the Model or any updates, revisions or new versions of the Model.

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The energy output range is based on analysis of 30 years of historical weather data, and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

PVWatts Calculator Inputs and Results

RESULTS

14,397,356 kWh/Year*

System output may range from 13,769,631 to 15,220,884 kWh per year near this location.

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)
January	2,18	656,159
February	3,43	929,050
March	4,88	1,389,681
April	5,44	1,453,068
May	5,88	1,558,525
June	6,19	1,563,567
July	6,63	1,703,029
August	6,05	1,564,253
September	5,21	1,348,247
October	3,44	959,936
November	2,50	697,384
December	1,93	574,456
Annual	4.48	14,397,355

Location and Station Identification

Requested Location	24096 170th ave, fergus falls, mn		
Weather Data Source	Lat, Lng: 46.33, -96.14	1.3 mi	
Latitude	46,33° N		
Longitude	96.14° W		

PV System Specifications

DC System Size	11000 kW					
Module Type	Premium					
Array Type	Fixed (open rack)					
System Losses	14.08%					
Array Tilt	20°					
Array Azimuth	180°					
DC to AC Size Ratio	1.2					
Inverter Efficiency	96%					
Ground Coverage Ratio	0.4					
Albedo	From weather file					
Bifacial	No (0)					
Monthly Irradiance Loss	Jan	Feb	Mar	Apr	May	June
	0%	0%	0%	0%	0%	0%
	July	Aug	Sept	Oct	Nov	Dec
	0%	0%	0%	0%	0%	0%

Performance Metrics

DC Capacity Factor	14,9%
--------------------	-------

Possible Siting for 11MWdc PV Array at Green Plains Ethanol Plant

System Capacity: 11 MWdc (18 acres)



Appendix N

Applicant's Draft Emergency Response Plan

Appendix 6 – Emergency Response Plan (DRAFT)

Emergency Response Plan

Project Name:

Summit Carbon Solutions Otter Tail to Wilkin Project

MPUC Docket Number:

IP7093/PPL-22-422

SCS Document Number:

SCS-0500-SM-01-PLN-002

Date

September 12, 2022

REVISION HISTORY

DATE	REVISION	REVISION DESCRIPTION	PREPARED BY:	REVIEWED BY:	APPROVED BY:
2022-09-12	A	Draft Plan	SP	JS	RD

DRAFT

Acronyms and Abbreviations

AOC	Abnormal Operating Conditions
CFR	Code of Federal Regulations
CO ₂	Carbon Dioxide
CST	Company Support Team
ERP or Plan	Emergency Response Plan
FSC	Finance Section Chief
Green Plains Ethanol Plant	Green Plains Otter Tail LLC Ethanol Plant
IAP	Incident Action Plan
IC	Incident Commander
ICS	Incident Command System
IDLH	Immediately Dangerous to Life and Health
LOFR	Liaison Officer
LSC	Logistics Section Chief
LRT	Local Response Team
MCE	Midwest Carbon Express
MNOSHA	Minnesota Occupational Safety and Health Administration
MNOPS	Minnesota Office of Pipeline Safety
NRC	National Response Center
OPID	operator identification number
OPS	Operations Section Chief
OSHA	Occupational Safety and Health Administration
PHMSA	Pipeline and Hazardous Materials Administration
PIO	Public Information Officer
ppm	parts per million
Project	Otter Tail to Wilkin Project
PSAP	Public Safety Answering Point
QI	Qualified Individual
SCS or Company	Summit Carbon Solutions
SOFR	Safety Officer
UC	Unified Command

Glossary of Terms

Term	Description
Agency Personnel	Agency personnel refers to local, county, state, and/or federal employees, contractors, or businesses employed by governmental entities.
Blowdown	The act of releasing gas from the pipeline system so work can be done safely on the depressurized facilities.
Controlled Release	Often occurs due to safety reasons surrounding facility design, or intentional venting to perform maintenance or inspection of equipment.
Immediately Dangerous to Life and Health (IDLH)	The National Institute of Occupational Safety and Health defines an IDLH condition as a situation "that poses a threat of exposure to airborne contaminants when that exposure is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment". The IDLH limit represents the concentration of a chemical in the air to which healthy adult workers could be exposed (if their respirators fail) without suffering permanent or escape-impairing health effects.
Unintentional Release	A release caused by equipment leaks, defective seals, damaged pipeline, or other abnormal operating conditions.

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DRAFT

1 Purpose

Summit Carbon Solutions, LLC (SCS) is proposing to construct and operate an approximately 28.1-mile carbon dioxide (CO₂) pipeline and associated facilities in portions of Wilkin and Otter Tail counties (the Otter Tail to Wilkin Project [Project]). The Project will capture and transport CO₂ from the Green Plains Otter Tail LLC Ethanol Plant (Green Plains Ethanol Plant) near Fergus Falls, Minnesota to the North Dakota and Minnesota border just south of the City of Breckenridge in Wilkin County. The CO₂ will ultimately be safely and permanently stored deep underground utilizing separately permitted Class VI injection wells in a sequestration site area in North Dakota.

This Emergency Response Plan (ERP or Plan) is for the Otter Tail to Wilkin Project pipeline system operated by SCS. The purpose of the ERP is to provide guidance for quick, safe, and effective response to an emergency to protect the public, all responders, SCS personnel, and the environment.

2 Scope of the Plan

This plan been developed to meet the requirements of Title 49 Code of Federal Regulations (CFR) 195.402(e) and is intended to cover incidents that could occur along the Otter Tail to Wilkin pipeline system.

This Plan is intended to provide the necessary information for pre-emergency planning as well as procedures for Company personnel to respond to and mitigate incidents during an emergency. A description of the pipeline system operations is included in Figure 1. Response procedures and guidelines are provided in Section 4 of this Plan.

Figure 1: General Pipeline System

General Pipeline System Information	
Pipeline Name:	Midwest Carbon Express – Otter Tail to Wilkin Project
Operator Name:	Summit Carbon Solutions, LLC
Operator Address:	2321 North Loop Drive Suite 221 Ames, IA 50010
Mainline Number	24-hour Emergency: [TBD before system startup] Corporate Headquarters: 515-531-2635
Qualified Individual(s):	Director, Regulatory Compliance (see Section 5 for contact information)
States Traversed:	Minnesota
Counties Traversed:	Otter Tail and Wilkin
Pipeline Description	
<p>The Summit Carbon Solutions Midwest Carbon Express – Otter Tail to Wilkin Project pipeline consists of approximately 28.1 miles of a high-strength carbon steel 4-inch diameter carbon dioxide (CO₂) pipeline. The line originates at the Green Plains Ethanol Plant near Fergus Falls, Otter Tail County, MN. The pipeline traverses generally south and west through Otter Tail and Wilkin Counties to the North Dakota and Minnesota border south of the City of Breckenridge in Wilkin County. The pipeline will be operated with a maximum operating pressure of 2,183 pounds per square inch and the CO₂ will be maintained in a dense phase or supercritical state during normal operations.</p> <p>See Section 9 for a map depicting the pipeline and facility locations and high populated and other populated areas.</p>	
Product Description	
<p>CO₂ is naturally occurring in the atmosphere, used in the food and beverage industry, and produced by the human body during ordinary respiration, so it is commonly perceived by the general public to be a relatively harmless gas. However, at concentrations of 4% by volume (40,000 parts per million [ppm]), CO₂ is Immediately Dangerous to Life or Health (IDLH), and at concentrations of 8% by volume (80,000 ppm) can cause dimmed sight, sweating, tremor, unconsciousness, and possible death by asphyxiation.¹ Because CO₂ is colorless, odorless, and heavier than air, a significant uncontrolled release may cause CO₂ to temporarily accumulate near the ground in low lying outdoor areas, and in confined spaces such as caverns, tunnels, and basements until it dissipates into the atmosphere. CO₂ is not flammable, combustible, or explosive.</p>	

¹ https://www.fsis.usda.gov/sites/default/files/media_file/2020-08/Carbon-Dioxide.pdf.

3 Response Teams

3.1 Introduction

This section describes organization features and duties of the Company's Qualified Individual (QI), Local Response Team (LRT), and Company Support Team (CST). The Company's initial response to an incident will be provided by the LRT, once activated by the QI. The Incident Commander (IC) will activate a CST if an incident exceeds the local capabilities. In some cases, the initial responders to an incident may include local law enforcement and/or local fire department(s). SCS will work with these agencies to manage a coordinated response effort.

The National Incident Management System Incident Command System (ICS) will be used to manage emergency response activities. Because ICS is a management tool that is readily adaptable to incidents of varying magnitude, it will be used for all emergency incidents. Staffing levels will be adjusted to meet specific response team needs based on incident size, severity, and type of emergency. Local agencies are also trained on using ICS and may fill roles during a coordinated response effort. ICS principles include:

- Common Terminology
- Manageable Span of Control
- Management by Objectives
- Incident Action Planning
- Comprehensive Resource Management
- Established Incident Facilities
- Integrated Communications

As a component of an ICS, the Unified Command (UC) is a structure that brings together the responsible party (i.e., SCS) and agencies at the command level. The UC links the organizations responding to the incident and provides a forum for the responsible party and responding agencies to make consensus decisions. Under the UC, the various responding agencies and company personnel may blend together throughout the organization to create an integrated response team. The ICS process requires the UC to set clear objectives to guide the on-scene response resources. The primary entities of a UC may be two or more of the following:

- Federal On-Scene Coordinator
- State On-Scene Coordinator
- Local On-Scene Coordinator
- Company IC (Responsible Party IC)

3.2 Qualified Individual

The QI is defined by the U.S. Department of Transportation, Pipeline and Hazardous Materials Administration (PHMSA) as a company employee that has been given authority to fund response efforts without consulting Company leadership for further authorization and knows how to commence the response procedures of this Plan. The QI is responsible for activating the ICS response organization, including the LRT and CST.

The QI will be an English-speaking SCS employee that is available on a 24-hour basis with the full authority to activate and deploy the necessary emergency response contractors. The QI or Alternate QI

will activate personnel and equipment, act as a liaison with the UC, and obligate any funds required to carry out all the required or direct emergency response activities.

3.3 Local Response Team

The first Company person on scene will function as the IC and person-in-charge until relieved by an authorized person who will then assume the position of IC. The number of positions/personnel required to staff the LRT will depend on the size and complexity of the incident. The duties of each position may be performed by the IC directly or delegated as the situation demands. The IC is always responsible for directing response activities and will assume the duties of all the primary positions until the duties can be delegated to other qualified personnel.

A typical ICS organization is shown in Figure 2. The LRT will fill the necessary positions and request additional support from the CST to fill/back up any additional positions necessitated by the incident. Detailed job descriptions of the response team positions are provided in this Section.

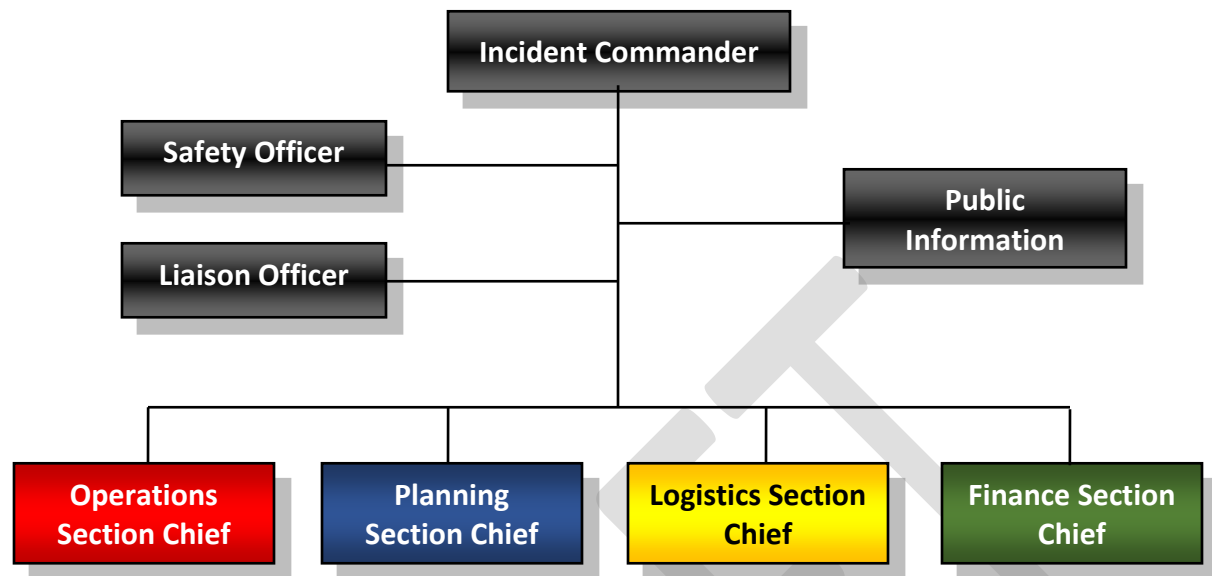
3.4 Company Support Team

For response operations outside of the capabilities of the LRT, the QI and IC will determine the need for mobilization of a CST. The members of the LRT will typically become members of the CST.

The CST, once fully staffed, is designed to cover all aspects of a comprehensive and prolonged incident response. The number of positions/personnel required to staff the CST will depend on the size and complexity of the incident. During a prolonged response, additional personnel may be cascaded in to fill additional ICS positions or relieve responding personnel.

The CST is staffed by trained personnel from various Company locations and by various contract resources as the situation requires.

Figure 2: Incident Command System Organization



Incident Command System Roles and Responsibilities

Incident Commander	
<p><i>The IC has responsibility for overall management of the incident. The IC has the authority to approve the use of a contractor even if no “open-end” contract exists, as well as the authority to commit monies to initiate response and clean-up activities. The first employee on-site will assume the responsibilities of IC until properly relieved. Generally, the most senior employee on-site will assume the IC position. The IC also has overall responsibility for the health and safety of responders.</i></p>	
<input type="radio"/>	Assess the situation and/or obtain a briefing from the prior IC.
<input type="radio"/>	Determine incident objectives and strategy.
<input type="radio"/>	Establish the immediate priorities.
<input type="radio"/>	Establish an Incident Command Post.
<input type="radio"/>	Brief Command Staff and Section Chiefs.
<input type="radio"/>	Establish an appropriate response organization commensurate with the severity of the incident and potential for impact to public health and/or the environment
<input type="radio"/>	Ensure planning meetings are scheduled as required.
<input type="radio"/>	Approve and authorize the implementation of an Incident Action Plan (IAP).
<input type="radio"/>	Ensure that adequate safety measures are in place.
<input type="radio"/>	Coordinate activity for all Command and General Staff.
<input type="radio"/>	Coordinate with key people and officials
<input type="radio"/>	Approve requests for additional resources or for the release of resources.
<input type="radio"/>	Keep appropriate agencies/organizations informed of incident status.
<input type="radio"/>	Approve the use of trainees, volunteers, and auxiliary personnel.
<input type="radio"/>	Authorize release of information to the news media
<input type="radio"/>	Ensure Incident Status Summary (ICS Form 209) is completed and forwarded to appropriate higher authority
<input type="radio"/>	Order the demobilization of the incident response when appropriate.

Safety Officer	
<p><i>The Safety Officer's (SOFR) function is to develop and recommend measures for assuring personnel safety, and to assess and/or anticipate hazardous and unsafe situations. Only one SOFR will be assigned for each incident; however, there may be assistants.</i></p>	
<input type="radio"/>	Participate in planning meetings.
<input type="radio"/>	Identify hazardous situations associated with the incident.
<input type="radio"/>	Review the IAP for safety implications.
<input type="radio"/>	Exercise emergency authority to stop and prevent unsafe acts.

Safety Officer	
<input type="checkbox"/>	Investigate accidents that have occurred within the incident area.
<input type="radio"/>	Review and approve the medical plan.
<input type="radio"/>	Develop the Site Safety Plan and publish Site Safety Plan summary (ICS Form 208) as required.

Public Information Officer	
<p><i>The Public Information Officer (PIO) is responsible for developing and releasing information about the incident to the news media, incident personnel, and other appropriate agencies and organizations.</i></p> <p><i>Only one PIO will be assigned for each incident. The PIO may have assistants as necessary. The assistants may represent assisting agencies, companies, or jurisdictions. The PIO and assistants will establish a Joint Information Center to assist with developing information releases.</i></p>	
<input type="radio"/>	Determine from the IC if there are any limits on information release.
<input type="radio"/>	Develop material for use in media briefings.
<input type="radio"/>	Obtain IC approval of media releases.
<input type="radio"/>	Inform media and conduct media briefings.
<input type="radio"/>	Arrange for tours and other interviews or briefings that may be required.
<input type="radio"/>	Obtain media information that may be useful to incident planning.
<input type="radio"/>	Maintain current information summaries and/or displays on the incident and provide information on the status of the incident to assigned personnel.

Liaison Officer	
<p><i>The Liaison Officer (LOFR) serves as a “go-between” linking the IC to various agencies. These are agencies that do not have a direct tactical assignment within the UC but have an interest in the response activities or wish to offer assistance.</i></p> <p><i>The LOFR intercepts, greets, and briefs agency representatives as they arrive on scene. It is the responsibility of the LOFR to notify the IC before escorting anyone to the Command Post. A separate Liaison Area may need to be established to accommodate agency representatives not directly involved in the UC.</i></p>	
<input type="radio"/>	Be a contact point for Agency Representatives.
<input type="radio"/>	Maintain a list of assisting and cooperating agencies and Agency Representatives. Monitor check-in sheets daily to ensure that all Agency Representatives are identified.
<input type="radio"/>	Assist in establishing and coordinating interagency contacts.
<input type="radio"/>	Keep federal, state, local agencies supporting the incident aware of incident status.
<input type="radio"/>	Monitor incident operations to identify current or potential inter-organizational problems.

Liaison Officer	
<input type="checkbox"/>	Participate in planning meetings, providing current resource status, including limitations and capability of assisting agency resources.
<input type="radio"/>	Coordinate response resource needs for incident investigation activities with the Operations Section Chief (OPS).
<input type="radio"/>	Ensure that all required agency forms, reports, and documents are completed prior to demobilization.
<input type="radio"/>	Coordinate activities of visiting agencies or government officials arriving to survey the response.

Operations Section Chief	
<p><i>The OPS is responsible for the management of all operations directly applicable to the primary mission (e.g., clean-up, recovery). The OPS activates and supervises tactical response elements in accordance with the IAP and directs its execution. The OPS also requests or releases resources; makes expedient changes to the IAP (as necessary); and reports these actions to the IC.</i></p>	
<input type="radio"/>	Develop operations portion of IAP.
<input type="radio"/>	Brief and assign Operations Section personnel in accordance with the IAP.
<input type="radio"/>	Supervise Operations Section.
<input type="radio"/>	Determine need and request additional resources.
<input type="radio"/>	Review suggested list of resources to be released and initiate recommendation for release of resources.
<input type="radio"/>	Assemble and disassemble Strike Teams assigned to the Operations Section.
<input type="radio"/>	Report information about special activities, events, and occurrences to the IC.

Planning Section Chief	
<p><i>The Planning Section Chief is responsible for the collection, evaluation, dissemination, and use of information; particularly with regard to the development of the incident and the status resources. This information is needed to: 1) understand the current situation, 2) predict the probable course of incident events; and 3) prepare alternative strategies for the incident.</i></p>	
<input type="radio"/>	Collect and process situation information about the incident.
<input type="radio"/>	Supervise preparation of the IAP.
<input type="radio"/>	Provide input to the IC and the OPS in preparing the IAP.
<input type="radio"/>	Chair planning meetings and participate in other meetings as required.
<input type="radio"/>	Assign available personnel already on-site to ICS organizational positions as appropriate.
<input type="radio"/>	Establish information requirements and reporting schedules for Planning Section Units (e.g., Resources, Situation Units).

Planning Section Chief	
<input type="checkbox"/>	Determine the need for any specialized resources in support of the incident.
<input type="radio"/>	If requested, assemble and disassemble Strike Teams and Task Forces not assigned to Operations.
<input type="radio"/>	Establish special information collection activities as necessary (e.g., weather, environmental, toxics).
<input type="radio"/>	Assemble information on alternative strategies to meet response objectives.
<input type="radio"/>	Provide periodic predictions on incident potential. The incident potential examines the current situation and the potential future situation based on the incident specifics (e.g., adverse weather, potential community impacts, duration of incident response operations, legal concerns)
<input type="radio"/>	Report any significant changes in incident status or any Critical Reporting Requirements to the IC (e.g., injury, public health impacts, special request from agencies).
<input type="radio"/>	Compile and display incident status information.
<input type="radio"/>	Oversee preparation and implementation of the Incident Demobilization Plan.
<input type="radio"/>	Based on incident severity and site-specific conditions, incorporate ICS forms and plans (e.g., Traffic, Medical ICS 206, Communications ICS 205, Site Safety ICS 208) into the IAP.

Logistics Section Chief	
<p><i>The Logistics Section Chief (LSC) is responsible for providing facilities, services, and material in support of the incident. The LSC participates in the development and implementation of the IAP.</i></p> <p><i>Resources are divided into Support and Services. Support resources are used in support of the IAP (e.g., boom, vacuum trucks, skimmers). Service resources include food/water, communication, and medical resources.</i></p>	
<input type="radio"/>	Plan the organization of the Logistics Section.
<input type="radio"/>	Assign work locations and preliminary work tasks to Section personnel.
<input type="radio"/>	Notify the Resources Unit of the Logistics Section units activated including names and locations of assigned personnel.
<input type="radio"/>	Assemble and brief Branch Directors and Unit Leaders.
<input type="radio"/>	Participate in preparation of the IAP.
<input type="radio"/>	Identify service and support requirements for planned and expected operations
<input type="radio"/>	Provide input to and review the Communications Plan, Medical Plan and Traffic Plan.
<input type="radio"/>	Coordinate and process requests for additional resources.
<input type="radio"/>	Review the IAP and estimate Section needs for the next operational period.
<input type="radio"/>	Advise on current service and support capabilities.

Logistics Section Chief	
<input type="radio"/>	Prepare service and support elements of the IAP.
<input type="radio"/>	Estimate future service and support requirements.
<input type="radio"/>	Recommend release of Unit resources in conformity with Incident Demobilization Plan.
<input type="radio"/>	Ensure the general welfare and safety of Logistics Section personnel.

Finance Section Chief	
<i>The Finance Section Chief (FSC) is responsible for all financial, administrative, and cost analysis aspects of the incident and for supervising members of the Finance Section. Depending on the incident, the FSC position may or may not be assigned. Agencies within the UC may require and staff the FSC position.</i>	
<input type="radio"/>	Attend planning meetings as required.
<input type="radio"/>	Manage all financial aspects of an incident.
<input type="radio"/>	Provide financial and cost analysis information as requested.
<input type="radio"/>	Gather pertinent information from briefings with responsible agencies.
<input type="radio"/>	Develop an operating plan for the Finance/Administration Section; fill supply and support needs.
<input type="radio"/>	Determine the need to set up and operate an incident commissary.
<input type="radio"/>	Meet with Assisting and Cooperating Agency Representatives, as needed.
<input type="radio"/>	Ensure that all personnel time records are accurately completed and transmitted, according to policy.
<input type="radio"/>	Provide financial input to demobilization planning.
<input type="radio"/>	Ensure that all obligation documents initiated at the incident are properly prepared and completed.
<input type="radio"/>	Brief administrative personnel on all incident-related financial issues needing attention or follow-up prior to leaving incident.

4 Procedure

4.1 Receiving, Identifying, and Classifying Incidents

Generally, an incident is a chain of events which has caused, or could have caused, injury, illness, and/or damage to the environment or the public. In this Plan, an incident refers to an event requiring some form of action on behalf of the Company. Notification of incidents may occur via phone from external sources (the public or emergency response agencies such as fire or police), phone from employees or contractors, or operational monitoring by the Pipeline Control Center. Regardless of the source, each incident's relative risk will be continually evaluated and characterized until it has been controlled and resolved. The initial IC role will be filled by the first Company employee to arrive at the incident scene.

An emergency is defined as an urgent, sudden, and serious event that requires immediate action that may result in harm to employees or the public, environmental degradation, and/or property damage. If

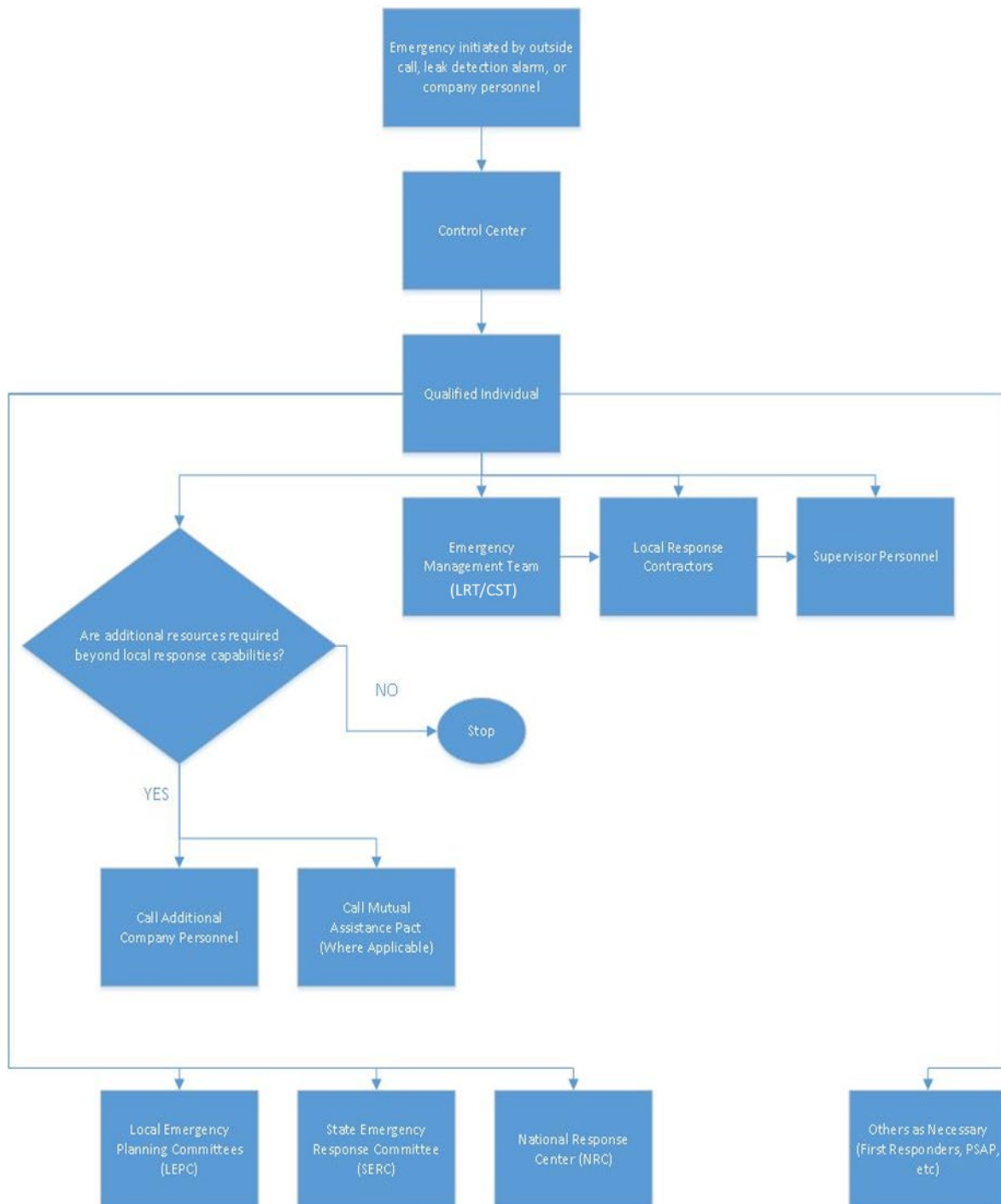
an emergency is reported, SCS will shut down the impacted system and make immediate notifications to ensure protection of the public and company personnel.

Incident Classification	
Low Risk	<p>Incidents that will not need to involve outside agencies, such as Police, Fire, etc.</p> <p>Incidents that can be secured by the Pipeline Operations field personnel that do not impact the public or environment.</p> <p>Examples may include:</p> <ol style="list-style-type: none">1. Incipient stage fires addressed with hand-held extinguishers2. Small spills of fuel, lube oil, or other regulated materials that remain in containment or small releases that disperse immediately into the atmosphere3. Minor injuries not requiring hospitalization
High Risk	<p>Incidents that require an immediate response by the Pipeline Controller and Pipeline Operations Field personnel, such as:</p> <ol style="list-style-type: none">1. Accidental/uncontrolled release of CO₂ from the pipeline2. Fire beyond the capabilities of a handheld extinguisher or explosion occurring near or directly involving a pipeline facility3. Operational failure causing a hazardous condition

4.2 Communicating to Appropriate Operator Personnel

Should notification of an event relating to a pipeline leak or potential emergency which requires immediate response be received, the following Emergency Notification Flowchart, located in Figure 3, provides guidance regarding notification of appropriate operator personnel, contractors, emergency, and public officials.

Figure 3: Emergency Notification Flowchart



4.3 Prompt and Effective Response

A prompt and effective response to each type of incident identified in Section 4.1 is critical to minimizing any adverse effect to public health, the environment, and property.

- All immediate response events (high risk) identified in Section 4.1 should be mitigated by shutting down the pipeline segment(s) involved as soon as possible.
- If the notification is taken by the Pipeline Controller, the pipeline segment(s) involved will be shut down immediately.
- Any other individual receiving notification will immediately notify the Pipeline Controller for immediate shutdown of the affected pipeline segment(s).
- The Control Center shall determine the external notification that need to be made based on the incident type and severity. See Section 6 for the public safety answering point (PSAP) for each county and Section 7 for regulatory notifications, both federal and state, including the public.

Initial response actions are those taken by local personnel immediately upon becoming aware of a discharge or emergency incident before the LRT Team (described in Section 3) is formed and functioning.

The first SCS employee on-scene will function as the IC until properly relieved. The person functioning as the IC during the initial response period has the authority to take the steps necessary to control the situation and must not be constrained by these general guidelines.

Initial Response Actions

Initial Response Action Checklist	
<input type="checkbox"/>	Take appropriate personal protective measures and utilize CO ₂ monitoring equipment to ensure public and responder safety, as the situation demands.
<input type="checkbox"/>	Confirm Control Center has been notified.
<input type="checkbox"/>	Call for medical assistance if an injury has occurred.
<input type="checkbox"/>	Restrict access to the incident site and adjacent areas as the situation demands. Take additional steps necessary to minimize any threat to health and safety. Contact local police or fire to assist as needed.
<input type="checkbox"/>	Assess the magnitude of the incident and quantity released.
<input type="checkbox"/>	Advise public/personnel in the area of any potential threat and/or initiate evacuation procedures.
<input type="checkbox"/>	Use testing and sampling equipment to determine potential safety hazards, as the situation demands.
<input type="checkbox"/>	Identify/Isolate the source and minimize the loss of product, as appropriate.
<input type="checkbox"/>	Take necessary fire response actions and/or contact the local fire department to assist as needed
<input type="checkbox"/>	Notify Management of the incident.
<input type="checkbox"/>	Utilize the ICS 201 form to begin logging all field activities and decisions.

Incident Specific Response Actions

Should notification be received of high risk incident, the following procedures will be followed.

- Accidental/Uncontrolled release of CO₂ from the pipeline.
 - Confirmation will be made by personnel on-scene that Pipeline Control is aware of the incident to effectuate shut down of the pipeline and closure of mainline valves to isolate the release and minimize the amount of CO₂ released.
 - Consideration should be given to notifying and evacuating the public downwind of the release and closing roads. Coordinate with nearby fire departments and law enforcement to aid in any evacuation efforts.
 - Pipeline Control will call the appropriate PSAP and nearby fire departments, law enforcement, and other appropriate agencies. See Section 6 for a listing of PSAPs and Section 7 for agency contacts. Personnel on-scene during an incident may call 911 directly.
 - Pipeline Control dispatches Company Response Crew to investigate the incident and notifies the QI.
 - Company Response Crew arrives at the incident site and completes initial response actions. A designated Company person from the response crew will fill the initial IC position.
 - The IC will conduct a risk assessment and coordinate with the QI to determine what ICS positions need to be filled for the LRT.
 - The QI or IC will establish liaison with the local emergency coordinating agencies, such as the 911 emergency call centers or county emergency managers in lieu of communicating individually with each fire, police, or other public entity.
 - If the response exceeds local capabilities, the IC will coordinate with the QI to determine the need for mobilization of a CST.
- Fire or explosion occurring near or directly involving a pipeline facility. Note, CO₂ is not flammable, combustible, or explosive.
 - Call for assistance from nearby fire departments and company personnel as needed. Take all possible actions to keep fire from spreading to pipeline equipment. If fire still threatens the pipeline, activate shutdown procedure and depressurize threatened pipeline segments as practical.
 - For an explosion involving a pipeline facility, shut down the pipeline.
 - The IC will conduct a preliminary assessment of the situation upon arrival at the scene. Evaluate scene for potential hazards. Determine what product is involved.
 - Assemble the LRT at the Command Post.
 - Coordinate response efforts with on-scene fire department.
- Operational failure causing a hazardous condition.
 - Confirmation will be made by personnel on-scene that Pipeline Control is aware of the incident to effectuate shut down of the pipeline and closure of mainline valves to isolate the release and minimize a hazardous condition.

- Consideration should be given to evacuating the public downwind of the release and closing roads. Coordinate with nearby fire departments and law enforcement to aid in any evacuation efforts.
- Pipeline Control will call the appropriate PSAP and nearby fire departments, law enforcement, and other appropriate agencies. See Section 6 for a listing of PSAPs and Section 7 for agency contacts. Personnel on-scene during an incident may call 911 directly.
- Pipeline Control dispatches LRT to investigate the incident and notifies the QI.
- Company Response Crew arrives at the incident site and completes initial response actions. A designated Company person from the response crew will fill the initial IC position.
- The IC will conduct a risk assessment and coordinate with the QI to determine what ICS positions need to be filled for the LRT.
- The QI or IC will establish liaison with the local emergency coordinating agencies, such as the 911 emergency call centers or county emergency managers in lieu of communicating individually with each fire, police, or other public entity.
- If the response exceeds local capabilities, the IC will coordinate with the QI to determine the need for mobilization of a CST.
- Fire or explosion occurring near or directly involving a pipeline facility. Note, CO₂ is not flammable, combustible, or explosive.
 - Call for assistance from nearby fire departments and company personnel as needed. Take all possible actions to keep fire from spreading to pipeline equipment. If fire still threatens the pipeline, activate shutdown procedure, and depressurize threatened pipeline segments as practical.
 - For an explosion involving a pipeline facility, shut down the pipeline.
 - The IC will conduct a preliminary assessment of the situation upon arrival at the scene. Evaluate scene for potential hazards. Determine what product is involved.
 - Assemble the LRT at the Command Post.
 - Coordinate response efforts with on-scene fire department.

4.4 Personnel and Equipment

SCS will provide personnel, equipment, instruments, tools, and material as needed to respond to an emergency incident.

- All local company personnel are available for call-out as needed for duty on a 24-hour basis to support public safety agencies.
- Additional personnel, if required, will be acquired from agency responders from public safety agencies and/or response contractors.
- If public authorities are involved, they will be given full cooperation and assistance. In no event shall such cooperation and assistance violate safety rules or consist of actions that would endanger the public or employees.
- Company employees, contractors, and agency responders will be equipped with tools, supplies, and equipment available to be used in cases of emergency conditions existing on or near the pipeline system. CO₂/oxygen monitoring devices should be used in the event of an accidental/uncontrolled release of CO₂. Self-contained breathing apparatus may be required pending results from on site-specific hazards and monitoring results.

4.5 Release of Carbon Dioxide

In the event of a breach of pipeline integrity resulting in an uncontrolled release of CO₂, following actions will be coordinated to minimize hazards to public health, the environment, and property.

Pipeline Control will immediately identify any possible rupture and fully close any remote mitigation valves to minimize the volume of CO₂ released from the pipeline.

Pipeline Control will notify the PSAP and/or other agencies such as fire and law enforcement as well as aerial patrol to assist in identifying the location of the release. Aerial patrol will look for:

- blowing soil;
- presence of frost near the pipeline right of way;
- vapor cloud similar to that produced by dry ice; and
- dead or dying vegetation on or near the pipeline right of way in an otherwise green area.

Based upon the estimated volume of the release, topography, proximity of habitable structures, and weather conditions, work with the local emergency response agencies to effect orderly evacuation of the public. The safety of the public and the response team comes first.

Notify emergency agencies to help control traffic, establish danger zones to control sightseers, and determine if it is advisable to set up roadblocks. Roadblocks may be needed for pedestrian, automotive, and train traffic. If active train tracks are near or crossing the area of potential impact, the railroad dispatcher will be notified (telephone numbers of railroad dispatchers are included in Section 6 of this procedure).

As appropriate, deploy outside assistance such as construction contractors or additional air monitoring services.

If roadblocks are set up, advise the controlled points of any resources which have been contacted so they may be admitted to the controlled area.

To enhance cooperation during an incident response, SCS will liaise with agency responders and public officials including participating in emergency tabletop exercises, coordinating meetings to discuss hazards and emergency response, and conducting facility tours or open houses. These and other public outreach activities will be included in the Public Awareness Program that will be developed and implemented prior to commencing operation of the pipeline.

Pipeline Control actions during emergency response actions will be detailed in the Control Room Management Plan to be developed and implemented prior to commencing pipeline operations. Generally, the actions will include:

- ## 5 SCS Internal Contacts

[illegible]

6 Public Safety Answering Points and Railroad Contact Information

Public Safety Answering Points (PSAPs) - MINNESOTA	
Otter Tail County	218-998-8555 - Otter Tail County Sheriff's Office
Wilkin County	218-643-8544 - Wilken County Sheriff's Office

Railroad Emergency Contact – 24/7	
BNSF Railway	1-800-832-5452; then press 1 for emergency
Otter Tail Valley	866-527-3499 (will be answered as Genesee and Wyoming Railroad but this is the emergency number for Otter Tail Valley as well)

7 Federal and State Agency Notifications

7.1 Federal Agencies

FEDERAL PIPELINE SAFETY REPORT NATIONAL RESPONSE CENTER	
c/o United States Coast Guard (CG-5335) – Stop 7581 Washington, DC 20593-0001	
24 Hour Phone	(800) 424-8802
<p>REPORTING REQUIREMENTS: The National Response Center (NRC) is the sole federal point of contact for reporting CO₂ releases which enter or threaten to enter the navigable waters of the United States and for pipeline related incidents/ accidents as defined by the U.S. Department of Transportation, Office of Pipeline Safety. If you have a release or a pipeline incident/accident to report, contact the NRC at the earliest practicable moment (within 1 hour) via the toll-free number, or visit the NRC website (https://nrc.uscg.mil/) for additional information on reporting requirements and procedures. For those without 800 access, please contact the NRC at 202-267-2675.</p> <p>Type: Any discharge that has impacted or threatens to impact navigable waters or a release that meets the criteria of PHMSA's reporting requirements under 49 CFR 195 (see PHMSA reporting requirements on the next page).</p> <p>Verbal Notification: Immediately (not later than one (1) hour of confirmation discovery to meet 49 CFR 195.52(a)). See PHMSA notification for follow-up NRC notification criteria within 48 hours).</p>	
Telephonic Reporting Must Include the Following Information:	
1	Name and address and operator identification number (OPID) of SCS
2	Name and telephone number of the reporter
3	The location of the failure
4	The time of the failure
5	The fatalities and personal injuries (if any)
6	All other significant facts known by SCS that are relevant to the cause of the failure or extent of the damages or extent of the damages.

PIPELINE AND HAZARDOUS MATERIALS ADMINISTRATION (PHMSA)

U.S. Department of Transportation
1200 New Jersey Avenue, SE. Washington, DC 20590
(800) 424-8802 – 24 hours to NRC/emergency number
202-373-2428

REPORTING REQUIREMENTS

Type:

In addition to the reporting of accidents to the NRC as noted below, a written accident report (PHMSA Forms 7000-1 via the online PHMSA Portal) must be submitted for releases resulting in any of the following:

- Explosion or fire not intentionally set by SCS.

- Release of five gallons or more of CO₂, except that no report is required for a release of less than five barrels resulting from a pipeline maintenance activity if the release is:
 - not one described under the NRC's reporting conditions
 - confined to company property or pipeline right-of-way; and
 - cleaned up promptly.

- Death of any person.

- Personal injury necessitating hospitalization.

- Estimated property damage, including cost of clean-up and recovery, value of lost product, and damage to the property of the operator or others, or both, exceeding \$50,000

Written reports are required to be submitted as soon as practicable but **no later than 30 days** after discovery of the accident on PHMSA Form 7000-1. Reports shall be filed by the Manager, EHS or designee. Changes or additions to the original report (PHMSA Form 7000-1) must be filed as a supplemental report within 30 days.

Verbal Notification:

Call to the NRC, within one (1) hour of confirmed discovery and within 48 hours revise or confirm initial report, meets the required verbal notification under PHMSA reporting requirements.

Written Notification:

As soon as practicable, an accident meeting any of the above criteria must be report via the PHMSA Portal at the following link:

<https://portal.phmsa.dot.gov/portal>

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)	
OSHA Hotline	(800) 321-6742
Basic requirement. ALL fatalities (regardless if they are work related or not) must be reported to OSHA within 8 hours of occurrence. Work-related inpatient hospitalizations, amputations and losses of an eye occurring within 24 hours of the incident must be reported to OSHA within 24 hours.	

7.2 State Agencies

MINNESOTA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (MNOSHA)	
Reporting of workplace fatalities and certain injuries	877-470-6742 800-321-6742 (After hours, weekends, holidays)
Reporting Requirement: Verbal	
MNOSHA must be notified for work-related incidents resulting in:	
<ol style="list-style-type: none">1. Fatalities within eight hours2. Inpatient hospitalizations, amputations, or loss of an eye within 24-hours	

MINNESOTA POLLUTION CONTROL AGENCY	
Spill reporting – 24/7 Immediately report	651-649-5451
Normal business hours	(800) 422-0798
<p>Reporting Requirement: Verbal Immediately notify the Minnesota Pollution Control Agency for:</p> <ul style="list-style-type: none"> I. Any release that might cause environmental damage II. Any amount of any substance that is released into the environment that could cause pollution of waters of the state 	

MINNESOTA DEPARTMENT OF PUBLIC SAFETY OFFICE OF PIPELINE SAFETY (MNOPS)	
Spill reporting 24/7 emergency	(800) 422-0798 statewide 651-649-5451 metro and out of state
<p>MNOPS has authority for pipelines operated in the State of Minnesota. In the event of a release, if the spill is required to be reported to PHMSA/NRC, it should also be immediately reported to the MNOPS.</p> <p>Telephonic: Notification should be made as soon as possible and within 1 hour. A follow-up call shall be made within 48 hours of the initial notification to update and/or confirm information.</p> <ul style="list-style-type: none"> - All emergency releases - All reportable accidents as required by PHMSA - Any discharge of any substance or material which may cause water pollution <p>Written: A copy of the 7000-1 report required by PHMSA shall be sent to the Minnesota Office of Pipeline Safety.</p>	

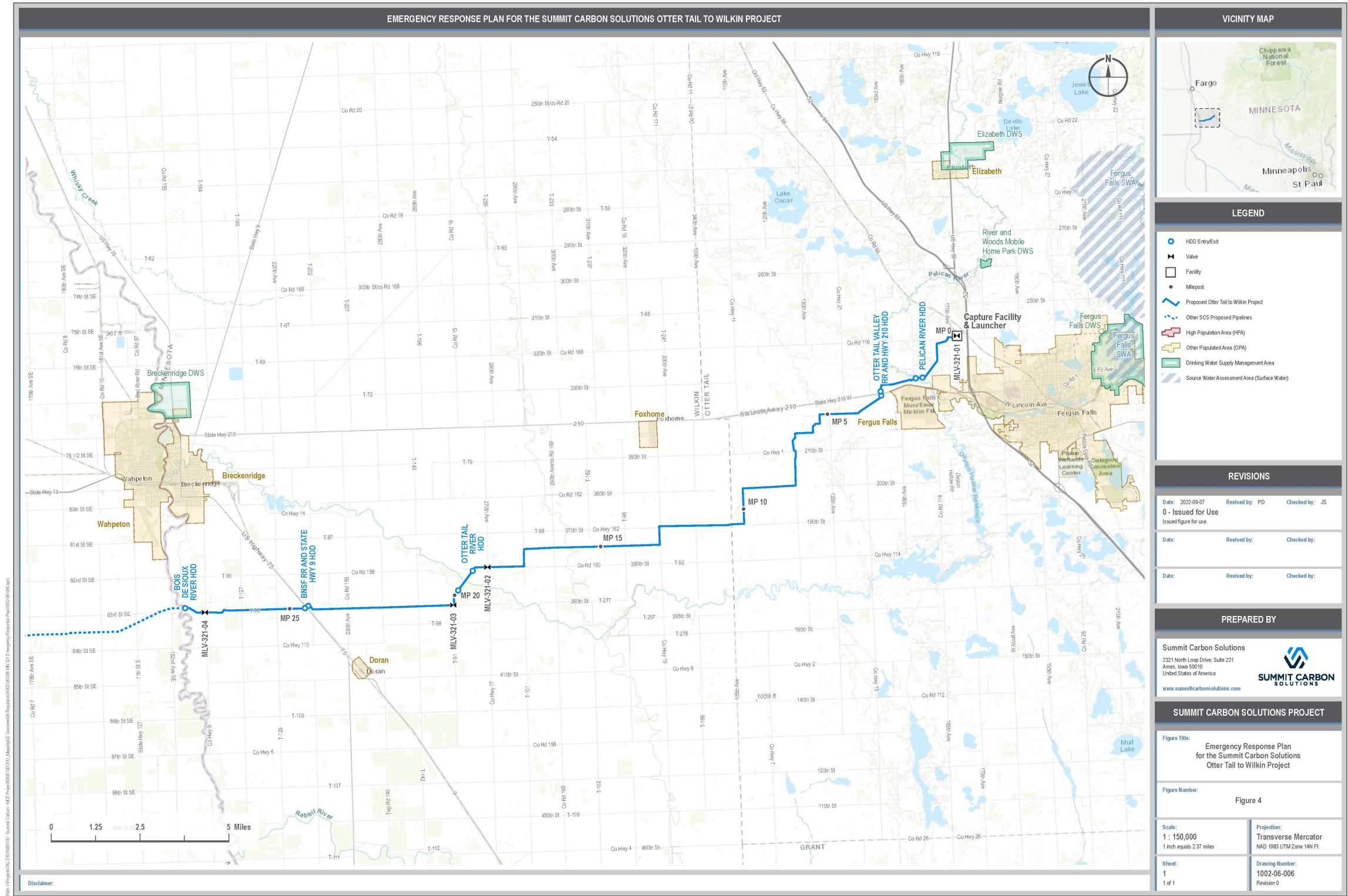
8 Contractor Contact Information

SCS to provide listing of contractors prior to operations.

Contractor Resources		
Company	Capability	Telephone
TBD		

9 Mapping

Figure 4: Project Overview Map



10 Training and Exercises

10.1 Training

The Director, Regulatory Compliance shall ensure that all required Company personnel have received Incident Command training and that all Company personnel working within the ICS response organization understand their roles and responsibilities and the chain of command.

Company personnel shall receive specialized initial training for their roles and will also receive annual training as required by the Company's training program. To remain active, all Company response personnel must meet all training requirements to maintain current certifications and response readiness.

As part of the training program, the Company will meet with agency personnel to discuss response preplanning and preparedness.

10.2 Exercises

A tabletop exercise is a facilitated discussion about what the Company would do in response to an emergency incident. The exercise leads participants through a simulated scenario and prompts them to examine plans, policies, and procedures without disrupting the work environment. It allows for a facilitated discussion of roles, procedures, and responsibilities in the context of a simulated scenario.

The goals of the tabletop exercise include:

- Evaluate the ability to prepare and respond using current plans, policies, procedures, and resources.
- Identify and document improvements for plans, policies, procedures, etc.

The tabletop should be designed to help identify strengths and areas for improvement. Example tabletop objectives may include:

- Evaluate the facility's response organization and operation within the response management system.
- Evaluate internal notifications and alerts, procedures, and training needs.
- Evaluate internal and external communications, including notifications to agencies and the public.
- Evaluate designated staging areas and other emergency response support locations, including activation of Company personnel.
- Evaluate response plans and procedures.
- Evaluate responder and equipment readiness.

Agency personnel will be given an opportunity to attend and participate in these exercises to help facilitate response actions, team integration, and agency expectations.

11 Operator Qualification Tasks

To comply with the Operator Qualification program requirements in 49 CFR 195 subpart G, an Operator must have written description of the processes used to determine the qualification of persons performing operations and maintenance tasks. These descriptions will be maintained in the following documents.

AOC	Abnormal Operating Condition (Field)
AOC	Abnormal Operating Condition (Control Center)
CT 63.1	Start-up of a Liquid Pipeline (Field)
CT 63.2	Shutdown of a Liquid Pipeline (Field)
CT 64.1	Start-up of a Liquid Pipeline (Control Center)
CT 64.2	Shutdown of a Liquid Pipeline (Control Center)

12 Records/Forms

Employees involved in emergency response should keep logs documenting the times of contacts and actions taken during the emergency. These logs may be useful when conducting the post- accident review.

- PHMSA Form 7000-1 Accident Notification Report
- Incident/Accident Investigation
- SCS Safety Manual

Figure 5: ICS 201 Incident Briefing

[illegible]

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1. Incident Name	2. Prepared by: (name) Date: _____ Time: _____	INCIDENT BRIEFING ICS 201-CG
6. Current Organization (fill in additional appropriate organization) <div style="text-align: center;"> _____ _____ _____ _____ _____ </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;"> _____ — Safety Officer _____ — Liaison Officer _____ — Public Information Officer _____ </div> <div style="width: 45%;"></div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px; width: 20%;"> Operations Section _____ </div> <div style="border: 1px solid black; padding: 5px; width: 20%;"> Planning Section _____ </div> <div style="border: 1px solid black; padding: 5px; width: 20%;"> Logistics Section _____ </div> <div style="border: 1px solid black; padding: 5px; width: 20%;"> Finance Section _____ </div> </div>		

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Figure 6: ICS 214a Individual Log

[illegible]

Figure 7: Incident Notification Form

Incident Report Form			
Name (First/Last): _____	Day Phone: _____		
Title: _____	Evening Phone: _____		
Operator Name: _____	Organization Type: _____		
Facility Name: _____	Company: _____		
Address: _____	Address _____		
Facility Latitude: _____	Facility Longitude: _____		
Incident Details			
Date/Time of Incident: _____	Date: _____	Time _____	
Spill Location/Address: _____			
Nearest City: _____	State: _____	County: _____	Zip: _____
Section: _____	Township _____	Range: _____	Borough _____
Distance from City _____	Direction from City _____		
Container Type: _____	Container Storage Capacity _____		
Facility Oil Storage Capacity (gallons): _____			
Materials			
Discharge Amount	Unit of Measure	Impacted Water	Quantity Impacting Water
		<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Response Actions			
Actions Taken to Correct, Control or Mitigate Incident: _____			
Impact			
Number of Injuries _____	Number of Deaths: _____		
Evacuation Required: <input type="checkbox"/> Yes <input type="checkbox"/> No	Number Evacuated: _____		
Areas to be Evacuated: _____			
Damage Amount (approximate): _____			
Medium Affected: _____			
Medium Description: _____			
More information on Medium: _____			
Additional Information			
Any information about the incident not recorded elsewhere in this report: _____			
Call Notifications			
National Response Center (NRC): _____	1-800-424-8802	NRC Report # _____	
PHMSA <input type="checkbox"/> Yes <input type="checkbox"/> No	OSHA <input type="checkbox"/> Yes <input type="checkbox"/> No	State: <input type="checkbox"/> Yes <input type="checkbox"/> No	
Additional Notifications: _____			
Note: It is not necessary to wait for all information before calling NRC			

Figure 8: Initial Notification Form

[illegible]

13 References or Related Documents

[Reference and Related Documents to be added]

14 Plan Maintenance

Responsibility

Single point accountability for the ERP development and maintenance rests with the Director, Regulatory Compliance. Accountabilities include:

- Development and maintenance of the ERP;
- Ensure systems (ex: ICS) and response structure can meet the requirements specified herein;
- Ensure the ERP is reviewed at least annually and revised/updated as necessary; and
- Ensure SCS employees, contractors, and responders are trained on and provided a copy of the ERP.

Plan Revisions

Initially, and at regular intervals, SCS will perform hazard assessments to identify possible incidents that have the potential to negatively impact people, the environment, and/or property. This plan will be updated to address any changes to or new hazards identified in the hazard assessments.

Initiating Revisions

All requests for change must be made through the Director, Regulatory Compliance using the Revision Request Form incorporated in this document.

Revision Distribution

Plan revisions are issued with an Acknowledgement of Receipt Form and a brief description of the itemized changes. The Acknowledgement of Receipt Form must be signed and returned to the Director, Regulatory Compliance. A revised date is shown at the bottom of each updated or new page. The original date of the manual is August 18, 2022.

Distribution List	
Copy Number	Plan Holder
1	Director, Regulatory Compliance Summit Carbon Solutions 2321 North Loop Drive, Suite 221 Ames, IA 50010
2	TBD Emergency Management/Response Agency Representative(s)
3 (Electronic)	TBD

In the event SCS experiences an incident, or conducts an exercise or training session, the effectiveness of the plan will be evaluated and updated to include lessons learned as necessary. After each incident or exercise, a post incident/exercise review will be conducted in a timely manner. The Plan will be evaluated to determine its usefulness during the incident/exercise. Items discussed after an incident include but are not limited to effectiveness of detection and detection equipment, proper and timely notifications, initial and ongoing incident assessments, mobilization of resources, and/or response effectiveness. Consideration will be given to including agency responder personnel in the post-incident or training session review.

If an operating condition changes that would substantially affect the implementation of the plan, SCS will modify the Plan to address such a change. Updates would be implemented prior to the change or interim operating provisions would be instituted until the update is fully implemented.

[illegible]

Disclaimer

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DRAFT

Appendix O

Comments on Draft EIS and Responses

Appendix O

Comments on the Draft EIS and Responses

This appendix contains the written and verbal comments received on the draft Environmental Impact Statement (EIS) for the Otter Tail to Wilkin Carbon Dioxide Pipeline Project (project), and responses to these comments by Department of Commerce, Energy Environmental Review and Analysis (EERA) staff. The draft EIS was issued January 23, 2024. Comments on the draft were solicited through public meetings and a public comment period. The public comment period ended on February 23, 2024. Approximately 176 written comments were received during this time from individuals, companies, agencies, Tribes, and organizations.

During this same public comment period, the Minnesota Public Utilities Commission (Commission) received testimony regarding the project from parties to the hearing. Where this testimony includes comments on the draft EIS, these comments are included in this appendix and responses are provided (see comment-response table in **Attachment 1**).

Written Comments

Written public comments are compiled and presented in the attached comment-response table (**Attachment 1**). The comment-response table also includes EERA staff's responses. Some of the responses include modifications to the EIS, as indicated in the responses. All modifications to the text of the EIS are denoted by a vertical line in the margin next to the text that has been modified.

The comment-response table in **Attachment 1** presents comments from agencies, Tribes, and organizations first, followed by individuals in alphabetical order. The comment-response table also includes the date that the comment was received and the eDocket identification number.

After receiving Minnesota Department of Natural Resources (DNR) comments on the draft EIS, EERA staff obtained Conservation Planning Reports for the RA-North and RA-Hybrid route alternatives. These Conservation Planning Reports are included in **Attachment 2**.

Attachment 3 includes the response from EERA staff (dated February 28, 2024) to an information request from CURE. This response was not filed to the project eDocket and is included here to help clarify comment responses.

Verbal Comments

During the Draft EIS comment period, the public was invited to provide verbal comments at the following in-person and virtual public meetings:

- February 6, 2024, 6:00 p.m., Breckenridge, Minnesota
- February 7, 2024, 1:00 p.m., Fergus Falls, Minnesota
- February 7, 2024, 6:00 p.m., Fergus Falls, Minnesota
- February 8, 2024, 6:00 p.m., virtual

Transcripts of these public meetings are provided in **Attachment 4**. During the meetings, EERA staff and its consultants provided responses to most comments raised during the meetings. Thus, the responses to these comments are included in the transcripts. EERA staff identified five comments from the public meetings where an additional response is appropriate. These comments and responses are as follows:

- In response to a question about use of eminent domain, as indicated in Section 3.5, the applicant cannot exercise the power of eminent domain for the project.
- In response to comments about capture facility water usage calculations, Section 5.7.8.2 was revised to clarify the applicant's calculation of approximately 13 million gallons per year.
- A figure showing the three alternative routes has been added to the Executive Summary, as suggested by a commenter.
- In response to comments that figures attached to the applicant's Minnesota Environmental Construction Plan (ECP) in Appendix D refer to a pipeline diameter of 4 to 24 inches, the cover page for the ECP has been revised to clarify that the proposed Otter Tail to Wilkin CO₂ pipeline would be 4 inches. The figures in question are "typical" and are used to convey best management practices for a range of pipeline diameters.
- In response to comments about whether the volume of water needed for operation of the capture facility is sustainable, additional information has been added to Section 5.7.8.2 to address the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to including a contingency plan as part of its DNR appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a request from the DNR, when necessary.

Appendix O

Comments on the Draft EIS and Responses

Attachment 1

Comments on the Draft EIS and Responses

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
American Carbon Alliance	Buis, Tom	2024-02-08	On behalf of the American Carbon Alliance (ACA), I am writing to express my unequivocal support for the Summit Carbon Pipeline project and to encourage the Minnesota Public Utilities Commission to approve its implementation. The Summit Carbon Pipeline represents a pioneering effort to address the challenges associated with carbon emissions, providing an effective and scalable solution for the capture and transport of CO ₂ from various industrial sources to secure storage sites. The technological advancements, strategic partnerships, and effort to obtain voluntary easements, made by the Summit team underscore the project's commitment to cutting edge practices and its potential to make a substantial positive impact on Minnesota's carbon footprint.	Thank you for your comment.	20243-204403-01
American Carbon Alliance	Buis, Tom	2024-02-08	The ACA believes this transformative pipeline project represents a significant milestone in our nation's agricultural landscape. This project isn't merely about environmental sustainability but bolstering the agricultural economy, preserving generational farming, and ensuring a stable foundation for ethanol production. Connecting ethanol plants to a CO ₂ pipeline to enable the creation of sustainable aviation fuel further underscores the ingenuity and forward-thinking approach that benefits both our farmers and the broader energy industry. The successful implementation of this project will not only lower carbon intensity scores but foster an environment where American-produced liquid fuel remains competitive in a rapidly evolving global marketplace. It will create new opportunities for job growth within our communities, drive up land values for farmers, and increase the price of corn. I urge the Commission to consider the long-term benefits of the Summit Carbon Pipeline and to prioritize the advancement of projects that contribute to both environmental stewardship and economic growth. By supporting initiatives like this, we can position Minnesota as a leader in responsible energy practices and contribute to the ongoing global efforts to combat climate change. Thank you for your time and consideration. I trust that the Commission will make a well-informed decision that reflects the best interests of our state and its residents.	Thank you for your comment.	20243-204403-01
American Carbon Alliance	Peterson, Collin	2024-02-08	I am writing to express my wholehearted support for the Summit Carbon Pipeline project, which is slated to have a positive impact on Minnesota's energy landscape and contribute significantly to the state's efforts in carbon capture and storage. Embracing innovative solutions such as this pipeline is crucial for addressing the challenges posed by climate change and provides Minnesota farmers and producers with new markets. The Summit Carbon Pipeline aligns with Minnesota's commitment to reducing greenhouse gas emissions. The project's focus on carbon capture and sequestration not only demonstrates a forward thinking approach to environmental sustainability but also emphasizes the importance of collaboration between the public and private sectors.	Thank you for your comment.	20243-204403-01
American Carbon Alliance	Peterson, Collin	2024-02-08	The Summit Carbon Pipeline is not only an investment in cleaner energy but also a step towards supporting economic growth and job creation throughout the Midwest. This would mean the creation of jobs and revenue for local communities, and a generational opportunity for family farms and rural economies. Connecting ethanol plants to a CO ₂ pipeline to enable the creation of sustainable aviation fuel further underscores the ingenuity and forward-thinking approach that benefits both our farmers and the broader energy industry. I urge the Minnesota Public Utilities Commission to carefully consider the facts presented by Summit Carbon Solutions and to support the Summit Carbon Pipeline project. By endorsing initiatives like this, we can position Minnesota as a leader in sustainable energy practices, setting an example for other states and contributing to the global fight against climate change. Thank you for your attention to this matter, and I trust that you will make a decision that prioritizes the long-term environmental and economic well-being of our state.	Thank you for your comment.	20243-204403-01
City of Lamberton	Halter, Valerie	2024-02-21	Dear Members of the Minnesota Public Utilities Commission, I am writing to express the deep concerns of the City of Lamberton regarding Docket 22-422 and the proposed carbon pipeline projects that may affect our community. The City Council appreciates your time and consideration in addressing the following concerns, which pertain to the potential impacts on our Emergency Medical Services (EMS) personnel, water supply, and local recreational spaces.	Thank you for your comment.	20243-204403-01
City of Lamberton	Halter, Valerie	2024-02-21	1. EMS Personnel Concerns: The safety and preparedness of our EMS personnel are paramount. In the event of a pipeline failure, it is crucial that our volunteers are adequately trained and equipped with the necessary tools to handle such situations. The City of Lamberton, like many communities, faces challenges in staffing our emergency services, and we fear that the perceived hazard associated with potential pipeline failures may discourage individuals from joining our EMS or fire departments. Given the volunteer nature of our EMS, compensating them at a level commensurate with the associated risks is unfeasible. Additionally, the lack of training for our EMS personnel is a pressing concern, and we request that training initiatives commence before any construction begins.	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to respond safely to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a carbon dioxide (CO ₂) rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft	20243-204403-01

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
				plan would be revised as required by the Pipeline and Hazardous Materials Safety Administration (PHMSA) if the project is approved. Additionally, Energy Environmental Review and Analysis (EERA) staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	
City of Lamberton	Halter, Valerie	2024-02-21	<p>2. Water Supply Concerns:</p> <p>Our city is currently dependent on a single well with limited backup well availability. During the summer months, we have had to restrict water usage for businesses within our community due to the inability to meet demand. We are apprehensive about the potential impact on our municipal water facilities if they are required to supply water to the pipeline. Moreover, concerns regarding the effects on surrounding aquifers, coupled with limited options for water access, necessitate careful consideration to safeguard the essential needs of our residents.</p>	Thank you for your comment. Water resources are described in Section 5.7.8 of the Environmental Impact Statement (EIS). The commenter references an area in Redwood County. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
City of Lamberton	Halter, Valerie	2024-02-21	<p>3. Recreational Space and Economic Impact:</p> <p>The presence of a pipeline poses a threat to our local parks, particularly the one located on the Cottonwood River. This park not only serves as a recreational space for residents but also attracts visitors from surrounding areas. The associated construction activities could disrupt the natural landscape, affecting the camping sites and revenue generated from them. This, in turn, may deter individuals from enjoying the park due to perceived risks associated with the pipeline.</p> <p>In conclusion, the City Council of the City of Lamberton urges the Minnesota Public Utilities Commission to thoroughly assess and address these concerns before proceeding with any decisions related to Docket 22-422. Our community's safety, water security, and recreational spaces are integral to our residents' well-being and the vitality of Lamberton as a whole.</p> <p>Thank you for your attention to this matter, and we look forward to a comprehensive evaluation of the potential impacts on our community.</p> <p>Sincerely, Valerie Halter City Clerk on Behalf of the City Council</p>	Thank you for your comment. The commenter references an area in Redwood County. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
Consumer Energy Alliance	Ventura, Chris	2024-02-16	<p>On behalf of Consumer Energy Alliance (CEA), I write today to thank the Minnesota Department of Commerce and the Minnesota Public Utilities Commission for receiving public comments on the draft environmental impact statement regarding the Otter Tail to Wilkin Carbon Dioxide Pipeline Project.</p> <p>Founded in 2006, CEA is a nonpartisan, nonprofit organization advocating for a balanced energy policy and responsible access to resources. CEA represents virtually every sector of the U.S. economy – from the iron and steel industry to truckers, airlines, agriculture, labor organizations, restaurants, chemical manufacturers, small businesses, and families across the nation – that are concerned about U.S. energy policies, energy security, and long-term price and supply stability.</p> <p>Since our founding, CEA and its members have strongly supported actions that thoughtfully advance our nation towards a cleaner, more environmentally responsible energy future. This includes emissions reductions that help meet our nation’s climate goals.</p> <p>As put forth in the Department of Commerce’s Draft EIS, the Otter Tail to Wilkin Carbon Dioxide Pipeline Project will contribute to helping both Minnesota and our nation meet these climate goals. As stated in the Draft EIS, “The project would have a net beneficial effect on climate change as it would capture and store CO₂ emissions,” from ethanol being produced in state. This is because the proposed pipeline is designed to be a carbon management solution that would allow for the capture of up to 12 million tons of CO₂ each year – the equivalent of removing the emissions of 2.6 million vehicles from our roads.</p>	Thank you for your comment.	20243-204403-01
Consumer Energy Alliance	Ventura, Chris	2024-02-16	<p>Safely capturing, transporting, and storing the CO₂ emissions from Minnesota’s ethanol plants will ensure that Minnesota’s ethanol industry will be able to continue to supply fuel that will meet new regulations calling for minimized emissions as our country looks to aggregate cumulative impact.</p> <p>As a result, it will also ensure Minnesota’s corn farmers will be able to market their harvests locally, as ethanol production in 2022 generated \$8 billion of economic activity in Minnesota, which includes \$1.9 billion of income for Minnesota residents. More than</p>	Thank you for your comment.	20243-204403-01

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
			<p>meeting our environmental goals, the proposed project will allow families, farmers, and local businesses across the state to continue having access to affordable, reliable fuel and ensure the stability of the industry that provides it. The stable and predictable energy supplies supported by investments in projects like this will help people power their lives, make payroll, and support local communities. We appreciate the opportunity to offer these comments and urge the Minnesota Department of Commerce and the Minnesota Public Utilities Commission to consider not just the economic benefits projects like the Otter Tail to Wilkin Carbon Dioxide Pipeline Project will deliver but also the environmental benefits these projects will provide to Minnesota.</p> <p>Sincerely, Chris Ventura Executive Director Consumer Energy Alliance-Midwest</p>		
CURE	Dolph, Christy	2024-02-13	<p>Q. Please summarize your conclusions.</p> <p>A. The DEIS does not provide enough information to allow me to determine which route alternative is least damaging to water resources and soils in a comprehensive way. In particular, the DEIS does not provide sufficient geotechnical evidence to allow for an assessment of the comparative risks presented by the three route alternatives to 1) disruption of sensitive groundwater resources and 2) the likelihood of inadvertent spills of drilling fluid to the environment. According to the DEIS, this lack of evidence is because geotechnical investigations have not been completed for critical areas along the route alternatives. However, given the existing information that is available in the DEIS, RA-North would appear to have lesser potential impacts on soil and surface water resources compared to RA-South and RA-Hybrid.</p> <p>Overall, the available scientific evidence on the subject of impacts of pipeline installation on soil and water resources points to the likelihood of lasting impacts from pipeline construction. And, as pipeline infrastructure continues to grow, the impacts of single projects accumulate, and together with other stressors such as agricultural intensification and environmental contamination, likely create thresholds in environmental degradation and habitat loss that can't be easily reversed.</p>	The applicant would complete a geotechnical evaluation of each horizontal directional drill (HDD) location along the pipeline prior to the start of construction. As described in Chapter 5, soils and geology along the three routes are generally similar. Because soils and geology are similar, geotechnical investigations, with the associated time and costs, would be unlikely to aid the Commission in its decision.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	<p>Q. What does the DEIS generally conclude about the potential environmental impacts of the proposed project?</p> <p>A. In general, the DEIS concludes that many of the potential environmental impacts will be “minimal,” “temporary,” or “negligible.”</p> <p>Q. Do you agree with these conclusions?</p> <p>A. No. The science regarding the impacts of pipeline installation and operation on ecosystems has not remotely kept pace with large increases in pipeline infrastructure installed in the United States in recent decades. (1) Given the lack of data regarding impacts arising from pipeline installation, repeated characterization in the Executive Summary of the DEIS of potential environmental impacts from the proposed project as ‘minimal’, ‘temporary’, or ‘negligible’ cannot be based on much evidence. Moreover, the scientific evidence that does exist points to the likelihood of lasting environmental impacts to ecosystems and soil.</p> <p>(1) <i>Brehm, Theresa, and Steve Culman. 2023. "Soil degradation and crop yield declines persist 5 years after pipeline installations." Soil Science Society of America Journal 87 (2):350-364.</i></p>	Thank you for your comment. As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	<p>Q. How would you describe the groundwater resources along the routes presented in the DEIS?</p> <p>A. In this region, unconsolidated permeable glacial deposits and recent alluvial deposits are the most important sources of groundwater. These deposits consist of glacial sand and/or gravel outwash, ice-contact deposits, or sand and gravel alluvium deposited along existing streams. There are both surficial and buried glacial aquifers in the project area. Glacial aquifers are classified as surficial when the water table is in the deposit. Glacial aquifers are classified as buried when they are separated from the ground surface or from overlying surficial glacial aquifers by some continuous barrier to vertical flow. The DEIS states that most lakes, rivers, and many wetlands near the project are hydrologically connected to the water table. In Otter Tail County, the depth to water table is on average less than 20 feet below ground surface. In Wilkin County, the depth to water table is on average less than 10 feet below ground surface.</p>	Thank you for your comment.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	<p>Q. Are there specific construction methods that pose significant risks to groundwater resources?</p> <p>A. Yes. As the DEIS notes, the planned construction methods, such as using sheet piling to reinforce the pipeline trench, represent a substantial risk to sensitive groundwater resources that can have “significant long-term impacts.” (Page 5-136). This is consistent with accepted scientific knowledge.</p>	Thank you for your comment.	20242-203381-02

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
CURE	Dolph, Christy	2024-02-13	<p>Q. What specific type of aquifers are likely to be impacted by the planned construction methods?</p> <p>A. On p. 5-133 the DEIS notes that RA-South has been confirmed by the applicant to cross a sensitive artesian groundwater aquifer in an area with complex and highly variable groundwater. An artesian aquifer is a type of confined aquifer characterized by its natural ability to release water under pressure without the need for external pumping. This pressure arises from the geological confinement of the aquifer between relatively impermeable layers of sediment, causing water to rise above the aquifer's surface when a well is drilled into it. The DEIS further notes that is it is possible RA-North and RA-Hybrid cross this aquifer, though that has not been evaluated directly or confirmed.</p>	Thank you for your comment.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	<p>Q. What are your concerns about the risk to confined artesian aquifers from construction of the project?</p> <p>A. As noted in the DEIS, planned construction methods (i.e., using sheet piling to reinforce the pipeline trench) represents a substantial risk to these types of aquifers that can have “significant long-term impacts.” (Page 5-136). If sheet piling punctures the sediment cap of the aquifer it can create an aquifer “breach” where water flows uncontrollably out of the punctured location. Such a breach could drain or partially drain the aquifer, which could have long term or permanent effects on this groundwater resource. The uncontrolled flow of this water to the surface in new locations could also change the temperature and water chemistry of existing surface waters near the aquifer. If the aquifer is currently welling up to the surface naturally in some locations (i.e., existing artesian springs), then puncturing the aquifer in other locations could cause loss of water to the surface in these existing locations where it may currently support important freshwater ecosystems.</p> <p>Q. Have these kinds of impacts occurred in other pipeline projects?</p> <p>A. Yes. Most notably, the recently constructed Line 3/93 pipeline in Northern Minnesota has caused ongoing damage and groundwater impacts at multiple locations along the pipeline route via this mechanism—specifically, sheet piling puncturing into confined aquifers. This highlights the risk of pipeline construction methods, especially in areas with abundant shallow groundwater that is vulnerable to disturbance.</p> <p>Q. Can these aquifer breaches be corrected after they occur?</p> <p>A. In the case of Line 3/93 it has been the case that aquifer breaches are very difficult to plug or remedy after they have been caused. The attempts to repair damaged aquifers have resulted in additional environmental impacts, such as insertion of thousands of gallons of grout concrete into the subsurface environment in an effort to plug ruptured aquifer caps. The only real way to avoid damage from aquifer breaches is to avoid breaching in the first place.</p>	Thank you for your comment.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	<p>Q. Does the DEIS recommend or identify any other mitigative measures?</p> <p>A. Yes, the DEIS mentions that geotechnical investigations will be conducted prior to construction to assess the proximity to aquifers.</p> <p>Q. Do you believe this method will adequately protect aquifers from construction damages?</p> <p>A. It could, but this approach seems backwards in regards to resource protection. Investigations conducted after route approval are not useful in determining the best route alternative for the project that would minimize groundwater impacts.</p> <p>Q. Do you have any recommendations regarding process?</p> <p>A. Yes. In order to best protect water resources, detailed geotechnical investigations should be conducted along all route alternatives prior to route approval, and routes that cross vulnerable aquifer areas should be avoided.</p>	<p>Minnesota Rule 4410.2300(H) indicates that an EIS shall include “a thorough but succinct discussion of potentially significant adverse or beneficial effects generated” by the proposed project and each major alternative with “[l]ess important material ... summarized, consolidated, or simply referenced.” Factors to be considered include “the impact and the relevance of the information to a reasoned choice among alternatives” and “the relationship between the cost of data and analyses and the relevance and importance of the information.”</p> <p>The groundwater resources that could be affected by the project would be similar for all three route alternatives; therefore, potential impacts would be similar. The time and costs associated with performing an additional study on groundwater resources would not be expected to aid the Commission in its decision.</p>	20242-203381-02
CURE	Dolph, Christy	2024-02-13	<p>Q. Which alternative presents the lowest risk to groundwater resources?</p> <p>A. The No Action Alternative presents the lowest risk to groundwater resource. Otherwise, the DEIS does not contain the requisite information needed to evaluate the comparative risks posed by the remaining route alternatives to groundwater, although RA-South does present a confirmed risk to a vulnerable aquifer. The DEIS shows that RA-South presents a known and confirmed risk to a vulnerable aquifer system and that the other route alternatives have not been evaluated for their risk to similar aquifers. (Page 5-133). Without a fully informed comparison of groundwater conditions across the route, a comparable evaluation of risk to vulnerable water resources across all routes is not possible.</p>	Minnesota Rule 4410.2300(H) indicates that an EIS shall include “a thorough but succinct discussion of potentially significant adverse or beneficial effects generated” by the proposed project and each major alternative with “[l]ess important material ... summarized, consolidated, or simply referenced.” Factors to be considered include “the impact and the relevance of the information to a reasoned choice among alternatives” and “the relationship between the cost of data and analyses and the relevance and importance of the information.”	20242-203381-02

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
				The groundwater resources that could be affected by the project would be similar for all three route alternatives; therefore, potential impacts would be similar. The time and costs associated with performing an additional study on groundwater resources would not be expected to aid the Commission in its decision.	
CURE	Dolph, Christy	2024-02-13	Q. Based on the available information do you think that RA-South would have the least impact to groundwater resources? A. No. Based on available information RA-South has a significant risk of groundwater impacts that could be difficult or impossible to avoid or remediate.	Thank you for your comment.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	Q. Are there risks associated with the HDD method? A. Yes. HDD involves drilling a tunnel underneath a river or wetland, often at considerable depth (e.g., ~50 ft deep) and then installing prefabricated sections of pipe into the tunnel. To drill these tunnels, contractors lubricate a large drill bit with something called drilling fluid or drilling mud. This fluid is typically a mix of bentonite clay and other unknown chemicals that are typically not disclosed to the public and are listed as “proprietary”, or trade secret. As noted in the DEIS, “during HDD installation it is possible to encounter existing weak areas in the ground where pressurized drilling mud can escape into the surrounding matrix. These can include unconsolidated gravel, coarse sand, soil fissures, and fractured bedrock.” (Page 5-104). In other words, when HDD is used to drill through sensitive sediments beneath rivers and wetlands, the tunnels can lose structural integrity and develop leaks. These leaks are known as ‘frac outs’, and result in drilling fluid spills into the surrounding environment. Leaks happen initially in the subsurface, and can spread all the way to the land or water surface, or to other subsurface locations and aquifers. Notably, conditions that create vulnerability for frac outs (i.e., the presence of unconsolidated gravel and sand) are prevalent in the proposed project region as noted by the DEIS, indicating a risk for HDD-related inadvertent releases. Bentonite clay (one of the primary constituents of drilling fluid) is a very fine sediment that represents a stressor to aquatic life if spilled into streams, rivers or wetlands. Fine sediments can clog the gills and suffocate aquatic life like mussels, insects, and fish. Fine sediments can also degrade habitat for these life forms. There have been relatively few scientific studies of drilling mud toxicity to the environment. Most of the available scientific studies were conducted for coastal environments. In coastal settings, drilling muds have demonstrated toxicity for fish, crustaceans, mollusks and other organisms.	The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	Q. Is there any potential additional risk to aquatic life from the chemicals used in drilling fluid? A. The DEIS notes that chemical additives may be mixed with drilling fluid to lubricate the drill or improve viscosity. (Page 5-136). Ecotoxicity data for potential drilling fluid additives are not presented in the DEIS. Without more information on the additional chemicals used in the drilling fluid it is not possible to fully assess the extent of risk to aquatic organisms from this chemical mix. It is reasonable to assume that drilling fluid mixes have acute toxicity to aquatic life, but the lack of information in the DEIS makes further analysis exceedingly difficult to complete. Q. Do you have any recommendations for mitigating these risks? A. There is no way to completely mitigate the potential risks associated with HDD. Given the likely risk of inadvertent drilling fluid release at river crossing locations where HDD is used and the potential impact of these releases on water quality and ecosystem health, the applicant should be required to document and report the amount of drilling fluid lost to the environment in each release. Ideally, the applicant should be required to disclose all chemicals used for HDD and the amounts used in its drilling fluid so that there is more clarity on potential toxicity to aquatic life. Geotechnical investigations should also be conducted along all route alternatives prior to route approval. In the DEIS, no geotechnical investigation is listed for the Red River crossing for RA-North, and the investigation for the Pelican River has not been completed. Without this information, we cannot evaluate the comparative risks associated with HDD for the different routes. These investigations are critical to informing route selection and crossing method. Construction of the recent Line 3/93 pipeline project in northern 1 Minnesota resulted in ‘frac outs,’ or an inadvertent releases of drilling fluid to the environment at a majority (67%) of river locations crossed using HDD, in part because the pipeline company conducted crossings in geologic conditions that were unsuitable for the HDD crossing method.	As described in Section 5.7.8.2, an additive approved by the Minnesota Department of Health (MDH) or meeting NSF International/American National Standards Institute (ANSI) Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5. The applicant would conduct a geotechnical investigation and prepare a site-specific HDD engineering design before implementing any HDD at waterbody crossings. As described in Chapter 5, soils and geology along the three routes are generally similar. Because soils and geology are similar, geotechnical investigations, with the associated time and costs, would be unlikely to aid the Commission in its decision.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	Q. What are typical crossing methods for smaller rivers, streams, and other surface waters? A. Often, for smaller surface waters, construction companies will use the “open cut” trenching method for crossing. This method	Thank you for your comment.	20242-203381-02

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
			<p>involves digging a trench directly across the stream banks and stream bed. If water is flowing through the stream, methods such as temporary dams or continuously pumping water out of the channel are used to dewater the stream during construction.</p> <p>Q. Is this kind of crossing method proposed in the DEIS?</p> <p>A. Yes, this is listed in the DEIS as the proposed crossing method.</p> <p>Q. Are there risks associated with the open cut trenching crossing method?</p> <p>A. There are several risks associated with open cut trenching. Risks include permanent loss of riparian habitat along the pipeline right-of-way, potentially resulting in loss of stream bank stabilization. Open cut trenching can also increase stream channel erosion and entry of eroded sediments into waterways due to construction activities prior and subsequent to the actual digging of a trench across a stream, including excavation of intake pits, placement of barriers, installation, and removal of temporary bridges and stream stabilization efforts. This method of stream crossing, especially if the streams are dewatered for dry trench construction, can result in a loss of in-stream habitat and death of any aquatic organisms in the length of the dewatered stream. Finally, the disturbance of the bed and banks of streams during open cut trenching can result in instability and potential future vertical or lateral erosion (i.e., the stream channel migrating to the side or up and down), in turn resulting in additional turbidity and potential degradation of water quality.</p>		
CURE	Dolph, Christy	2024-02-13	<p>Q. Which alternative presents the lowest risk to surface water resources?</p> <p>A. The No Action Alternative presents the lowest risk to surface water resources. Otherwise, because of the lack of geotechnical investigations for all potential HDD crossings as described above, the DEIS does not contain the requisite information needed to evaluate the comparative risks posed by the remaining route alternatives to surface water. However, based on the existing information provided in the DEIS, RA-South and RA-Hybrid would appear to impact more surface waters than RA-North. RA-South and RA-Hybrid cross more surface waters than RA-North. The Regions of Influence (ROI) for RA-South and RA-Hybrid also intersect more perennial streams than the ROI for RA-North. Perennial streams are typically wet all year long, and water quality and aquatic life in these streams are more likely to be impacted by pipeline construction activities, compared to intermittent streams or ditches that may be dry during construction. Even if streams are not directly crossed by the project, sediment-laden water from construction activities in the ROI can enter these waterways and cause pollution.</p> <p>Q. Does RA-South demonstrably reduce risk to surface water resources?</p> <p>A. No. Based on the available information RA-South will have significant negative impacts on surface water resources.</p>	Thank you for your comment. As shown in Table 5-48, Table 5-49, and Table 5-50, impacts on perennial waterbodies would be mitigated by the use of HDD. Impacts on surface water resources are not characterized as significant for any of the route alternatives.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	<p>Q. How would you describe the wetland resources along the routes presented in the DEIS?</p> <p>A. Throughout much of the state of Minnesota, including the area crossed by the route alternatives for this project, the large majority of naturally occurring wetlands have been eliminated from the land as the result of European colonization and the wholesale conversion of land from a grasslands/wetland/forest complex to intensive agriculture.</p> <p>Q. Does Minnesota have special protections for wetlands?</p> <p>A. Yes, in fact, the state’s Wetland Conservation Act states that protecting the state’s remaining existing wetlands is critical to the goal of no-net-loss for wetland ecosystems.</p> <p>Q. How do we protect wetlands?</p> <p>A. The best way to protect the function of wetland ecosystems is to prevent their degradation in the first place, as these functions typically can’t be readily restored once damaged. For example, a recent report by the MPCA entitled Status and Trends of Wetlands in Minnesota: Vegetation Quality Baseline concludes that “Ultimately, a greater emphasis on protection would be an appropriate approach to further promote the no-net-loss of wetland quality and biological diversity of Minnesota’s wetlands. The plant community changes that occur (i.e., increased abundance of non-native invasive species) when wetlands are exposed to virtually any variety of impact are typically not self-correcting. Direct management of the vegetation itself is often required—in addition to correcting external impacts—to reestablish native composition and abundance distributions. Enhancing degraded plant communities is typically time consuming and requires a significant financial investment.” (2) Similar research based on a meta-analysis of the available scientific literature found that restoration activities typically do not restore the structure and functional attributes of wetlands that are lost or damaged during development projects. (3) For example, both wetland plant assemblages and biogeochemical functioning in terms of carbon storage in wetland soils remained critically reduced even 100 years post-restoration of damaged wetlands. This study is attached as Schedule CD-2.</p>	Thank you for your comment.	20242-203381-02

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			<p>(2) Minnesota Pollution Control Agency, <i>Status and Trends of Wetlands in Minnesota: Vegetation Quality Baseline</i> (Sept. 2015), https://www.pca.state.mn.us/sites/default/files/wq-bwm1-09.pdf.</p> <p>(3) Moreno-Mateos, D., Power, M. E., Comín, F. A., & Yockteng, R. (2012). "Structural and functional loss in restored wetland ecosystems." <i>PLoS Biology</i> 10(1), e1001247. https://doi.org/10.1371/journal.pbio.1001247.</p>		
CURE	Dolph, Christy	2024-02-13	<p>Q. What does this mean for this DEIS?</p> <p>A. Because conserving existing wetlands is critical to maintaining key ecosystem functions and an existing state policy goal, and because degraded wetlands cannot be readily restored once damaged, evaluating comparative impacts of route alternatives to wetland health is an important consideration.</p> <p>Q. Which alternative presents the lowest risk to wetlands?</p> <p>A. The No Action Alternative presents the lowest risk to existing wetland health. When evaluating comparative wetland impacts among the route alternatives as summarized in the DEIS, RA-South impacts more than twice as many wetland acres (44.6 acres) as RA-North (20.9 acres), and RA-South impacts nearly twice as many wetland acres as RA-Hybrid (24.7 acres). This comparative difference is not noted in the Executive Summary of the DEIS. RA-South and RA-Hybrid also impact comparatively more acres of forested wetlands and riverine wetlands than RA-North. These wetland types are especially sensitive to disturbance and more difficult to restore.</p> <p>Q. Is RA-South protective of wetland resources?</p> <p>A. No. Other alternatives would seem to be preferable in terms of protecting wetland resources.</p>	The acres referenced in this comment from Table 5-53 are the total acres within the region of influence (ROI), which is the route width, not the anticipated acres of impacts. Additionally, the route width for RA-South has been increased to allow for additional study and the potential need to make modifications to the alignment, while a similar increase has not been included for the other route alternatives, contributing to the greater acres within the ROI for RA-North. Text has been added to Table 5-53 noting this. Table 5-54 reports the anticipated temporary and permanent impacts, which are greatest for RA-South but similar across the three alternatives. Text has been added to the Executive Summary noting this difference.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	<p>Q. What is your opinion on the DEIS's conclusions about the impacts of flooding on the operation of the project?</p> <p>A. The DEIS states, "Because the pipeline would be underground, flooding would not impact operation of the project." (Page 5-96). This statement is blatantly inaccurate, as flooding represents a known risk to pipeline operation and safety, and increases the risk of pipeline exposure via erosion and subsequent potential for rupture and leaks. As stated by the U.S Pipeline and Hazardous Materials Safety Administration (PHMSA), "Operators should be aware that severe flooding, river scour, and river channel migration may create unusual operating conditions that can adversely affect the safe operation of a pipeline, and may require corrective action." (4)</p> <p>(4) <i>Pipeline Safety: Potential for Damage to Pipeline Facilities Caused by Flooding, River Scour, and River Channel Migration</i>, 84 Fed. Reg. 14715 (Apr. 11, 2019).</p>	The text in Section 5.7.2 has been expanded to clarify that the pipeline would be buried underground with sufficient cover to protect it from flooding. The minimum depth of cover would be 54 inches, extended to 60 inches at waterbody crossings, and the depth would be greater at the waterbody crossings installed via HDD. All perennial streams would be crossed by HDD or bore, as shown in Tables 5-48 through 5-50. Other streams that would be crossed are intermittent or ephemeral streams, many of which are drainage ditches, and they would not be at significant risk of flooding-related problems like scour.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	<p>Q. Does pipeline installation impact the health of the soil in which it is installed?</p> <p>A. According to the existing scientific literature, pipeline installation is likely to have lasting permanent effects on soil health. A recent review of the scientific literature identified 34 studies reporting pipeline impacts on agricultural and natural ecosystems from eight countries. (5) They concluded that pipeline installation typically results in degraded soils and degraded vegetation resources (including diminished crop yields) that can persist for many years following installation. These researchers found that even current best management practices of pipeline installation and remediation employed by three different companies in Ohio (including soil 'double lift' and 'deep ripping' practices) were insufficient to mitigate widespread soil degradation and crop yield loss along pipeline routes. (6)</p> <p>(5) Brehm, Theresa, and Steve Culman. 2022. "Pipeline installation effects on soils and plants: A review and quantitative synthesis." <i>Agrosystems, Geosciences & Environment</i> 5 (4):e20312. doi: https://doi.org/10.1002/agg2.20312.</p> <p>(6) Brehm, Theresa, and Steve Culman. 2023. "Soil degradation and crop yield declines persist 5 years after pipeline installations." <i>Soil Science Society of America Journal</i> 87 (2):350-364.</p>	The impacts of pipeline construction on soils are addressed in Section 5.7.6. As indicated by the definitions found on Page 5-1 of the draft EIS, "long-term impacts extend beyond the end of construction and are generally associated with operation of the project." Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term.	20242-203381-02
CURE	Dolph, Christy	2024-02-13	<p>Q. In general, what kind of soils do the route alternatives cross?</p> <p>A. The DEIS identifies the large majority of soils crossed by all three route alternatives as especially prone to disturbance and sensitive to compaction, and as representing prime farmland.</p> <p>Q. How would you characterize the potential impacts of the construction of the proposed project on soils?</p> <p>A. The Executive Summary of the DEIS describes the soil impacts as "minimal and temporary." (Page ES-8). This is likely inaccurate. Degradation of sensitive soils from pipeline installation can cause changes in soil that can damage the germinating and growing environment for crops and native vegetation, alter nutrient cycling and water movement in the soil, and increase the potential for wind and water erosion for years following the disturbance. (7)</p>	As indicated by the definitions found on Page 5-1 of the draft EIS, "long-term impacts extend beyond the end of construction and are generally associated with operation of the project." Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term. Section 5.7.6 includes the acreages of various soil characteristics along each route alternative as well as the total footprint for each route alternative.	20242-203381-02

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			<p>Q. Which alternative presents the lowest risk to soils?</p> <p>A. Based on the soil characterization data in Table 5-42 (p.5-117), RA-North appears to present the least risk to soil degradation (other than the No Action option, which would present no risk to soil degradation). RA-North has the smallest project footprint of all route alternatives in total acres affected (17% smaller than RA-South). Compared to RA-South, RA-North crosses fewer acres that are prone to soil compaction (19% fewer), fewer acres of wet soils that are susceptible to compaction (i.e., hydric soils, 6% fewer), substantially fewer acres that are susceptible to water erosion (92% fewer), fewer wind erodible acres (14% fewer), and substantially fewer acres with revegetation concerns (35% fewer). RA-Hybrid appears to be intermediate in these impacts between RA-South and RA-North.</p> <p><i>(7) Brehm, Theresa, and Steve Culman. 2023. "Soil degradation and crop yield declines persist 5 years after pipeline installations." Soil Science Society of America Journal 87 (2):350-364.</i></p>		
CURE	Dolph, Christy	2024-03-14	<p>Q. Mr. Zoller describes the applicant’s proposed actions to mitigate damage from horizontal directional drilling (HDD). Do you believe these activities will adequately protect impacted waterbodies?</p> <p>A. No. If soils are not amenable to HDD, that route should not be selected. But from Mr. Zoller’s testimony, it seems like the applicant will still try to cross water bodies with HDD in non-amenable places and instead just have a contingency plan for spills. Once drilling fluid is spilled to subsurface environments or waterways, it is impossible to remove, and may have negative impacts on surface or subsurface water quality.</p> <p>Q. Do you agree with Mr. O’Konek’s opinion that RA-North 1 and RA-Hybrid do not avoid or minimize potential impacts?</p> <p>A. No. First, not all routes have been assessed equally. In particular, necessary geotechnical investigations to evaluate impacts to groundwater and suitability for HDD crossings have not been completed for RA-North and RA-Hybrid. Because not all routes have been equally assessed, it is impossible to evaluate and compare the potential impacts of all the routes. Second, where routes have been evaluated (in terms of impacts to wetland acres, vulnerable soils, and surface waters), RA-South appears to have larger impacts than RA-North and RA-Hybrid. Even if these differences are argued by the applicant to be “small,” less impact is less impact. Our wetlands and native prairies were removed from the pre-settlement landscape one by one, after all.</p>	<p>Alternatives are not required to be studied in the same level of detail. Minnesota Rule 4410.2300(H) indicates that an EIS shall include “a thorough but succinct discussion of potentially significant adverse or beneficial effects generated” by the proposed project and each major alternative with “[l]ess important material ... summarized, consolidated, or simply referenced.” Factors to be considered include “the impact and the relevance of the information to a reasoned choice among alternatives” and “the relationship between the cost of data and analyses and the relevance and importance of the information.”</p> <p>As described in Chapter 5, soils and geology along the three routes are generally similar. Because soils and geology are similar, geotechnical investigations, with the associated time and costs, would be unlikely to aid the Commission in its decision. The applicant would complete a geotechnical evaluation of each HDD location along the pipeline prior to the start of construction.</p>	20243-204360-02
CURE	Dolph, Christy	2024-03-14	<p>Q. Do you have any response to Mr. O’Konek’s comments about the applicant’s groundwater investigations?</p> <p>A. Yes. I am concerned that the applicant appears to only have groundwater investigations underway for the RA-South route and not RA-North or RA-Hybrid.</p> <p>Q. Why does this matter?</p> <p>A. Without detailed investigations, it is impossible to determine what impacts RA-North or RA-Hybrid may have on groundwater resources along the route. Without that information, it is also impossible to adequately assess whether one route is better or worse than another.</p> <p>Q. Do you have any response to Mr. O’Konek’s statement about sheet piling?</p> <p>A. Yes. The applicant’s commitment to not using sheet piling in beach ridge areas is good practice. Sheet piling is used to support the walls of the pipeline trench as the pipeline is being installed, preventing collapse of the trench or soil erosion. However, this raises the question about how the applicant will construct the pipeline in these areas instead. It is important to know this because the groundwater is complex and prevalent in the beach ridge areas, and it is unclear how the applicant will construct a trench or perhaps drill through a groundwater-rich area that may be unstable, without harming this sensitive groundwater resource. Without more detail on the proposed construction method for this region, it is difficult to anticipate how construction— whether via HDD or open cut trenching method—might impact those resources.</p>	<p>Minnesota Rule 4410.2300(H) indicates that an EIS shall include “a thorough but succinct discussion of potentially significant adverse or beneficial effects generated” by the proposed project and each major alternative with “[l]ess important material ... summarized, consolidated, or simply referenced.” Factors to be considered include “the impact and the relevance of the information to a reasoned choice among alternatives” and “the relationship between the cost of data and analyses and the relevance and importance of the information.”</p> <p>The groundwater resources that could be affected by the project would be similar for all three route alternatives; therefore, potential impacts would be similar. The time and costs associated with performing an additional study on groundwater resources would not be expected to aid the Commission in its decision.</p> <p>In surrebuttal testimony on March 28, 2024, the applicant indicated that, should trench wall stability be a concern in beach ridge system areas, the applicant would use trench boxes to stabilize the trench walls, which would not result in additional excavation.</p> <p>Additionally, as part of its coordination with the Department of Natural Resources (DNR), the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system</p>	20243-204360-02

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				area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	
CURE	Dolph, Christy	2024-03-28	<p>Q. In rebuttal testimony, Mr. DeJoia critiques the Brehm and Culman studies you referenced in direct testimony. What is your response?</p> <p>A. In his testimony, Mr. DeJoia argues that the Brehm and Culman studies are unreliable for a number of reasons. I disagree with his assessment.</p> <p>First, Mr. DeJoia argues that the study by Brehm and Culman (2023) only evaluates pipeline construction impacts at year 2 and 3 post construction. But Mr. DeJoia does not acknowledge the time that was required for pipeline construction itself in the total duration of impact. The study authors measured soil impacts during a period of 4 to 5 years following the inception of pipeline construction. The time required for pipeline construction itself does represent a time of impact and decreased crop yield, as the right of way is being actively disturbed during this time and is not able to be planted or harvested.</p> <p>Second, although Mr. DeJoia takes issue with the conclusions drawn by Brehm and Culman (2023), he also indicates that there will likely be impacts to agricultural soils for several years after the project, in concurrence with the general findings of these papers. As Mr. DeJoia states in his testimony regarding Ohio farm fields impacted by pipeline construction that were studied by Brehm and Culman (2023): “The yield losses for 2020 and 2021 (years 2 and 3) were reported to be 21% and 14% respectively. These average yield losses are consistent with what a reclamation scientist would expect yield losses to be after 2- and 3-years post-construction completion.” (Page 3). Thus, Mr. DeJoia’s testimony indicates that, based on his own experience, there are likely to be significant and measurable impacts on agricultural yields in the years following pipeline construction, in agreement with the analysis by Brehm and Culman (2023). Notably, this conclusion is further supported by a separate study in Iowa by Tekeste et al., attached as Schedule CD-3, which showed that even after best management practices were implemented to help reclaim soil after pipeline construction, crop yields in a pipeline right of way were still substantially lower after two years (25% decrease in soybean yield, 15% decrease for corn yield).</p> <p>Mr. DeJoia also argues that approximately 50% of fields studied by Brehm and Culman (2023) showed no significant impacts to crop yields following pipeline construction. His testimony appears to offer this as evidence of limited impact. But half of all measured farm fields exhibiting significant impacts to crop yields does indicate substantial impact, especially if this impact is scaled up along the entire length of a large linear infrastructure project, such as the one proposed by the applicant.</p> <p>Next, Mr. DeJoia raises the concern that farmers whose fields were damaged by pipeline construction were more likely to self-identify for inclusion in the study. These comments are speculation and cannot be verified one way or the other. It also stands to reason that all farmers will be broadly concerned about potential damage to farm fields from any large infrastructure project and would wish to know what the longer-term impacts to their agricultural production might be.</p> <p>Mr. DeJoia also raises the concern that only a small proportion of fields out of the total number impacted by pipeline construction were studied by Brehm and Culman (2023). I agree that the long-term impacts associated with pipeline construction have been wildly understudied compared to the extent of their (ever increasing) footprint on the landscape. However, rather than find reassurance from this lack of data, lack of information about potential harm should invoke the precautionary principle, in which our society and governance structures have a responsibility to protect the public (including farmers) from harm, where there is plausible scientific risk. In my opinion, the studies by Brehm and Culman (2022; 2023) and Tekeste et al., have indicated there is certainly a plausible risk of longer-term degradation of soil from pipeline construction.</p> <p>Finally, Mr. DeJoia’s testimony does not provide evidence about how soils are expected to recover in time periods beyond 3 years following construction. Indeed, few to no long-term studies have been conducted regarding the impacts of pipeline construction to soils over a time frame exceeding 5 years. Again, I do not generally find this lack of data reassuring with regards to our understanding of the long-term impacts of pipeline construction. However, it is reasonable to assume the impacts to soil measured in years 2 and 3 following the completion of construction do not immediately disappear over longer time frames. Thus, there are likely to be longer term impacts to soil and crop yield following pipeline construction, even with implementation of best management practices.</p>	<p>As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term.</p>	20243-204752-02
CURE	Dolph, Christy	2024-03-28	<p>Q. Do you agree with Mr. DeJoia’s assertion that impacts on soil will primarily be the same across route alternatives?</p> <p>A. No. Mr. DeJoia argues that “soils data included in the DEIS is critical to evaluate potential impacts to soils.” (Page 5). However, he then argues paradoxically that measures of soil data in the DEIS are not an important consideration when evaluating route</p>	Section 5.7.6 includes the acreages of various soil characteristics along each route alternative as well as the total footprint for each route alternative.	20243-204752-02

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			alternatives, because construction practices will be the most important factor determining soil health outcomes. While pipeline construction practices are the main driver of soil degradation in the proposed project, evaluating the extent of potential impacts is critical when comparing route alternatives, which is why this information is presented in the DEIS. As stated in my original testimony, RA-North presents the lowest total potential impact on soil conditions among route alternatives (other than the No Build Alternative, which of course would have no impact on soils). RA-North has the smallest project footprint of all route alternatives, crosses fewer acres that are prone to soil compaction, fewer acres of wet soils that are susceptible to compaction (i.e., hydric soils), substantially fewer acres that are susceptible to water erosion, fewer wind erodible acres, and substantially fewer acres with revegetation concerns. RA-Hybrid appears to be intermediate in these impacts between RA-South and RA-North.		
CURE	Dolph, Christy	2024-03-28	Q. Do you have any other responses to Mr. DeJoia’s rebuttal testimony? A. It is also important to consider the potential soil impacts of a single pipeline in the context of future planned CO ₂ pipeline infrastructure. If CO ₂ pipelines become widely adopted, the installation of a vast new network of CO ₂ pipelines across Minnesota would have a cumulative impact on some of the richest and most productive agricultural soils in the country.	Installation of other pipelines is outside the scope of this EIS.	20243-204752-02
CURE	Dolph, Christy	2024-03-28	Q. Mr. Zoller states in rebuttal testimony that the applicant will not use sheet piling in beach ridge areas and would conduct exploratory borings where sheet pile will be used elsewhere along the route. What is your response? A. From this testimony, it is not clear what alternative construction methods will be used in the beach ridge areas or in any groundwater-rich areas if the work/trench area is unstable and the pipeline is not able to be inserted without the use of sheet pilings. More detailed information on how construction will be conducted in these areas is needed to assess potential impacts to groundwater in these cases. According to water table data from the Minnesota Natural Resource Atlas, the depth to groundwater for the majority of the RA-South construction workspace is estimated to be 0-10 feet (Attached as Schedule CD-4). (1) This indicates that construction will likely intersect surficial groundwater given the ground disturbance depths listed by Mr. Zoller for construction either without sheet piling (disturbance depths of 5-6ft) or with sheet piling (disturbance depths of 10-15 ft). (1) <i>Minnesota Natural Resources Research Institute, Minnesota Natural Resources Atlas, https://mnatlas.org/resources/water-table-depth/.</i>	In surrebuttal testimony on March 28, 2024, the applicant indicated that, should trench wall stability be a concern in beach ridge system areas, the applicant would use trench boxes to stabilize the trench walls, which would not result in additional excavation. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	20243-204752-02
CURE	Dolph, Christy	2024-03-28	Q. Does Mr. Zoller’s rebuttal testimony address the issues you raised in direct testimony regarding horizontal directional drilling (HDD)? A. No. From Mr. Zoller’s testimony and from the original DEIS, it is clear that HDD methods are proposed for all three route alternatives (apart from the No Build alternative). But Mr. Zoller’s testimony does not provide additional information about whether geotechnical investigations as to the suitability of HDD have been conducted for proposed HDD crossings for all three route alternatives. In the DEIS, geotechnical investigations had only been conducted for a portion of HDD crossings in all route alternatives, with no geotechnical investigations listed for the Red River crossing for RA-North, and the investigation for the Pelican River listed as not yet completed. Without evidence from these geotechnical investigations, it is difficult to assess the comparative risk to water bodies presented by HDD in the different route alternatives.	The applicant would complete a geotechnical evaluation of each HDD location along the pipeline prior to the start of construction. As described in Chapter 5, soils and geology along the three routes are generally similar. Because soils and geology are similar, geotechnical investigations, with the associated time and costs, would be unlikely to aid the Commission in its decision.	20243-204752-02
CURE	Dolph, Christy	2024-03-28	Q. What is your response to Mr. Zoller’s comments about the DEIS’s calculation of expected impacts to wetlands crossed by RA-South? A. Mr. Zoller explains that he believes the expected impacts to wetlands reported in the DEIS are overstated. He argues that this is due partly to the use of the National Land Cover Dataset (NLCD), which has a 30m resolution (i.e., it presents the landscape in 30m x 30m pixels). Mr. Zoller is correct that land cover data of this resolution often does not adequately capture wetland cover. However, the occurrence of small wetlands (smaller than 30m x 30m) is also very likely to be <i>underestimated</i> by the NLCD. Thus, there is the possibility that the land cover data currently used in the DEIS is actually undercounting wetlands crossed by the route alternatives. An alternative approach to evaluating wetland cover would be to use the Minnesota National Wetland Inventory (NWI) dataset. As stated by the Minnesota Department of Natural Resources, the updated National Wetland Inventory for Minnesota has recently been remapped using lidar and high-resolution aerial imagery, making it the most comprehensive, current and accurate wetland inventory in the country. (2) If there are concerns about accurately measuring wetland impacts across route alternatives, the Minnesota-specific	Clarification regarding National Wetlands Inventory (NWI) and National Land Cover Database (NLCD) data sources has been added to Tables 5-3, 5-4, 5-53, and 5-54. The widening of the route for future routing flexibility is “for additional route study and the potential need to make modifications to the pipeline alignment,” not for future construction.	20243-204752-02

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			<p>NWI is likely a better resource than the NLCD. I would argue that the DEIS should be improved by including wetland estimates from the updated Minnesota NWI into estimates of wetland impact across route alternatives (note the distinction between the Minnesota NWI and the national NWI from U.S. Fish and Wildlife Service, the latter of which may not contain recent updates).</p> <p>Mr. Zoller also notes that some of the potential impact of RA-South to wetlands occurs because of a part of the route that has been widened to account for future routing flexibility, and that this area is highly populated with wetlands. This statement seems to imply that this area is intended to incur future construction impacts. Having a widened area intended for future construction located in an area of especially high wetland density seems likely to indicate potential future wetland impacts in this area and raises the question of why a wetland-dense area was selected for this purpose.</p> <p><i>(2) Minnesota Department of Natural Resources, National Wetlands Inventory Update, https://www.dnr.state.mn.us/eco/wetlands/nwi_proj.html.</i></p>		
CURE	Dolph, Christy	2024-03-28	<p>Q. Do you agree with Mr. Zoller’s assessment that all three route alternatives will have the same environmental impacts?</p> <p>A. I agree with Mr. Zoller’s testimony that all three route alternatives apart from the No Build Alternative will result in environmental degradation associated with construction. However, Mr. Zoller argues that the environmental impacts from RA-South, RA-North and RA-Hybrid are equivalent in terms of their extent of impact. I disagree with this assessment. As summarized in the DEIS and noted in my direct testimony, there are numeric differences in impact across the route alternatives. Based on the existing information provided in the DEIS, RA-South and RA-Hybrid would appear to impact more surface waters than RA-North, RA-South appears to intersect more wetland acres than the other route alternatives, and RA-South also crosses more soils that are prone to degradation, compaction, and erosion.</p>	Thank you for your comment.	20243-204752-02
CURE	Dolph, Christy	2024-03-28	<p>Q. Does Mr. Zoller’s rebuttal testimony address issues you raised in direct testimony regarding the assessments of comparative impacts to sensitive groundwater areas between the route alternatives?</p> <p>A. Mr. Zoller’s comments do not address the concern identified in my direct testimony that all route alternatives have not received the same level of assessment with regards to potential and comparative impacts to sensitive groundwater areas. Without this assessment, it is difficult to determine which routes will have the least impact to groundwater resources. Mr. Zoller notes that routes RA-North and RA-Hybrid are “within one mile” of sensitive confined aquifers that RA-South has been confirmed to cross (i.e., the beach ridge aquifer areas). (Page 2). One mile is a considerable distance and the exact proximity of these routes to beach ridge aquifer areas should be assessed directly, with regards specifically to the construction workspace.</p>	<p>Section 5.7.8.1 has been revised to clarify that all three routes would cross the beach ridge system area. Minnesota Rule 4410.2300(H) indicates that an EIS shall include “a thorough but succinct discussion of potentially significant adverse or beneficial effects generated” by the proposed project and each major alternative with “[l]ess important material ... summarized, consolidated, or simply referenced.” Factors to be considered include “the impact and the relevance of the information to a reasoned choice among alternatives” and “the relationship between the cost of data and analyses and the relevance and importance of the information.”</p> <p>The groundwater resources that could be affected by the project would be similar for all three route alternatives; therefore, potential impacts would be similar. The time and costs associated with performing an additional study on groundwater resources would not be expected to aid the Commission in its decision.</p>	20243-204752-02
CURE	Gorman, John	2024-02-13	<p>Q. What is the purpose of your testimony in this proceeding?</p> <p>A. I am providing a review of the Accidental Release Dispersion Reports found in Appendix G of the Draft Environmental Impact Statement for Summit Carbon Solutions’ Otter Tail to Wilkin County Carbon Dioxide Project.</p> <p>Q. Please summarize your conclusions.</p> <p>A. I conclude that it is impossible to determine the overall quality of the modeling work presented because of the lack of details and discussion provided.</p>	Thank you for your comment.	20242-203381-03
CURE	Gorman, John	2024-02-13	<p>Q. Please summarize your experience with modeling software that estimates the dispersion of supercritical CO₂ or similar substances.</p> <p>A. Over the course of the last 10+ years, I have used a wide range of modeling software that has the ability to estimate the dispersion of supercritical CO₂ or similar substances. The majority of the relevant modeling software I have used employed Computational Fluid Dynamics (CFD). These programs are generic in the sense that they can model a diverse range of situations and are not limited to only estimating the dispersion of CO₂ or similar substances. My most relevant software experience includes ANSYS-CFX and ANSYS-FLUENT (ANSYS Inc, Southpointe 2600, Ansys Drive Canonsburg, PA 15317 USA), COMSOL (COMSOL, Inc., 100 District Avenue, Burlington, 1 MA 01803, USA), and OpenFOAM (OpenCFD Ltd, owner of the OpenFOAM Trademark, is a wholly owned subsidiary of ESI Group). ANSYS3</p>	Thank you for your comment.	20242-203381-03

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			CFX, ANSYS-FLUENT, and COMSOL are all commercially available CFD software. OpenFOAM is the free open source CFD software package. All of the aforementioned software has the ability to estimate the dispersion of CO ₂ or similar substances using CFD, and I have used them on countless occasions. My relevant experience includes modeling supercritical CO ₂ and other substances (gases, pollution, particles (solid and liquid), etc.) being dispersed into the atmosphere over different terrains (with trees, windbreaks, hills, houses, etc.) and within urban cities (such as New York and Beijing, China). The purpose of these various activities was to estimate the dispersion of substances, predict the outcomes, and find solutions to mitigate the effects.		
CURE	Gorman, John	2024-02-13	Q. Are there other variables described in the report or missing from the report that would impact the outcomes of the modeling? A. Yes. None of the governing model equations were provided, so it is difficult to know what precisely was included in the model or the limitations of the model. Also, it is unclear how the CO ₂ was modeled, that is, what equations of state may have been used to account for phase changes (not all equations of state have the same accuracy or validity). There also is no discussion of determining the real-world, worst-case conditions, such as wind speed or CO ₂ in the pipe (amount, phase, etc.). These details have a significant impact on the dispersion of the CO ₂ and are important parameters to study for finding worst-case results (maximum impact distances).	As Dr. Gorman has stated, the CO ₂ was modeled as starting in a liquid phase. The CANARY model automatically calculates the phase based on temperature and pressure. The liquid phase was used for modeling because the aerial dispersion modeling and report (Appendix G) determined a worst-case temperature and pressure indicating the product in a liquid state. The angle of release is addressed in detail in Appendix G.	20242-203381-03
CURE	Gorman, John	2024-02-13	Q. What is Verification and Validation? A. Verification and Validation (often referred to as V&V) are independent procedures that are used together to check that something (a device, software, or model) fulfills its intended purpose. In terms of simulation and modeling, verification is a process to ensure the underlying mathematical model is implemented correctly and then accurately solved. Verification can be separated into two activities: code verification and calculation verification. Validation is the process of assessing the degree to which the model is an appropriate representation of reality. Validation activities are concerned with demonstrating the correctness of the underlying model assumptions and the degree to which sensitivities and uncertainties of the computational model are understood. Validation is generally demonstrated by comparing model predictions with the results from appropriate real-world data (e.g., physical results, experiments). Q. Why is Verification and Validation important? A. The outcome of performing V&V activities is to show agreement between actual real-world data and model prediction, as well as the predictive accuracy of the model. Without performing and presenting results related to V&V activities, it is impossible to know how accurate the results presented from any modeling activity are. In other words, without V&V activities, it is impossible to know if the results from the CANARY software (or any other model) have any basis in reality.	Thank you for your comment.	20242-203381-03
CURE	Gorman, John	2024-02-13	Q. Does the report adequately describe the assumptions or inputs used, and why is it important? A. The report does not adequately describe the assumptions or inputs used; this includes both the CANARY software and the model's results being presented. Any result from any model is only as good as the assumptions and inputs used. Without knowing the assumptions, it is impossible to frame the results as they might apply to real-world situations. In terms of the inputs, those also directly affect the outcome of the results. For example, this report demonstrated the results change notably by ~19.1% (or 107.9 ft) when they changed inputs and got a maximum impact distance of the 40,000-ppm of CO ₂ to be 617.5 ft instead of 509.6 ft. Q. Does the report state what phase the modeled CO ₂ was assumed to be in? A. No. It's not clear from the report that the conditions of the CO ₂ within the pipe are fully known. Q. Why does the phase of the CO ₂ matter? A. The initial phase (liquid, vapor, supercritical) will impact its dispersion (the jet) leaving a pipe rupture. Based on the report, it's not clear what impact the initial phase of the CO ₂ within the pipeline would have on the dispersion. For CO ₂ to be in the supercritical phase, it has to be above both the critical pressure and the critical temperature. For instance, CO ₂ at 2,200 psi for temperatures in the range of -20F and 30F would be in the liquid phase and not supercritical.	As Dr. Gorman has stated, the CO ₂ was modeled as starting in a liquid phase. The CANARY model automatically calculates the phase based on temperature and pressure. The liquid phase was used for modeling because the aerial dispersion modeling and report (Appendix G) determined a worst-case temperature and pressure indicating the product in a liquid state.	20242-203381-03
CURE	Gorman, John	2024-02-13	Q. Does the report state what angle of release was modeled? A. Yes. The report states that the angle of CO ₂ release is 19 degrees from horizontal. Q. Why does the angle of release matter? A. According to the Aerial and Thermal Dispersion Analysis report, within the CANARY software, the angle of release can have a great impact on the predicted dispersion (Table 6, page 8). However, the report does not describe how the angle relates to a ruptured pipe and the rupture diameter, which, according to the report, the rupture diameter is identical to the pipe diameter (Table 7, page 11). It is also not clear if this angle would represent a real-world worst-case or merely the worst-case result that can be generated within the CANARY software.	The angle of release is addressed in detail in Appendix G.	20242-203381-03

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CURE	Gorman, John	2024-02-13	<p>Q. Does the report state what the assumed flow rate at the time of rupture?</p> <p>A. Yes. The Aerial and Thermal Dispersion Analysis report states that for the results being presented they assumed a mass flow rate of 13.34 lbs/sec of CO₂ at the rupture (Table 7, page 11). However, the value listed in the CO₂ Pipeline Sensitivity Analysis Report is listed as 10.36 lbs/sec (Table 2, page 9).</p> <p>Q. Why does the flow rate at the time of release matter?</p> <p>A. The flow rate is the amount of CO₂ being released into the air and directly affects the size of the resulting plume, the concentration levels, and the impact distance.</p> <p>Q. How does missing or unclear information about the flow rate impact the DEIS analysis?</p> <p>A. It is unclear from the report why this mass flow rate was chosen, how it was determined, and if this value represents the maximum possible value. It is unclear whether any consideration was given to the initial rupture/breakage or if the mass flow rate was assumed to be a constant value over the modeling time period.</p>	<p>The value of 10.36 lbs/sec is for a theoretical pipeline and does not differ significantly from the 13.34 lbs/sec used for the EIS modeling. The sensitivity study shows relationships between key inputs used in aerial dispersion and is not modeling the project pipeline, as explained in Appendix G.</p>	20242-203381-03
CURE	Gorman, John	2024-02-13	<p>Q. From your review of Appendix G, was there any validation and verification of the CANARY software?</p> <p>A. No.</p> <p>Q. What did the report in Appendix G conclude?</p> <p>A. For the portion of the report dedicated to the CANARY analysis, Allied Solutions concludes an earlier analysis (by Summit Carbon Solutions using the CANARY software) was valid but could have been more conservative. This report, by Allied Solutions, found the maximum impact distance of the 40,000-ppm of CO₂ using CANARY to be 617.5 ft from the rupture. In contrast, the original analysis by Summit Carbon Solutions found 509.6 ft. They also conclude that conducting a CFD analysis would provide better insight into the effects of local terrain, windbreaks, and exposure times related to different concentration levels.</p> <p>Q. Do you agree with these conclusions?</p> <p>A. With regard to the two separate analyses performed using the CANARY software, there is not enough information to make a conclusion. With regard to the maximum impact area, it is impossible for me to know without performing an independent analysis. In terms of conducting a CFD analysis, I agree that conducting a CFD analysis would be advantageous and provide better insight, assuming it was performed properly.</p>	<p>Computational Fluid Dynamics (CFD) and CANARY are validated together and discussed in the CFD Analysis Report dated January 15, 2024 (in Appendix G of the draft EIS). Quest Consultants, the developers of CANARY, provide validation of the software in the CANARY User Guide for each analysis module. Quest Consultants address verification through the release and dispersion models contained in the QuestFOCUS package (the predecessor to CANARY by Quest), which were reviewed in a United States Environmental Protection Agency (EPA) sponsored study (TRC [1991], Evaluation of Dense Gas Simulation Models. Prepared for the U.S. Environmental Protection Agency by TRC Environmental Consultants, Inc., East Hartford, Connecticut, 06108, EPA Contract No. 68-02-4399, May, 1991) and an American Petroleum Institute (API) study (Hanna, S. R., D. G. Strimaitis, and J. C. Chang [1991], Hazard Response Modeling Uncertainty (A Quantitative Method), Volume II, Evaluation of Commonly-Used Hazardous Gas Dispersion Models. Study cosponsored by the Air Force Engineering and Services Center, Tyndall Air Force Base, Florida, and the American Petroleum Institute; performed by Sigma Research Corporation, Westford, Massachusetts, September, 1991). In both studies, the QuestFOCUS software was evaluated on technical merit (appropriateness of models for specific applications) and on model predictions for specific releases. One conclusion drawn by both studies was that the dispersion software tended to overpredict the extent of the gas cloud travel, thus resulting in too large a cloud when compared to the test data (i.e., a conservative approach).</p> <p>Also, a third study prepared for the Minerals Management Service (Chang, et al. 1998) reviewed models for use in modeling routine and accidental releases of flammable and toxic gases. CANARY by Quest received the highest possible ranking in the science and credibility areas. In addition, the report recommends CANARY by Quest for use when evaluating toxic and flammable gas releases (Chang, Joseph C., Mark E. Fernau, Joseph S. Scire, and David G. Strimaitis [1998], A Critical Review of Four Types of Air Quality Models Pertinent to MMS Regulatory and Environmental Assessment Missions. Mineral Management Service, Gulf of Mexico OCS Region, U.S. Department of the Interior, New Orleans, November, 1998).</p>	20242-203381-03

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				Appendix C of Allied's Aerial and Thermal Dispersion Analysis Report (in Appendix G of the EIS) has been updated with the above validation information.	
CURE	Gorman, John	2024-02-13	<p>Q. Can you describe the typical steps used for performing and presenting a CFD analysis?</p> <p>A. Yes, it typically involves a process where a scientist or engineer will:</p> <ul style="list-style-type: none"> • Check and present assumptions that are 1 inherent to the model and model parameters, (such as boundary conditions (inputs), flow regimes, relevant physical phenomena, etc.) and explaining how they were determined/chosen. • Determine, create, describe, and show the geometry being modeled or represented (e.g., terrain, structures, pipe rupture, etc.). • Discuss and show the numerical methods being used, including the governing equations, constitutive equations, fluid properties, etc., to know precisely what was modeled. • Discretize the model into calculation points, often called the grid, mesh, nodes, or cells. Perform an analysis to ensure the grid/mesh/cells (calculation points) are sufficient for obtaining an accurate simulation result. • Discuss and use reliable convergence criteria for the numerical methods. The convergence criteria is the condition chosen to ensure the error in the solution to all the mathematical equations is acceptably small. • Perform validation and verification activities to show that the numerical model can accurately represent the desired situation and that the obtained results are realistic. • Present the results in a clear manner with accompanying discussion. <p>Q. Did the CFD modeling in Appendix G follow these steps?</p> <p>A. I am unable to determine that.</p> <p>Q. Why are you unable to determine that?</p> <p>A. The report does not describe or discuss any of the important details needed regarding these steps or to fully evaluate the CFD model and analysis.</p>	<p>Appendix A of the Aerial and Thermal Dispersion Analysis Report dated January 11, 2024, (in Appendix G of the draft EIS) explains how the CFD modeling was done and validated. While the processes explained in Appendix G may not have been organized the same way that Dr. Gorman explained he would organize it, it covers all of the material points needed for correctly modeling CFD.</p> <p>CURE filed Information Request No. 2 on February 15, 2024, after Mr. Gorman's testimony was filed on February 13, 2024. The Minnesota Department of Commerce, Energy Environmental Review and Analysis Unit provided a response on February 28, 2024, which is attached to this comment matrix (Appendix O). See the answer to question 17 of the CURE IR 002 EERA ("Was any validation or verification of the CFD model performed? Please provide records of the verification and validation.")</p> <p>In the response to CURE Information Request No. 2, Allied answered: Yes, we validated the CFD model (Scenario 2 in the CFD report) against the CANARY model (Scenario 1 in the CFD report). Using two different modeling software applications with completely different computational approaches, we applied them to the same scenario and validated the CFD model against the CANARY model on a macro level—comparing the final result of one model to the final result of another model—which accounts for any and all variations in data, assumptions, and modeling between the two approaches. As is shown in the CFD report, the results of Scenarios 1 and 2 are very close, which validates that both approaches are reasonable and appropriate. If the results of Scenarios 1 and 2 would not have been reasonably close, neither model would have been validated, and a different validation approach would have become necessary. Furthermore, CANARY is the accepted industry standard for aerial dispersion modeling, thereby providing a reasonable standard by which to compare and validate the CFD model in Scenario 2.</p>	20242-203381-03
CURE	Gorman, John	2024-02-13	<p>Q. What important details did you think were missing from the report?</p> <p>A. In general, the CFD modeling approach is vastly different from the CANARY analysis approach. There are many more steps and details involved with CFD modeling that need to be explained in order to understand and interpret the results. In my professional opinion, the following questions remain unanswered in the report:</p> <ul style="list-style-type: none"> • What were the boundary conditions? (e.g., was an atmospheric boundary layer profile used or a flat/uniform wind velocity? Was there thermal radiation? How was the CO₂ introduced (phase)? How were the winter conditions (snow) taken into account?). • How large was the solution domain compared to the area of interest? (e.g., were the boundary conditions far enough away so as not to artificially affect the results?) • What was the ruptured pipe geometry, and was it created to match the scenario analyzed by the CANARY software? • What is the justification for using such a simplified model (Darcy's Law approach) to account for the windbreaks? Were any steps taken to ensure this simplified model and the values for the porous media used were accurate and appropriate for modeling trees? • Regarding the modeled terrain and geometry, what was upstream of the pipe rupture? Images or diagrams to illustrate the scenarios seem appropriate. • How were the fluids modeled (laminar or turbulent flow regimes)? And how was the flow regime determined for the wind and the CO₂ rupture? What turbulence model was used if the fluid flow was treated as turbulent? • Were phase change, variable material properties, and buoyancy (natural convection) included in the analysis? And how were they 	<p>CURE filed Information Request No. 2 on February 15, 2024, after Mr. Gorman's testimony was filed on February 13, 2024. The Minnesota Department of Commerce, Energy Environmental Review and Analysis Unit provided a response on February 28, 2024, which is attached to this comment matrix (Appendix O). The Minnesota Department of Commerce and Allied responded to these comments in questions 3-6, 8, 9, 13, 14, 16, and 17 of the CURE IR 002 EERA.</p>	20242-203381-03

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			<p>implemented?</p> <ul style="list-style-type: none"> • Was there a grid/mesh/cells study performed to ensure it was sufficient to model the scenario and get accurate results? Similarly, was a time-step sensitivity study used to ensure the relevant physical phenomena were modeled accurately? • What were the convergence criteria used for determining if the simulation was acceptable? • Was any validation or verification of the CFD model performed? 		
CURE	Gorman, John	2024-02-13	<p>Q. Based on the conclusions and modeling described in Appendix G, do you agree with the potential impact areas identified?</p> <p>A. Because of the lack of detail in this report, it is impossible to determine whether the conclusion about potential impact areas is correct.</p> <p>Q. Are you able to conclude anything about the safety of the proposed project based on the results described in Appendix G?</p> <p>A. No. There is not enough detail about the modeling to determine whether the conclusions it reaches are correct.</p> <p>Q. Are you able to conclude whether any of the routes—RA-North, RA-Hybrid, or RA-South—pose fewer risks to humans and animals than the others?</p> <p>A. No.</p> <p>Q. Does the information provided in Appendix G demonstrate that any of the routes—RA-North, RA-Hybrid, or RA-South—is safe for public health or the environment when considering possible CO₂ plume impacts?</p> <p>A. No.</p>	Thank you for your comment. Modeling was not used to determine if one pipeline route is safer than another route.	20242-203381-03
CURE	Gorman, John	2024-02-13	<p>Q. What is CANARY?</p> <p>A. CANARY is analysis software created by Quest Consultants (908 26th Avenue N.W., Norman, OK 73069-8069, USA).</p> <p>Q. What does it calculate or analyze?</p> <p>A. The CANARY software uses a simplified approach to estimate/analyze where a plume of a potentially hazardous substance, such as CO₂, might spread in the event it is released by a leak or rupture.</p> <p>Q. Are there limits to what the CANARY software can analyze?</p> <p>A. Yes. The terms ‘modeling’ and ‘simulation’ are generic and can refer to a wide range of analysis activities. Not all analysis activities are equal in terms of accuracy, detail, and capability. The type of analysis the CANARY software performs is a simplified form of modeling based on solving mathematical algorithms to predict outcomes. This type of analysis should not be confused with other modeling approaches, such as CFD. CFD is a more advanced form of modeling, and when performed correctly, is far more accurate and precise.</p> <p>Q. What are the specific limitations of CANARY that render it less useful for this type of modeling?</p> <p>A. The CANARY software modeling approach does not take into account critical factors such as: 1.) effects due to spatial or temporal variations in the local windspeed; 2.) changes in terrain or obstacles (such as buildings or trees); 3.) dynamic three-dimensional thermal-fluid phenomena (such as natural convection or entrainment); and 4.) ruptures where the released jet of CO₂ is primarily in the vertical direction. This modeling approach also relies on certain assumptions, such as the resulting shape of the CO₂ plume and how it travels in the wind with a uniform velocity.</p> <p>Q. Do you have additional concerns about this type of software and the lack of information about how it was used to complete the reported modeling?</p> <p>A. Yes. The report does not discuss the actual equations being solved or the assumptions the software uses to perform the analysis. Other software in the same category of the CANARY software cannot accurately handle a situation with low wind speeds (at or near zero). This is particularly relevant since low wind speeds tend to have the worst outcome.</p>	The equations used in CANARY are available in the CANARY User Guide for licensed users. There is one set of predetermined equations for each type of analysis within the CANARY software. The assumptions used by Allied in the CANARY model were described in Appendix A of the Aerial and Thermal Dispersion Analysis Report dated January 11, 2024 (in Appendix G of the draft EIS). The industry standard looks at 4.5 miles per hour as an acceptable wind speed for this type of analysis, and Allied used 4.0 miles per hour in the CANARY modeling. To address concerns that the CANARY software cannot accurately handle a situation with low wind speeds (at or near zero), Allied completed additional aerial dispersion modeling using CFD and 1.0 mile per hour wind speeds. Allied has now modeled this (at or near zero wind speed) case using CFD to supplement the previous modeling efforts to also cover this particular scenario. Chapter 8 of the EIS has been updated, and the detailed results of this supplemental modeling are included in Appendix G.	20242-203381-03
CURE	Gorman, John	2024-03-14	<p>Q. Do you have a response to Mr. Lange’s discussion of frost heave and soil temperature as it relates to dispersion of CO₂ in the event of a rupture?</p> <p>A. While the temperature chosen might be conservative for potential issues such as “frost heave,” the DEIS did not demonstrate that the temperatures were conservative for issues of dispersion or how changes in the ambient soil and air temperatures affect dispersion (regardless of the initial CO₂ phase) exiting from a pipe rupture. The issue of what might cause a pipe rupture (like frost heave) is a separate issue from modeling the dispersion after it hypothetically occurs.</p> <p>Q. Mr. Lange states that computational fluid dynamics (CFD) modeling has many shortcomings which make it less useful for predicting the potential dispersion of CO₂ in the event of a pipeline rupture. Do you agree?</p> <p>A. No. I do agree with Mr. Lange that CFD modeling requires many input values and complex parameters, which are identified by the</p>	Appendix A of the Aerial and Thermal Dispersion Analysis Report dated January 11, 2024, (in Appendix G of the draft EIS) explains that the temperatures chosen for this project were done based on worst-case dispersion impact distance. All inputs are detailed in the Aerial and Thermal Dispersion Report and in the CFD Analysis Report. Supplemental information about the CFD model was provided by the Minnesota Department of Commerce in response to CURE's Information Request Number 2, which is attached to this comment matrix (Appendix O).	20243-204360-03

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			analyst. This is why it is necessary to know the input values and complex parameters used by Allied Solutions in its modeling. Without that information, it is not possible to do a detailed analysis. And if the analyst does not have that information, it is unclear how a thorough analysis can be done or how an analyst could expect a tool, such as a simplified analysis program (like CANARY), to provide a relevant analysis alone.		
CURE	Gorman, John	2024-03-14	<p>Q. Is CFD modeling unable to model or less useful when modeling long linear infrastructure projects like the one proposed by the applicant?</p> <p>A. Not necessarily. In terms of a pipe rupture, as Allied Solutions attempted to demonstrate, CFD models can be used to gather more detailed results relevant to the issues of dispersion. Therefore, employing a select number of CFD models would provide a more thorough analysis, augmenting existing means of studying the entire infrastructure.</p> <p>Q. Mr. Lange states that the applicant and Allied Solutions used “extremely conservative” inputs for the CANARY model and that CFD modeling using the same data would result in less conservative dispersion distances. Do you agree?</p> <p>A. Assuming the chosen inputs are indeed conservative for the basis of conversion, it is not possible to say a CFD model would result in less conservative distances without actually performing the CFD analysis. Also, a conservative input for a CANARY model has not been demonstrated to be a conservative input for a CFD model. For example, dispersion models similar to that employed by CANARY have been shown to underpredict concentrations after 30 meters (approximately 98 feet) from the CO₂ source. This study is attached as Schedule JG-2. Other studies, like the one attached as Schedule JG-3, have shown that CFD models are more adaptive and provide better predictions than dispersion modeling software. Therefore, CFD may result in more conservative predictions.</p>	<p>The JG-2 paper referenced addresses the results of a specific experiment done on DNV's PHAST dispersion model. The validation or comparison is specific to the experiment and the PHAST model predictions. The results of this validation only apply to PHAST. This paper does not reflect on a class or category of dispersion models—nor does not claim to. The paper specifically refers to PHAST in the title and throughout the paper. Any findings or conclusions in this paper may apply to PHAST, but should not be applied to other dispersion models or a class of models. PHAST was not used in modeling for the EIS, but CANARY was used instead.</p> <p>The JG-3 paper references a project that compares a Gaussian dispersion model, a "tuned" Gaussian dispersion model, and a CFD model. The paper goes on to say that the "tuned" Gaussian is very close to the CFD model for low momentum releases, which is what Gaussian models are appropriate for. The paper does not reflect on any other types of models besides a Gaussian model. CANARY uses equations that include Gaussian equations, but are more than Gaussian equations, enabling CANARY to account for high momentum/velocity during a rupture. While the JG-3 paper may indicate that Gaussian models have difficulty at predicting concentrations as distances increase—a specific distance is not actually stated in the JG-3 paper, but is generally indicated in a non-specific graph—it is difficult to see how the paper materially comments on models that do account for high product momentum/velocity during a rupture.</p> <p>Recognizing the limits of CANARY, Allied supplemented the aerial modeling with CFD modeling, as shown in Appendix G.</p>	20243-204360-03
CURE	Gorman, John	2024-03-14	<p>Q. Do you agree that the CANARY software allows for conservative results?</p> <p>A. No. In addition to the studies referenced above which suggest that CFD models may be able to provide better and more conservative predictions, there does not appear to be supporting evidence in the DEIS or related documents that demonstrates the CANARY model would provide “very conservative” results compared to an actual pipe rupture or compared to real-world data.</p> <p>Q. How long will it take for harmful concentrations of CO₂ to dissipate?</p> <p>A. It is not possible to know with any certainty. There are many assumptions made by the applicant and in the DEIS with regard to the time it takes CO₂ to dissipate, including a constant wind speed. For example, it might be possible the ambient air is stagnant, allowing a concentration of CO₂ to build up, and then a brief gust of wind moves the cloud of higher concentration CO₂ to another location.</p>	<p>Given that the CANARY software is valid/verified and that reasonably conservative inputs were used for modeling, one can conclude that the modeling results will also be reasonably conservative. The term "very conservative" is not used in the EIS. The purpose of the modeling is to be reasonably conservative—to model reasonable worst-case scenarios.</p> <p>Allied modeled four reasonable worst-case conditions, which requires certain assumptions to be made and scenarios to be modeled. These assumptions and scenarios are discussed in Appendix G of the EIS. Making these assumptions and modeling these scenarios provides reasonably conservative estimates for the extent of CO₂ concentrations and the time required for these concentrations to dissipate. The assumption of a constant wind speed is an industry accepted practice for modeling a worst-case scenario. The commenter, Dr. Gorman, brings up a particular scenario that does not use a constant wind speed. Dr Gorman suggests a scenario in which a release occurs with no wind, which is then followed by a gust of wind. Allied has modeled this scenario using CFD; results are presented in Appendix G of the final EIS.</p>	20243-204360-03

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CURE	Gorman, John	2024-03-28	Q. Mr. Lange states in rebuttal testimony that the CANARY model has been validated but does not state whether the model has been verified. Do you have any response? A. Yes. First, if the CANARY software has been validated, the results of that validation should be provided by the applicant and the Department of Commerce’s Energy Environmental Review and Analysis (EERA) Unit in this proceeding or in the DEIS. Second, it is imperative that the applicant and/or EERA state whether there has been any verification of the CANARY software model. As I stated in my direct testimony, verification is a process to ensure an underlying mathematical model is implemented correctly and then accurately solved. Without both of these crucial steps, it is not possible to know how accurate the results from any modeling are.	Appendix C of the Aerial and Thermal Dispersion Analysis Report dated January 11, 2024, (in Appendix G of the draft EIS) has been revised to provide additional information about the verification and validation of the models. Also see the Minnesota Department of Commerce answer to question 17 of the CURE Information Request Number 2 for additional verification and validation information.	20243-204752-03
CURE	Gorman, John	2024-03-28	Q. In rebuttal testimony, Mr. Lange addresses your previous testimony regarding the conditions of the CO ₂ within the pipeline. What is your response? A. Mr. Lange states that “although the report does not explicitly state what phase the CO ₂ was modeled in, the phase can be determined based on the content in the report...” (Lange Rebuttal, Page 2). According to Appendix G of the DEIS, for the CANARY analysis, Table 6 lists the values of pressure and temperature to be 2,197.89 psi and -20 °F, making it liquid CO ₂ . However, for the CFD analysis, and as clarified by CURE IR 002, “Mr. Prascher and Dr. Ward did not model a phase change. Mr. Prascher and Dr. Ward assumed that the all the CO ₂ in the pipeline became gaseous, which is more conservative than what happens in reality. This simplifies the modeling process. At the same time, the downwind results are not affected because they set the release CO ₂ mass to be the same as the mass released in the CANARY model.” (Attached as Appendix JG-4). This means the CANARY model used liquid CO ₂ , and the CFD analysis used gaseous CO ₂ without phase change. The report does not justify or explain the reasons for this difference. But again, as I stated in my direct testimony, the phase of the CO ₂ will greatly impact the dispersion from the rupture and must be accurately modeled. Concerningly, if the CANARY model was using liquid CO ₂ and the CFD was using gaseous CO ₂ , there is no way those things could have been validated against each other. If the mass flow rate of 13.34 pounds per second was used for both CANARY and the CFD, there is a large density difference between the gas and liquid phase. Liquid CO ₂ leaving the 4.5” pipeline diameter rupture would have a velocity of around 1.75 feet per second, whereas gaseous CO ₂ leaving the same rupture would have a velocity of around 881.9 feet per second, or approximately 600 miles per hour. The discrepancy here must be addressed.	Dr. Gorman acknowledges the modeling approach Allied took was more conservative than reality, which is the goal of such modeling. The Minnesota Department of Commerce addressed Dr. Gorman's other concerns in its answer to question 13 of the CURE Information Request Number 2, which is attached to this comment matrix (Appendix O).	20243-204752-03
CURE	Gorman, John	2024-03-28	Q. Do you have any other concerns you would like to raise? A. Yes. Although the applicant has provided some rebuttal to my direct testimony identifying issues with the modeling in the DEIS, EERA, who oversaw the contractors conducting the modeling, has not responded to my direct testimony. Therefore, the key questions and concerns I raised there about the validity and reliability of the modeling results remain unanswered by the party that initially offered the information.	EERA addressed Dr. Gorman’s questions and concerns through its responses to CURE Information Request Number 2.	20243-204752-03
CURE	Grubert, Emily	2024-02-13	Q. What are your findings? A. Optimizing carbon dioxide pipeline infrastructure around ethanol plants is not an effective use of resources. It is not clear that this project will be subject to updated federal standards for carbon dioxide pipelines once a widely expected update is issued, given that current standards are widely understood to be inadequate. The Otter Tail to Wilkin Carbon Dioxide Pipeline Project Draft Environmental Impact Statement (DEIS) does not accurately or adequately estimate the carbon intensity of the proposed project, which is problematic because the project justification is largely on the basis of the impacts on carbon intensity.	Thank you for your comment. The draft EIS discusses PHMSA rules and regulations, and the pending rulemaking process it is undertaking for CO ₂ pipelines, and acknowledges pending PHMSA changes to such regulations (see draft EIS, Chapter 3, Chapter 8, and Appendix G). The carbon intensity of the project is discussed in Chapter 6.	20242-203381-04
CURE	Grubert, Emily	2024-02-13	Q. Are all CO ₂ pipelines specifically regulated at the federal level? A. No. The Pipeline and Hazardous Materials Safety Administration (PHMSA) has regulatory jurisdiction over CO ₂ pipelines, but specific rules are only in place for pipelines that transport CO ₂ as a supercritical fluid rather than as a liquid or a gas. Q. Are the current federal regulations generally accepted to be adequate? A. No. The lack of specific and updated regulations for CO ₂ pipelines is widely recognized as a gap. Currently, a first draft of updated rules on CO ₂ pipelines from PHMSA is expected in late 2024, but final rules will likely not be in place until much later. Although the DEIS notes that the pipeline contemplated in this project would be managed in accordance with PHMSA minimum federal safety standards, it is important to know that the existing PHMSA minimum federal safety standards for CO ₂ pipelines are widely considered inadequate and are currently being updated by PHMSA. (1) For the full context I am including a report by Pipeline Safety Trust on this topic as Schedule EG-2. (1) Pipeline and Hazardous Materials Safety Administration, PHMSA Announces New Safety Measures to Protect Americans From Carbon Dioxide Pipeline Failures After Satartia, MS Leak, May 26, 2022, https://www.phmsa.dot.gov/news/phmsa-announces-new-safety-measures-protect-americans-carbon-dioxidepipeline-failures ; Mike	Thank you for your comment. PHMSA regulations (that is, their appropriateness) and related standards for CO ₂ pipelines are outside the scope of the EIS (Appendix A). The draft EIS discusses PHMSA rules and regulations, and the pending rulemaking process it is undertaking for CO ₂ pipelines, and acknowledges pending PHMSA changes to such regulations (see draft EIS, Chapter 3, Chapter 8, and Appendix G). The Applicant has stated its proposed CO ₂ pipeline would be designed, constructed, and operated to meet PHMSA regulations, including any operational changes to PHMSA regulations that may occur in the future. To the extent applicable, and in response to this and similar comments, Section 3.6 and Appendix G of the EIS have been updated to include this information.	20242-203381-04

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			Soraghan, Midwest CO ₂ Pipeline Rush Creates Regulatory Chaos, Mar. 3, 2023, https://www.eenews.net/articles/midwest-co2-pipeline-rush-creates-regulatory-chaos/ .		
CURE	Grubert, Emily	2024-02-13	<p>Q. What is a carbon intensity (CI) score?</p> <p>A. A carbon intensity, or CI, score is defined by the DEIS as “the amount of CO₂e [carbon dioxide equivalent] emissions per unit of energy produced.” (Page 6-3). This value is calculated on a life cycle basis, and requires accounting for both new sources of greenhouse gas emissions (e.g., energy inputs to carbon capture and storage; emissions associated with oil production from CO₂-driven enhanced oil recovery) and any sequestration, among other components.</p> <p>Q. Does the DEIS adequately evaluate the CI score for the Green Plains Ethanol Plant 10 project?</p> <p>A. No. In particular, the DEIS overstates the CI score benefit of carbon capture and sequestration applied to the Green Plains Ethanol Plant. The DEIS claims that capturing 0.19 million metric tonnes per annum (mmtpa) of CO₂ from the ethanol plant would reduce the project’s CI score from 76 g CO₂/MJ ethanol to 36.3 g CO₂/MJ ethanol. (Page 6-6). The calculation provided on Page 6-6, however, has two major flaws. First, the calculation suggests that the CI score for ethanol across its life cycle would be 0.19 mmtpa CO₂ (the amount of CO₂ proposed for capture) divided by the total energy contained within the ethanol, or 36.3 g CO₂/MJ. This is incorrect: this equation gives the amount of CO₂ captured per MJ of ethanol, not the life cycle CI score for ethanol. I also note that the DEIS inappropriately rounds 0.185454 mmtpa CO₂ captured (Table 5-39) prior to making this calculation: the value presented should be 35.4 g CO₂/MJ captured, not 36.3. Further, the DEIS inconsistently refers to CO₂ versus CO₂e (which accounts for the CO₂ equivalent climate impact of other greenhouse gases emitted over the life cycle of the analyte), despite defining CI score in CO₂e terms. (Page 6-3).</p> <p>Q. What other flaw in the assumptions about CI scoring renders the DEIS analysis questionable or invalid?</p> <p>A. The second flaw is that the DEIS is not estimating the amount of CO₂ abated per MJ of ethanol, but rather the amount captured: an abatement value would need to account for any additional life cycle GHG emissions associated with energy and other inputs to the carbon capture and storage process. Table 5-39 does not provide sufficient information to assign emissions to the capture and storage processes specifically (particularly as emissions from operation of the capture facility are combined with emissions from fermentation that are not captured), but illustratively, this Table suggests that net capture from the plant is actually 0.14 mmtpa, not 0.19 mmtpa CO₂ – 25% lower than the DEIS credits the project with. Further, this abatement value would need to account for any losses (e.g., leaks) of CO₂ between capture and storage, and after storage.</p> <p>Q. How should the CI score be recalculated to be valid?</p> <p>A. The Project CI Score should not be calculated (g CO₂/MJ captured) as is presented in the DEIS, but as (CI score without CCS) – (g CO₂/MJ abated).</p> <p>Q. What other errors in the analysis make the CI score difficult to validate and assess?</p> <p>A. In general, the DEIS fails to consistently distinguish between the amount of CO₂ captured and the amount of CO₂ permanently stored, and does not address the level of net CO₂ abatement, which would require careful evaluation of the emissions associated with energy inputs for the carbon capture and storage.</p> <p>Q. Why is it a problem that the DEIS does not adequately evaluate the CI score for the Green Plains Ethanol Plant?</p> <p>A. The stated rationale for the project evaluated in the DEIS, a CO₂ capture facility and 28.1 miles of pipeline that would transport captured CO₂, is that it “would reduce the carbon intensity of the ethanol produced and thereby improve the ethanol plant’s ability to compete in low carbon fuel standard (LCFS) markets.” (Page ES-1). Without an accurate CI score for the project, it cannot be verified that the project would successfully deliver this benefit. One particularly relevant point is that the DEIS contemplates the possibility that CO₂ from the project might be used for enhanced oil recovery (EOR) (Page 5-101), which would significantly reduce any CI score benefits and thus fundamentally alter the rationale for the project.</p> <p>Q. Based on the available information, has the applicant or the DEIS provided sufficient information to recalculate and verify the CI score?</p> <p>A. No. An accurate CI score cannot be estimated without a clear understanding of the fate of captured CO₂, including pipeline leakage, storage leakage, and failure to permanently store CO₂.</p>	<p>The carbon intensity score (CI Score) metric used in the draft EIS reflects the net emissions of the full life cycle analysis according to the United States Department of Energy Argonne National Laboratory's Greenhouse gasses, Regulated Emissions, and Energy use in Technologies (GREET) model, and results are current as of the release date of the draft EIS. The California Air Resources Board's (CARB) Low Carbon Fuel Standard (LCFS) may require CA-GREET results to calculate greenhouse gas (GHG) emissions to participate in the program. Argonne has developed this full fuel-cycle model to estimate energy use and emissions from transportation fuel/vehicle technology systems. The model includes detailed information on corn farming and chemical manufacturing. The model and its documents are posted at http://greet.anl.gov. Section 2.1 has been revised to clarify that the amount of CO₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and that commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent. The equation presented in Section 6.1.4. has been revised to estimate the impact of the proposed project on the net CI score as suggest: (CI score without CCS) – (gCO₂/MJ abated). Table 6-2 has been added to include a range of net CI scores for various capture rate scenarios and a footnote has been added to clarify unit conversions such as the CO₂ captured presented in units of CO₂e since the Global Warming Potential (GWP) for CO₂ is 1.</p>	20242-203381-04
CURE	Grubert, Emily	2024-03-28	<p>Q. Do you agree with Mr. Nelson’s carbon intensity score calculations?</p> <p>A. Based on the information he provided, I do not disagree with Mr. Nelson’s calculations or the conclusion that the project would have a carbon intensity of 46.5 g CO₂e/MJ, instead of 36.3 g CO₂e/MJ as reported in the DEIS. However, I disagree with Mr. Nelson’s</p>	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and that commenters have questioned the	20243-204752-04

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			<p>assessment that this is a “small inaccuracy.” (Nelson Rebuttal, Page 5). The updated carbon intensity is 28% higher than the value actually presented in the DEIS, which is not a minor or insignificant error for the core value being used to justify this project. It is essential to demand high quality analysis for these key metrics.</p> <p>Q. Mr. Nelson states that your statement that the project would not deliver benefits is “baseless.” What is your response?</p> <p>A. Although this project might be able to deliver a fuel with CI lower than that of gasoline (though most ethanol is blended with gasoline and thus reinforces ongoing use of that infrastructure), it does not deliver a fuel with a CI lower than that of the most likely alternative in a climate policy-aware setting, which is electricity. I do not dispute that the project lowers the emissions associated with ethanol. I do dispute the applicant’s claims that the project provides climate benefits at a system level, a claim that would need to be evaluated in the context of alternative fuels like electricity.</p>	<p>feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent. As indicated by the scoping decision, the EIS reviewed existing studies of the human and environmental impacts of ethanol production and provide a synthesized analysis of potential impacts on human and environmental resources. The CI score range presented in Chapter 6 includes potential direct and indirect emissions associated within the proposed design and construction of the project. Table 5-39 has been updated to provide a summary of GHG emissions from the initial construction as well as the proposed ongoing annual operations at the capture facility, CO₂ capture (abated), and electricity use.</p>	
CURE	Grubert, Emily	2024-03-28	<p>Q. Mr. Powell states that the applicant does not intend to ship captured CO₂ for enhanced oil recovery (EOR). What is your response?</p> <p>A. It is good to hear that the applicant does not intend to use CO₂ transported via the project for EOR. But I would reiterate the concerns I expressed in my direct testimony that intent is not a binding commitment, and the DEIS does contemplate this possibility (Page 5-101). Additionally, because the CO₂ is going to be put into a system of networked infrastructure (i.e., pipelines), claiming that the project is distant from existing oil production does not prove a physical impossibility for the CO₂ to be used for EOR. Furthermore, Mr. Powell himself acknowledges in his rebuttal testimony that it is the shipper, not the applicant, who “ultimately determine[s] the purpose and end use for CO₂ transported on their behalf.” (Powell Rebuttal, Page 2).</p>	<p>Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO₂ transported by the project could be used for enhanced oil recovery (EOR).</p>	20243-204752-04
CURE	McKinney, Zeke	2024-03-14	<p>Q. What is a safe level of exposure to CO₂ for humans?</p> <p>A. Because each person is different in how they may respond to different levels of CO₂, it is best practice to follow the exposure limits established by various regulatory and guidance agencies, such as NIOSH, the U.S. Environmental Protection Agency (EPA), the American Conference of Governmental Industrial Hygienists (ACGIH), and the Minnesota Department of Health (MDH) to minimize potential harms from CO₂ exposure. It is generally accepted that human beings will not experience discomfort from carbon dioxide exposure at levels around 1,000 ppm CO₂ (0.01% CO₂). The variability in human response was emphasized in the Discussion section of the article by van der Schrier et al., in which they state, “When individuals are exposed to an excess of CO₂ in ambient air, an important question is at what levels of CO₂ inhalation does the human body maintain its ability to adequately function to, for example, escape from the incident scene or to perform a cognitively challenging task. An answer to this question is not only dependent on the results of our current study in healthy young volunteers but is certainly also dependent on the age and more importantly the physical condition of the exposed individual as well as presence of underlying cardiac or pulmonary disease. Our current results indicate that during exposure to 9% CO₂ the body retains its ability to function for 10 min, albeit with large variability in tolerance with some subjects able to withstand 30 min and one subject 60 min of exposure.... Note that we expect CO₂ tolerance to decrease rapidly in older individuals with lower resilience and those with existing cardiac or pulmonary disease.” In general, indoor air quality studies suggest that humans experience discomfort and symptoms with prolonged exposure to carbon dioxide at levels of 1,000 ppm CO₂ (0.1% CO₂). A relatively recent study of cognitive performance testing in young, healthy, male subjects by Tu et al. (2020), attached as Schedule ZM-3, where subjects were exposed to varying concentrations of CO₂ in a controlled setting, demonstrated that at or below CO₂ levels of 12,000 ppm (1.2% CO₂) subjects reported “higher rates of headache, fatigue, agitation, and feeling depressed,” in addition to decreasing cognitive performance in parallel with evident changes in physiologic parameters (decreased systolic blood pressure and increased diastolic blood pressure). A recent review of low-level indoor CO₂ exposures by Azuma et al. made strong conclusions from available evidence, including that “recent studies show clear linear physiological changes in circulatory, cardiovascular, and autonomic systems, including an increase of pCO₂ in the blood, elevated blood pressure, increased heart rate, increased peripheral blood circulation, and increased sympathetic stimulation at CO₂ exposures in the range of 500 to 5000 ppm”, and that “several experimental studies on humans suggest that CO₂ may affect cognitive performance (decision making, problem resolution, speed of addition, number of correct links) starting at concentrations of approximately 1000 ppm for short-term exposure to CO₂.” (Attached as Schedule ZM-2).</p>	<p>A review of the science concerning CO₂ toxicity levels is not necessary for a reasoned choice among alternatives. The EIS continues to use CO₂ concentration levels defined by federal agencies in its discussion.</p>	20243-204360-04

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CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>[This comment letter includes the following attachments:</p> <ul style="list-style-type: none"> • Accufacts’ Perspectives on the State of Federal Carbon Dioxide Transmission Pipeline Safety Regulations as it Relates to Carbon Capture, Utilization, and Sequestration within the U.S. • PHMSA letters • CO₂ EOR Potential in North Dakota • Should Transportation Be Transitioned to Ethanol with Carbon Capture and Pipelines or Electricity? A Case Study] <p>This is the first ever carbon dioxide (CO₂) pipeline proposed to be routed by the Minnesota Public Utilities Commission (Commission), and EERA has far more experience with analyzing impacts of other kinds of large energy infrastructure, such as centralized power generation and transmission infrastructure. That said, this first CO₂ pipeline DEIS lacks large amounts of necessary information and does not yet constitute a hard look at the foreseeable impacts of the proposed pipeline.</p>	See the responses to CURE's more detailed comments below.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	I. The DEIS Mischaracterizes the Impacts of the Proposed Project to Human and Environmental Resources Over-reliance on the applicant or a failure to secure the assistance of sufficiently experienced contractors for this analysis does not obviate or relieve the Commission of its duties as a Responsible Governmental Unit. In order to provide the necessary information EERA must make significant and substantial changes to the DEIS in order to assure an adequate analysis of the significant impacts attributable to the human environment for this first-of-its-kind project. Wishing that impacts are minimal and transitory does not make it so.	See the responses to CURE's more detailed comments below.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	a. Human Settlement The DEIS concludes that the project’s potential impacts on human settlement—including environmental justice, land use and zoning, populated areas, property values, public health and safety, public services and infrastructure, socioeconomics, and Tribal treaty rights—will be “minimal” to “moderate.” The potential impacts on these aspects of human settlement, however, will likely be more long-term and substantial than the DEIS currently states. The DEIS should be revised/rewritten to include the following considerations.	See the responses to CURE's more detailed comments below.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>i. Environmental Justice</p> <p>Environmental justice is broadly understood by regulatory agencies and is not a mapping exercise alone. The U.S. Environmental Protection Agency defines environmental justice as “the just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision-making . . . activities that effect human health and the environment so that people . . . are fully protected from disproportionate and adverse human health and environmental effects (including risks) and hazards . . .” Similarly, the MN Pollution Control Agency defines environmental justice as “the right of communities of color, indigenous communities, and low-income communities, to the enjoyment of a health environment and to fair treatment with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.” According to the MPCA, “fair treatment” as used in this way “means no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies. The DEIS concludes that “EJ impacts from construction and operation of the project would not result in disproportionate adverse impacts for EJ areas of concern within the ROI.” The “EJ area of concern” appears to be limited by a rigid understanding of a census tract map and doesn’t admit that the project is proximate to Indian Country and tribal communities. This statement also appears to be based on the assumption that the only environmental-justice-related impacts that might occur are limited to traffic, noise, and air pollution. But we know that the health and environmental risks associated with the project go beyond these issues and limited geography. The rest of the DEIS confirms this. Limiting consideration of potential impacts to traffic, noise, and air pollution ignores the many other impacts a project can have on overburdened individuals and communities.</p>	Chapter 8 has been revised to include a new section (8.3.1.2) describing effects on environmental justice populations in the event of an accidental release of CO ₂ .	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>i. Environmental Justice (cont. 1)</p> <p>The DEIS also fails to consider the mental health impacts of hosting this kind of infrastructure. Although more research should be done in this area, studies have shown that there are tangible mental health impacts for those who live near industrial projects.¹ The project asks the communities along the route to bear the burden of the mental health impacts—namely the stress and anxiety associated with a potential leak or rupture—that comes with hosting this kind of infrastructure. The community closest to the existing ethanol plant will be especially impacted by further concentration of industrial impacts.</p>	Section 8.3.1.4 has been revised to acknowledge that people in the vicinity of the project may experience stress and anxiety related to fear of the effects of a potential leak or rupture. However, mental health impacts associated with the project would not be anticipated to be of the same magnitude as those experienced by those living near a large petrochemical complex in Texas City, Texas, as reported in the study cited by CURE.	20242-203795-01

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CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>i. Environmental Justice (cont. 2)</p> <p>The DEIS fails to link its EJ analysis to Indigenous cultural practices and the importance of a clean and abundant ecosystem for people who rely on native species for sustenance and traditional practices, such as collecting and preparing medicinal plants. As with the other part of the DEIS regarding treaty rights, the DEIS fails to adequately discuss and acknowledge that all of Minnesota is the historical homeland of Indigenous peoples, and all natural landscapes have some potential to be significant to communities that use these areas for cultural practices. The DEIS could be read to say that EERA only meaningfully consulted the Sisseton-Wahpeton Oyate regarding archeological resources, without providing opportunity for tribal members or staff to speak more broadly to impacts to living resources close to their reserved lands on the Lake Traverse Reservation. The DEIS should fully memorialize any and all concerns voiced by Tribal Nations regarding their access to cultural resources and practices, including any ongoing access to species and habitat in the project footprint.</p>	<p>Thank you for your comment. The EIS acknowledges that the project area was most recently occupied by the Dakota and Ojibwe. Other Tribes with historic cultural interest or ancestral ties to the project area are also noted. The EIS does, in the treaty rights discussion, state that the project area has been home to various peoples and cultures since time immemorial.</p> <p>The landscape within the project area, post-European contact, has been greatly altered toward a predominantly agricultural use. “Natural” landscapes are uncommon in the project area. The current project area is mainly private agricultural land and not available for public access. Native Minnesota plants and wildlife of potential significance to Tribes are discussed in Section 5.4.2 of the EIS. The project would temporarily impact the portions of the project area containing plant and wildlife habitat of potential Tribal significance during construction until restoration of disturbed areas is complete.</p> <p>Outreach to Tribal governments has been conducted throughout the environmental review and permitting process for the project. Tribes were provided an opportunity to comment on the content of the draft EIS while it was being prepared (Appendix J). Additionally, Tribes provided comment on the draft EIS after issuance (see Appendix O).</p>	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>ii. Land Use and Zoning</p> <p>The summary of land cover provided in the DEIS states that zero acres of open water would be impacted by the RA-South route, but that RA-Hybrid and RA-North would impact 1.3 and 1.6 acres, respectively. Based on the definition of “open water” used in the DEIS, which references “surface water” generally, this seems inconsistent with the more detailed surface water impacts information presented later in Chapter 5. The DEIS states that activities which could impact open water include clearing and grading, dewatering and trenching, access road construction, waterbody crossings, surface water withdrawals and discharges, fueling and use of hazardous materials, and restoration or reclamation of construction areas.</p> <p>Per Chapter 5.7.8 of the DEIS, all three routes might result in “clearing and grading of stream banks, topsoil disturbance, in-stream trenching, trench dewatering, backfilling, and expansion of access roads,” which “can increase sedimentation and erosion, modify hydrological flow, release chemical and nutrient pollutants from sediments, and introduce chemical contaminants such as fuel and lubricants.”² And all three routes might use surface water withdrawals for hydrostatic testing.³ The DEIS also confirms that all three routes cross more than 100 surface waters within the project area.⁴ Given this apparent discrepancy, EERA should revisit its statements and calculations of open water crossed by the routes to ensure their accuracy.</p>	<p>Although more than 100 surface waters are within the ROI for each route alternative, many fewer would actually be crossed by the project, because the ROI is larger than the construction workspace and because some waterbodies within the ROI would be crossed or avoided by HDD or bore technique, as shown in Tables 5-48, 5-49 and 5-50, thereby mitigating impacts on surface waters. Further mitigation for impacts on surface waters is addressed in section 5.7.8.3. Note: NLCD dataset resolution is often not sufficient to pick up small surface waters that would be included in the DNR Hydrography Dataset. Section 5.7.8.1 was revised, and a note was added to Table 5-47.</p>	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>iii. Populated Areas</p> <p>The way in which the DEIS discusses potential impacts on populated areas conflicts with how other potential impacts are described. This seems to stem in part from the decision to consider the ROI for populated areas to only be the local vicinity (within 1,600 feet of the route width) instead of the project area (within one mile of the route width) or even the entirety of Otter Tail and Wilkin Counties. Because there are no census-designated places or incorporated places directly within the route or in the local vicinity, the DEIS concludes that “there would be no impacts on populated areas.” Yet, at the same time, the DEIS acknowledges that construction personnel and employees of the capture facility would rely on and use resources in the cities of Fergus Falls and Breckenridge during construction and operation of the project. These cities are therefore impacted populated areas, and the analysis of impacts should be scoped properly to include foreseeable impacts to populated areas.</p> <p>More importantly, the Department heard from residents living along and near the route at the public meetings in May 2023 and February 2024. These residents expressed disappointment over the Department’s decision to consider the places along the route as being not “populated.” If there is no population impacted by this project, then who exactly did EERA invite to the public meetings to learn about it? It is inconsistent and dismissive to describe rural areas as depopulated simply because the immediate area next to the applicant’s preferred route doesn’t include a high-density housing development.</p> <p>Given the above, the Department should expand the ROI for populated areas to at least within one mile of the route width, but more</p>	<p>Minnesota Rule 7852.1900, Supb. 3(A) requires the Commission to consider the impact of a pipeline to, among other considerations, the "existence and density of populated areas." Minnesota Rule 7852 provides no definition of "populated area." As described in Section 5.4.6, the EIS defines populated areas using United States Census Bureau data for incorporated areas and census-designated places. As stated in Section 5.4.6.1, the ethanol plant is near, but not within, the incorporated city of Fergus Falls.</p> <p>The EIS does not state that no population is impacted by the project, and does not state that rural areas are not populated. Section 5.4.6.1 has been revised to more clearly define "Populated Areas" as analyzed in the EIS. Minnesota Rule 7852.1900, Supb. 3(A) requires the Commission to consider the impact of a pipeline to, among other considerations, the "existence and density of populated areas." Minnesota Rule 7852 provides no definition of "populated area." Section 5.4.6 has been</p>	20242-203795-01

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			reasonably within five to ten miles of the route width to capture more accurately who might be impacted by the proposed project. This should at the least capture Fergus Falls, Foxhome, Sunnyside, Doran, and Breckenridge.	revised to clarify the definition used in the EIS for populated areas and to note that the EIS describes potential impacts on the human environment, regardless of whether they would or would not occur within defined populated areas.	
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>iv. Property Values</p> <p>As direct testimony from Silvia Secchi explains, (5) the DEIS’s conclusion that the presence of the proposed project “would not be expected to affect the value of residential properties during project operation,” is based on outdated studies. (6) More recent research from 2023 found that “[p]roximity to an RMP [Risk Management Plan] facility, irrespective of any incidents, is associated with significantly lower home values.” (7) Another study concluded that “pipeline incidents on average dampen housing prices within 1,000 meters (3,280 feet)” of the pipeline. (8) Given the public knowledge of the Satartia, Mississippi incident, it is reasonable to assume these effects might also be significant for those living along the proposed project route for this proposed CO₂ pipeline.</p> <p>As such, the DEIS should be amended to acknowledge these more recent studies and address the possibility that the presence of the project will impact property values. In doing so, the DEIS should realistically discuss the impact of lowered property values throughout the project area on the local economy. To the extent that EERA lacks this economic expertise and information, it should engage additional outside experts to assess the negative impacts on property values. Without accurate information on the economic costs of this project, the DEIS’s rosy assessment of economic benefits is inaccurate and inadequate.</p> <p>(5) CURE – Exhibit ____, Secchi Direct, eDockets Document No. 20242-203381-05.</p> <p>(6) DEIS, at 5-38.</p> <p>(7) Dennis Guignet et al., <i>The property value impacts of industrial chemical accidents</i>, <i>Journal of Environmental Economics and Management</i>, https://doi.org/10.1016/j.jeem.2023.102839 (2023). <i>The study only considered RMP facilities, which are stationary sources. But there are many similar characteristics between RMP facilities and the proposed project that make comparison and reference to this study relevant.</i></p> <p>(8) Nieyan Cheng et al., <i>Pipeline Incidents and Property Values: A Nationwide Hedonic Analysis</i>, SSRN, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4116305 (2023).</p>	A new section on property value impacts related to pipeline incidents has been added to Chapter 8.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>v. Public Health and Safety</p> <p>The majority of CURE’s comments about public health and safety will be addressed below, in Sections IV and V, in the discussion about Chapter 8 and Appendix G. Here, we raise concerns about DEIS’s failure to consider the possibility of human trafficking and an increase in incidences of violence against community members as a result of the increase of temporary, transient construction workers. This is a difficult subject to discuss and brings up many emotions for all impacted by this work, including nearby communities and the workers themselves. But given the well-documented history of violence perpetrated against communities in the vicinity of similar projects—especially violence against Indigenous women and children—it is unacceptable to ignore the very real potential for these kinds of human health and safety impacts.</p> <p>It is especially concerning given the applicant’s decision to hire the same contracting company, Precision Pipeline, LLC, that worked on the Line 3 pipeline.⁹ Two of the men employed by Precision Pipeline to work on Line 3 were arrested during a human trafficking sting operation in Itasca County.¹⁰ Crisis centers also reported receiving an increase in reports about Line 3 workers harassing and assaulting women and girls living near the pipeline.¹¹ These incidents occurred, despite Enbridge being required to create a Human Trafficking Plan—noticeably absent from discussion in this DEIS—and Enbridge confirming that “each worker goes through ‘human trafficking awareness training’” before beginning work on Line 3.¹² The applicant has made similar promises here, notably only via direct testimony and not in its application or the DEIS: “Summit will require that all of its employees and contractors complete a Human Trafficking Prevention Training prior to construction work.”¹³</p> <p>The health and safety of the workers themselves is also of concern. The same contractor has a checkered history with safety, according to incident report data from the Occupational Safety and Health Administration (OSHA).¹⁴ The final EIS should take a close look at the contractor’s history of workplace incidents and discuss how this might impact the construction workers who would work on the project.</p>	<p>Section 5.4.8.2 has been revised to note the potential for violence associated with the presence of temporary workers. The applicant's commitment to educating all employees and contractors about prevention of human trafficking has been added to Section 5.4.8.3. In addition, Section 5.4.8.3 has been revised to add an EERA staff recommendation for a special permit condition requiring the applicant to provide its Human Trafficking Prevention Training for Commission review 30 days prior to submittal of the Plan and Profile.</p> <p>The decision to be made by the Commission does not include the specification of a specific contractor.</p>	20242-203795-01
CURE	Sarah Mooradian,	2024-02-23	The DEIS contains little information or analysis regarding the energy demand of the project that shows the full anticipated impacts to the grid and other member-owners of the relevant power provider. There is a minor discrepancy in the DEIS regarding the potential electricity use of the project that should be resolved in the final EIS. In discussing potential impacts to electric utilities, the DEIS	Section 5.4.9.1 has been updated to include the natural gas and electricity usage at the existing ethanol plant. The GHG Emissions Summary table, Table 5-39, has been updated to use 38,501,733 kWh to	20242-203795-01

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	Hudson Kingston		<p>reports that the applicant anticipates the project’s operational needs to be approximately 38,501,733 kilowatt hours (kWh) per year.¹⁵ The GHG Emissions Summary table, however, states the annual project electricity use would be 39,297,360 kWh.¹⁶</p> <p>The DEIS assumes without support that the project “is anticipated to have negligible impacts” on electric utilities. But the DEIS doesn’t provide for a clear comparison of existing electric use at the facility and the additional demand from the project. In fact, the only mention of existing electricity use is found in Appendix I. Over the last two years, the Green Plains Ethanol Plant has averaged 3,171,885 kWh per month, or a total of 38,062,620 kWh per year. So, the proposed project is anticipating using the equivalent of an additional ethanol facility in terms of electricity – the project will roughly double electrical usage at an already energy-intensive industrial plant. For even more context, it is helpful to compare the proposed use to Lake Region Coop’s existing electricity sales. According to the Coop’s December 2023 financial report, the coop sold approximately 470,000,000 kWh of electricity in 2022 and 2023.¹⁷ The new addition of the capture facility’s electricity would be about 8% of those sales. Most importantly, this additional electricity puts a new demand on the grid that is not otherwise needed. Despite the above, the DEIS did not consider whether there would be rate impacts on Lake Region Coop member-owners.</p> <p>EERA should revisit the potential for impacts to the electrical system and other Lake Region Coop customers and member-owners. It is important to know both the total expected energy use as well as the variable demand that is anticipated by the project’s additional electric usage. Will the project’s use spike at the same time as the existing plant’s demand? Will Lake Region Coop have to implement peak-shaving policies and technologies elsewhere to manage this new intense use? Even if no immediate upgrades are required to deliver energy to the plant, will this increase member-owners’ exposure to power outages or brown-outs in times of peak demand?</p>	be consistent. Per the applicant, Lake Region Electric Cooperative (LREC) has not indicated that the additional load would necessitate implementing peak-shaving policies (see Appendix I, Supplemental Information Inquiry 13 response and email from LREC).	
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>The DEIS is also lacking a thorough discussion about how the project may impact emergency services, especially in light of consistent evidence that emergency medical services in rural Minnesota are facing significant challenges when it comes to staffing, funding, and coverage.¹⁸ The legislature recently established a Joint Task Force on Emergency Medical Services, and just last week, legislators introduced a bill seeking funding for EMS services across the state.¹⁹ The final EIS should take a hard look at the existing EMS services in the project ROI, including number of personnel and whether those individuals are volunteers or paid employees, average response times, and whether the departments have adequate funding. The final EIS should then discuss whether these services will be able to respond to a potential leak or rupture in a timely manner and with the necessary equipment.</p>	The existing conditions of, and potential impacts and mitigations on, infrastructure and public safety, including emergency services, are discussed in Sections 5.4.8 and 5.4.9. Table 5-12 provides a list of emergency services in Otter Tail and Wilkin Counties. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to respond safely to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. Additionally, the applicant’s draft emergency Response Plan is included in Appendix N of the EIS. EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3. Section 8.5.1.5 has been revised to address Emergency Medical Services (EMS) staffing shortage problems.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>As the DEIS correctly notes, all routes have the potential to impact recreation during construction. However, the DEIS only considers the potential impacts to these resources during normal operations and does not address what might occur in the event of a rupture or leak. The final EIS should specifically address how a rupture in, say, the Fergus Falls Fish & Game Club’s parcel or near the Orwell 9 unit, would impact recreation at those locations. Furthermore, abandoned pipeline infrastructure has the potential to have ongoing environmental impacts and the DEIS should fully assess the foreseeable impacts to recreation from this project after it has been decommissioned and abandoned in place by the company.</p>	Impacts of a CO ₂ release on recreation have been addressed in Section 8.3.1.5.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>CURE agrees with the DEIS’s conclusion that the economic impacts of the project would be minimal, if not entirely negative when considering the property value losses due to the hazardous nature of this project. It is clear that the economic benefits being reported externally by the applicant are not accurately describing all the foreseeable economic impacts. This raises important questions about why the DEIS reports the applicant’s estimated tax revenue and overall economic benefits, without any analysis or independent verification of those amounts. As Dr. Secchi notes in her direct testimony, “there is robust literature that shows that these applicant reports are rhetorical devices that use inappropriate methods.”²⁰ The applicant’s report itself acknowledges the limits of its usefulness: <i>This report is intended solely for use by Summit Carbon Solutions...we make no representation as to the sufficiency of the report and our work for any other purposes. Any third party reading this report should be aware that the report is subject to</i></p>	The EIS discloses the results of a socioeconomic analysis performed by a third party contracted by the applicant. EERA staff concludes that socioeconomic impacts are anticipated to be minimal, short term to long term, and similar across the three route alternatives. A full, independent economic analysis is outside the scope of this EIS, and it is not implied that one was conducted. Chapter 6 describes alternative technologies for decreasing CO ₂ emissions.	20242-203795-01

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			<p><i>limitations, and the scope of the report was not designed for use or reliance by third parties for investment purposes or any other purpose.</i>²¹</p> <p>Importantly, these kinds of applicant-funded and applicant-supplied economic “studies” only look at benefits, not costs. Conspicuously absent is a discussion about opportunity costs, such as alternative use of public funds the projects depend on.²² A recent study compared the applicant’s project with building wind farms at the same cost. The study concludes that “investing in wind turbines to provide electricity for BEVs [battery electric vehicles] is far more beneficial in terms of consumer cost savings, CO₂e emissions, land use, and air pollution than making the same investment in a plan to capture CO₂ from ethanol refineries, pipe the CO₂ to an underground storage facility,” and use the ethanol for consumption in vehicles.²³</p> <p>Given that the report relied upon to determine economic impacts of the project is supplied by the applicant and has not been independently verified, EERA cannot use the applicant’s report as an accurate, full economic analysis. This is especially true since the report itself cautions against this exact type of false reliance. It is essential that the final EIS either entirely remove and replace the applicant’s estimations, or independently verify or vet those estimations. The final EIS should also consider the opportunity cost of the project. This may require EERA to redo a significant amount of analysis, which is necessary in order to have an accurate assessment of the actual economic impacts likely to flow from this project.</p>		
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>The DEIS recites the horrifying dispossession of land that occurred in 1863 along with the shameful history of promises made and broken, as well as the forced signing of land cessions under duress. It would be helpful for the DEIS to specifically acknowledge any experts who contributed to this part of the environmental analysis. Treaties between the federal government and Indian Nations are inherently difficult to interpret without fully understanding the intention of the tribal leadership at the table, which generally requires proper consultation with experts in the affected tribal communities. The DEIS should acknowledge any preparers who supplemented EERA’s staff on this analysis.</p> <p>It is incorrect to state that simply because land was stolen, and the treaties were abrogated in 1863 there is no potential for impacts to treaty rights. For example, to the extent that this project perpetuates the ethanol industry it also increases inputs to concentrated animal feeding operations, also known as “factory farms.” Ethanol distillers grains are regularly used as cheap feed for animals in factory farms.²⁴ Such facilities are being proposed on the doorstep of tribal communities in the same region as this project, such as White Earth’s reservation.²⁵ As a result, an analysis of treaty rights that ends in the 1800s is incomplete and all Dakota and Ojibwe Tribes with historic connections to this land should be given the opportunity to add information to the EIS regarding foreseeable impacts to their air, water, wildlife, and cultural interests from this project.</p>	Thank you for your comment. A list of preparers is included in Chapter 12. The ROI for Tribal Treaty Rights is the project area; therefore, the EIS describes treaties that overlap this geographical area. Tribes have had the opportunity to provide comment on potential impacts analyzed in the EIS throughout the environmental review and permitting process (see, e.g., Appendices J and O).	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>Tribes also have significant responsibility for emergency response and public safety, and that staff is not limited by arbitrary laws from 1863 that seek to hem them into small geographic spaces. To the extent that Tribal EMS staff may be called on to deal with a rupture of this pipeline that should be viewed as impacts to relevant tribal resources and fully analyzed in the EIS with the input of the foreseeably impacted governments. At minimum, the same Tribes who contributed staff time and expertise to the archeological studies for the DEIS should also be consulted regarding their concerns, and Tribal EMS capabilities that could be impacted by any part of the proposed pipeline network attached to this project.</p>	Given the proposed pipeline route and associated facilities would be located in Otter Tail and Wilkin Counties and would be in proximity to the city of Breckenridge and the city of Fergus Falls, these local governmental EMS services and personnel would likely be the first responders called upon in the event of an unanticipated release associated with the project. Tribal reservations and lands are not located in proximity to the proposed project, and Tribal EMS staff would not likely be called to respond to an unanticipated release. Section 8.3.1.5 has been updated to indicate that impacts on Tribal EMS services are not anticipated.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>The DEIS concludes that the economic impacts of the project on agriculture over the long term would be minimal. This appears to be in part because the DEIS believes any impacts to crop productivity will last for two to three years, on average. But recent research summarizing studies in this area contradicts this assumption and suggests that impacts from construction may be much more long-term.²⁶ For example, one study found that corn grain yields were reduced by up to 50% during the first two years after the installation of the pipeline, but that even after ten years, “ROW crops were only yielding 77% of control area yields.”²⁷ Another study confirmed that “silking was delayed, corn plants were stunted, and yields were decreased on ROW,” and persisted even with the use of fertilizer.²⁸ In short, “published research has demonstrated a general consensus that pipeline installations have resulted in lasting soil physical and chemical degradation and subsequent decreases in plant productivity.”²⁹ This remains true, even with more contemporary construction practices that aim to separate topsoil and subsoil.³⁰ The final EIS must reconcile the fact that</p>	As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase. The text in the final EIS has been revised to indicate that impacts can be long term.	20242-203795-01

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			“contemporary pipelines installation still results in sustained soil degradation and crop yield losses,” with its assumption that any economic impacts to agriculture will be short-term and minimal.		
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	While the DEIS goes through the motions of listing impacted resources, it appears that information provided by the applicant generally leads to overly optimistic analysis. In order to adequately analyze the foreseeable impacts of this project, EERA must acknowledge the technological limitations and recent history of the carbon capture industry. It does not work well and it generally is used to extract oil, not reduce climate emissions. Given the widely available facts about this project and others in the U.S., the DEIS should be updated and put in the larger context of the existing industry. Similarly, the DEIS cannot assume total mitigation of other impacts by other state agencies when the available evidence shows that regulatory enforcement is lacking and ineffective.	Thank you for your comment. The sources of information used to prepare the draft EIS are included at the end of each chapter. Section 5.7.2.3 has been revised to further discuss EOR and provide estimated volumes of produced oil and CO ₂ emissions from EOR for different CO ₂ capture rate scenarios.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	By this point, it is widely accepted that climate change is happening, and that the impacts of a warming climate are here to stay. Our unseasonably warm and relatively snow-free winter and the previous few years of drought and wildfires are just the most immediate symptoms of these changes. ³¹ Many of us have good-faith desires to stop climate change by reducing greenhouse gas emissions, including the emissions of carbon dioxide. But because carbon dioxide removal is a limited resource, how we choose to make those GHG emissions reductions is extremely important. ³² Carbon capture applied to ethanol refineries is not the best use of these resources. As Dr. Grubert notes in her direct testimony, projects like the one proposed by applicant rely on pipelines, which are extremely long-lived, ³³ “with serious implications for host communities, landscapes, and long-term land use options.” Furthermore, corn ethanol itself is highly land and water intensive and provides limited benefits to the energy system. It has a high carbon intensity relative alternative fuels like renewable-generated electricity, even with the addition of carbon capture and storage. Of course, the DEIS is not intended to consider the merits of a particular project. But the DEIS must accurately describe the potential impacts of that project. And in this case, the DEIS has failed to do so when it comes to describing and estimating the climate change impacts of the proposed project.	Thank you for your comment.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<i>1. The DEIS Erroneously Assumes 100% Capture and 0% loss of CO₂ Captured at the Green Plains Ethanol Plant</i> The DEIS assumes, without any evidence of independent verification, that the proposed project is capable of and will capture 100% of the CO ₂ emitted by the Green Plains ethanol plant: “By capturing and sequestering the CO ₂ underground, the project would provide a net benefit to GHG emissions and lower the carbon intensity of the ethanol plant because the emissions sequestered from ongoing annual operations would outweigh the capture facility’s construction and operation emissions.” ³⁴ This assumption is apparently based only on the applicant’s own statement that “the capture facility is designed to capture 100 percent of the CO ₂ produced by the ethanol plant.” ³⁵ But there is significant gap between what a facility is designed to capture and what it is actually capable of capturing. In reality, no carbon capture facility has produced publicly available information that supports the conclusion that the technology can and consistently does capture 100% of the target emissions. ³⁶ For example, the Illinois Industrial Carbon Capture and Storage project in Decatur, IL, has been in operation since 2017. ³⁷ Originally designed to capture one million metric tons of CO ₂ per year from the Archer Daniels Midland ethanol facility, the project has never been able to meet that goal. ³⁸ In fact, it has consistently been underperforming by about 48%. ³⁹ The only other example of a “large-scale” carbon capture facility at an ethanol plant is the Red Trail Energy facility in Richardton, North Dakota. The facility started capturing and sequestering CO ₂ from the adjacent ethanol facility in June 2022, claiming it is capable of capturing 100% of the plant’s emissions. ⁴⁰ But publicly available information about its first full year of operation has yet to be released. More recently, the Blue Flint ethanol facility in Underwood, North Dakota, began capture and sequestration of facility emissions and has reported, without evidence, a 100% capture rate. ⁴¹ Press releases aside, there is no available proof that any ethanol plant can capture as much CO ₂ as the DEIS assumes without proof will be captured at this project. Even if the applicant is able to defy what current technology has proven it is capable of accomplishing in other ethanol plants and captures 100% of the emissions from the Green Plains ethanol plant, the DEIS still assumes that no CO ₂ is lost throughout the transportation or sequestration process and that the CO ₂ will be stored for a climate-relevant (1,000 years) period of time. There is no evidence to support that assumption. Additionally, other carbon capture facilities attached to CO ₂ pollution sources have been turned on and off depending on the need for CO ₂ and the upkeep of the capture technology. For example, the Petra Nova plant in Texas stopped capturing CO ₂ for three years before its owner announced it may begin again. ⁴² Similar to the examples noted above, Petra Nova never met its goals for tons of CO ₂ captured over the years it did operate. ⁴³ It is not realistic to assume that the project will operate without any breakdown or updates for the entire lifetime of the ethanol plant. The DEIS must assess the excess pollution potential for regular or unplanned shutdowns of	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent.	20242-203795-01

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			<p>the carbon capture technology while ethanol is still being produced.</p> <p>What the DEIS fails to capture is the lifecycle CO2 emissions reduction—or increase—that the project will actually accomplish. This is confirmed by Dr. Grubert’s direct testimony, in which she concludes that “the DEIS fails to consistently distinguish between the amount of CO2 captured and the amount of CO2 permanently stored and does not address the level of net CO2 abatement.”⁴⁴ The final EIS must reflect the lack of evidence for the project’s ability to capture, transport, and permanently store all of the emissions from the facility.</p>		
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>2. The DEIS Ignores the Potential for Enhanced Oil Recovery</p> <p>The DEIS does briefly address the issue of enhanced oil recovery (EOR) in the larger discussion of GHG emissions from the project. But the DEIS makes several significant errors. First, it asserts that “production of oil through EOR would not be dependent on the availability of CO2 produced by the ethanol plant.”⁴⁵ North Dakota regulators and businesses with an eye on CO2-EOR say otherwise. Indeed, a consultant report presented to the North Dakota Legislature in 2016 went into great depth of the link between CO2 brought to North Dakota and EOR potential. It found: <i>If the Bakken is to realize its full EOR potential, the CO2 EOR projects in North Dakota will have to rely primarily on anthropogenic sources of CO2 supply....The development of CO2 EOR in the Bakken will require about 35 MMt of CO2 per year by 2035. That would require a combination of sources of supply within the state and from states nearby.</i>⁴⁶</p> <p>Plans to expand CO2 supply from anthropogenic sources have been on the radar for the oil and gas industry and their lobbyists for many years. This 2017 report from the Great Plains Institute explains the relationship: <i>Natural geologic supplies of CO2 are constrained and gradually depleting, so the potential to grow the EOR industry hinges upon increasing the supply of anthropogenic CO2, thereby also reducing net carbon emissions. In that context, low-cost, high-purity biogenic CO2 from fermentation in ethanol production represents a key early target for making additional anthropogenic CO2 available for EOR.</i>⁴⁷</p> <p>Lyn Helms, the Director of North Dakota Mineral Resources, also recently reiterated the need for external sources of CO2 for North Dakota CO2-EOR production: <i>Carbon dioxide has got to come to North Dakota from somewhere, if we’re going to stabilize and sustain Bakken oil production. So, we’ve got to find a way for carbon capture and utilization to become a part of North Dakota’s economy, or we will leave billions of barrels of oil in the ground.</i>⁴⁸</p> <p><i>In short, the relationship between EOR and CO2, especially CO2 produced by ethanol plants, are well-documented and expected to continue. And as the DEIS acknowledges, “it is possible” for CO2 captured by the project will be used for EOR. Statements made by the applicant’s Chief Organizational Officer, Jimmy Powell, confirm this point: “If another carrier decided to use, or ask us to transport CO2 for another purpose, like enhanced oil recovery, then that’s a possibility.”⁴⁹ Powell also confirmed that the applicant will be maintaining 10% of their capacity for other shippers.⁵⁰ The Petra Nova plant, mentioned above, went offline for three years due to the price of oil and the direct link between its carbon capture facility and its income from EOR,⁵¹ which was how the carbon capture was funded and made profitable in years of higher oil prices.</i></p> <p><i>Given the above, and the uncertainty of whether the CO2 sent to North Dakota will be stored or used for EOR, the DEIS must consider the very real possibility that all of the CO2 captured at the facility will be used for EOR. The 190,000 tons of CO2 proposed to be captured is about 2% of the contracted amount of CO2 the applicant has reported. It’s about 1% of the maximum capacity of CO2 the applicant has reported being able to capture and transport. This is dwarfed by the 10% that the applicant says can be used for any purpose after it is shipped in the pipeline. In short—all of the CO2 captured at the Green Plains facility could be used for EOR, and then some.</i></p>	<p>The text questioned by the commenter in Section 5.7.2.3 was prefaced with the following: "if all the CO2 produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO2, other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO2 transported by the project could be used for EOR.</p>	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>Despite this, the DEIS concludes that “given the number of variables, quantifying this amount could not be done with any reasonable certainty, and a generalized formula to predict oil extraction could not be identified,” and that therefore, “it would be speculative to conclude whether the availability or absence of CO2 from the ethanol plant would have a significant effect on future oil production.”⁵² But data from the EPA, International Energy Agency (IEA), and the Carnegie Endowment provide clear information which the DEIS can and should use to estimate the GHG emission impacts of CO2-EOR. First, the IEA reports that between “300 kg CO2 and 600 kg CO2 is injected in EOR processes per barrel of oil produced in the United States.”⁵³ The EPA estimates that an average carbon dioxide coefficient of one 42-gallon barrel of oil is 426.10kg CO2.⁵⁴ The Carnegie Endowment’s Oil-Climate Index confirms this general average and estimates an average carbon dioxide coefficient of 471kg CO2-e per barrel of crude oil for Bakken No-Flare-produced oil and 532 kg CO2-e per barrel for Bakken Flare-produced oil.⁵⁵ Clearly, the information is available for EERA to estimate the potential GHG emissions impacts of the project’s CO2 being used for EOR.</p>	<p>Section 5.7.2.3 has been revised to include an estimate of emissions from oil produced with EOR using the CO2 captured from the ethanol plant.</p>	20242-203795-01

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CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	Following the pipeline rupture near Satartia, Mississippi, the Pipeline and Hazardous Materials Safety Administration (PHMSA) issued an advisory bulletin related to the risks of land-movements and geohazards for pipelines. Chapter 8 of the DEIS mentions this advisory bulletin, but does not address whether the applicant has followed the recommended procedures outlined in the bulletin. The final EIS must include that information, as well as evidence supporting any claims by the applicant that it has followed those guidelines. If the applicant has not followed those guidelines, the final EIS should include an explanation from the applicant as to why it did not and an analysis of the failure to comply with best practices identified by federal expert agencies.	Text has been added to Section 5.7.3.4 describing geohazard assessments for the project designed to comply with PHMSA Advisory Bulletin 2022-01. As noted in Section 5.7.3.4 and Section 8.1, the applicant has committed to conducting a Phase I Geohazard Assessment to identify areas surrounding the pipeline that may be prone to large earth movement, as recommended by PHMSA in its June 2022 Advisory Bulletin, and EERA staff recommends that the results of the Phase I Assessment, and any subsequent assessments, should be provided to the Commission.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	The DEIS fails to include an analysis of the potential impacts, both short- and long-term of the proposed project on public and designated lands in the event of a leak or rupture. General impacts of a leak or rupture are of course described in Chapter 8. But the specific impacts that might occur in these unique public and designated lands are ignored. This is especially concerning as the DEIS lists federally- and state-listed endangered/threatened/special concern species without any meaningful discussion of how impacts to their habitat would harm their ability to continue to live in the area. The final EIS should look at each of the Waterfowl Production Areas within at least 1,000 feet of the ROW, given what the rupture modeling in Appendix G estimates about the potential impact radius of a rupture. Furthermore, a more in-depth analysis of the potential impact on aquatic ecosystems on public lands is necessary to better understand potential impacts to aquatic life long-term.	As described in Chapter 8, operation of the proposed pipeline would include integrated systems for detecting leakage, as well as protocols for addressing leaks promptly. Minor CO ₂ leaks from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to waterfowl and other wildlife within Waterfowl Protection areas (WPA). RA-South would cross the corner of an unnamed WPA and be near other WPAs, including the Orwell 9 Unit and Ridgeway WPA in Otter Tail County. If a leak or rupture occurred within a WPA, wildlife habitat could be affected in the same way as described above. RA-North and RA-Hybrid would cross the same unnamed WPA, but would not cross any other WPAs.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>The DEIS identifies lake sturgeon as a species potentially impacted by the project and that is under consideration by the U.S. Fish & Wildlife Service for listing in mere months. No further discussion is given to the potential impacts of the project on these fish, because it is assumed that “documented occurrences in the Otter Tail River [are] well upstream of all three route alternatives.”⁵⁶ But the DNR has recently tagged and released sturgeon into the lower Otter Tail River, below the Orwell Dam in Fergus Falls, which totally refutes the assumption that the fish only exist upstream.⁵⁷ The DEIS’s silence on this runs counter to state government’s ongoing and important conservation and research activities regarding this species.</p> <p>Lake sturgeon (<i>Acipenser fulvescens</i>) is a large, long-lived, freshwater fish species that historically inhabited rivers and lakes throughout three major North American watersheds: the Hudson Bay, the Great Lakes basin, and the Mississippi River.⁵⁸ This includes the Red River Basin.⁵⁹ Lake sturgeon’s preferred habitats are large shallow lakes, rivers, and near-shore areas.⁶⁰ Lake sturgeon feed by using their protruding mouths to suction up bottom-dwelling organisms such as crayfish and other crustaceans as well as insect larvae.⁶¹ Lake sturgeon have a low reproductive rate and may not begin to spawn until they are fifteen to twenty-five years old.⁶² Mature males spawn on average every other year and females spawn on average every three to four years.⁶³</p> <p>Sturgeons are highly vulnerable to habitat alteration because of their specialized habitat requirements, the long time it takes them to reach breeding maturity, and their episodic reproductive success. Temporary impediments, changes to behavior, temporary loss of habitat, and/or the alteration of water quality could increase the stress rates, injury, and/or mortality experienced by fish. If a pipeline rupture, spill, or other inadvertent release occurs within a waterbody, the resulting turbidity could impact water quality and impede fish movement, potentially increasing the rates of stress, injury, and/or mortality experienced by fishes.</p> <p>Because of the project’s potential to “increase sedimentation and erosion, modify hydrological flow, release chemical and nutrient pollutants from sediments, and introduce chemical contaminants such as fuel and lubricants,” the final EIS should include a detailed discussion of how the proposed project may impact this vulnerable species—including what may happen in during construction, operation, and in the event of a leak or rupture. The DEIS should more generally have sufficient information regarding all the listed species noted to assure that any potential take is foreseen and mitigated. Merely naming species and assuming they will be fine is not an analysis of potential impacts.</p>	The United States Fish and Wildlife Service (USFWS) recently announced (on April 23, 2024) that listing of the lake sturgeon is "not warranted" at this time. Therefore, the draft EIS discussion of potential impacts on all fish species potentially present applies to the lake sturgeon as well. However, additional language regarding lake sturgeon presence in the upper and lower reaches of the Otter Tail River was added to the Rare and Unique Resources section (5.7.5) and to the Wildlife section (5.7.10.1) in order to more fully describe the extent of lake sturgeon presence in the river.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	The DEIS incorrectly states that potential impacts on soil and corresponding vegetation would be expected to be short-term, lasting between two and three years, and potentially up to five years after restoration. ⁶⁴ As discussed in section I.b.i. above, studies suggest that the impacts of pipeline construction on soil and vegetation can last well beyond two to three years. The final EIS must include a more robust discussion of this issue and either adjust its estimates or explain why this project will be different from those studies and	Section 5.7.6 explains that the applicant would comply with required permits and implement its Minnesota Environmental Construction Plan (ECP) and Minnesota Agricultural Protection Plan (APP), which would minimize impacts on soils. The text in Section 5.7.6 has been revised to	20242-203795-01

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			able to ensure it will not have long-lasting impacts on soil health and plant productivity. EERA should also respond to concerns raised by Dr. Secchi and Dr. Dolph in direct testimony in PUC Docket No. 22-422.	indicate that while most impacts on soils during construction would be minimal and temporary, some impacts could be longer term.	
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>Water is a precious resource, one that is threatened by climate-change induced drought and deluge making water availability and quality uncertain, even in the land of 10,000 lakes.⁶⁵ The DEIS provides a cursory discussion of the amount of water that might be needed during construction and operation of the project, but assumes that because the Department of Natural Resources (DNR) has regulatory authority over water appropriations, it is not necessary at this time to require clear answers from the applicant about total water use, evidence for those estimates, and an analysis of how existing water use would be impacted by the proposed project. This is incorrect and ignores the clear directives of the Minnesota Environmental Protection Act (MEPA).</p> <p>DNR has famously and consistently failed to enforce groundwater appropriation limits, both across agricultural areas in Minnesota as well as against pipeline companies, namely Enbridge and its ongoing aquifer breaches caused by Line 3. Both the Star Tribune and New York Times have reported on the state’s failure to make any meaningful efforts to rein in over-pumping of groundwater by well permit owners in recent years.⁶⁶ “During the 2021 drought, nearly 800 Minnesota farmers with high-capacity wells pumped 6.5 billion more gallons of water than their permits allowed, state records show.”⁶⁷ In response DNR merely acknowledged that that was a lot of water and said they were “trying” to get people to comply with their permits.⁶⁸ The reporting of over use is said to be an “honor system” with no compliance checks by DNR.⁶⁹ Minimal fines are often given, and frequently forgiven before they are fully paid, but are not sufficient to deter violations in any case.⁷⁰</p>	Thank you for your comment.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	Closer to EERA’s expertise and experience, the Line 3 pipeline has repeatedly been shown to have caused aquifer breaches that resulted in millions of gallons of groundwater lost for no economic purpose. ⁷¹ Although Enbridge was charged criminally for three of the breaches, more breaches are still being discovered ⁷² and criminal enforcement clearly had no deterrent effect on what was already a fait accompli when the pipeline construction repeatedly punctured aquifers leading to uncontrolled leaks. Environmental review and mitigation before construction is the only viable opportunity for preventing such breaches and misappropriations, reliance on DNR rather than proper analysis in the DEIS is a mistake that has demonstrably not protected groundwater resources in the past.	Thank you for your comment.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	EERA must revisit its discussion about water resources and include a detailed discussion about where the applicant’s water appropriations will come from (what water source), what the existing water use conditions are for that source, and how the proposed use will impact nearby wells (ROI should be at least at the County level, given the intricate and interconnected nature of water resources). Additionally, the DEIS should discuss what available mitigation measures for fixing aquifer breaches would be sufficient to cure construction mishaps when they occur. To the extent that aquifer breaches cannot be fixed after the fact, the DEIS should discuss this and fully lay out the foreseeable impacts of these water appropriations that are known to occur when pipelines are constructed through Minnesota aquifers.	Additional detail regarding water appropriations has been added to Section 5.7.8.2. Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant, long-term impact on groundwater. Furthermore, text has been added to Section 5.7.8.2 to indicate EERA staff recommends the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	Additionally, CURE would like to incorporate by reference all of Dr. Christy Dolph’s direct testimony as it is also relevant to the inadequacy of the DEIS analysis regarding water and soil impacts. Dr. Dolph’s points about the failure to assess different routes’ potential impacts on the relevant aquifer should be addressed in the final EIS.	Thank you for your comment.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	The DEIS does acknowledge that horizontal directional drilling (HDD) may negatively impact soils and waterbodies in which installation occurs. But the DEIS does not provide an adequate discussion of the potential impacts to water quality and overall ecosystem harms that may occur in the event of “frac outs,” from either bentonite clay or additives mixed with drilling fluid for lubrication purposes. Furthermore, the DEIS fails to discuss whether or how the risk of frac outs can be mitigated or explain why the risk cannot be mitigated. As noted above, this is especially important to consider given the record of numerous frac outs that occurred during construction of Line 3. ⁷³	The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	Despite comments submitted by CURE and others during the scoping process, ⁷⁴ the DEIS does not address the potential impacts of a CO ₂ leak or rupture in water during winter conditions, and particularly, when there may be ice covering open waters or wetlands. The final EIS must include information about this issue.	Sections 8.3.1 and 8.3.4 have been revised to discuss the potential impacts of ice covering waters or wetlands at the point of a rupture. In general, if CO ₂ released from the pipeline was trapped by ice, then the CO ₂ would release more slowly into the atmosphere as it traveled	20242-203795-01

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				laterally under the ice until it escaped through cracks or gaps in the ice, thereby decreasing the impact distance (the distance the CO ₂ would travel through the air). The EIS modeled the worst-case scenario where the CO ₂ is not trapped by ice. In the event of a pipeline rupture that caused CO ₂ to be trapped by ice covering a waterbody, CO ₂ could remain in contact with the water for more time, and the concentration of carbonic acid could increase. In other words, the water and aquatic species could experience a greater impact from the CO ₂ , but the atmosphere would experience less CO ₂ , and the risk to humans and other terrestrial species would be lower.	
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>Wetlands ecosystems are among the most valuable in the world because they provide critical ecosystem functions like carbon sequestration, biodiversity conservation, fish production, water purification, and erosion control.⁷⁵ In general, most of the state’s naturally occurring wetlands have been eliminated, in large part due to the conversion of that land to agricultural purposes.⁷⁶ But wetlands are also difficult to restore once damaged and often never recover their original functions. This means that remaining wetlands are even more important to protect from degradation. As a result, Minnesota has “adopted a broad policy goal to achieve no-net-loss” of remaining wetlands and promote “increases in the quantity, quality, and biological diversity of wetlands.”⁷⁷</p> <p>There appears to be a discrepancy in how the DEIS reports the potential wetland impacts of the project. In one place, the DEIS asserts that “the loss of wetlands would be less than 0.01 acre, resulting in minimal change in water resource land cover.”⁷⁸ But in Table 5-44, the DEIS reports that acres of wetland impact within the construction workspace alone for all three routes would be between 0.8 acres and 4.7 acres for both construction and operation of the project.⁷⁹ And in Table 5-51, the acres of wetlands within the ROI (route width), are even larger—20.9 acres for RA-North, 24.7 acres for RA-Hybrid, and 44.6 acres for RA-South.⁸⁰ The final EIS must identify which of these totals is most accurate in estimating potential wetland impacts and losses and explain why it reaches that conclusion.</p>	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and the associated resolutions. Table 5-4 uses NLCD data to analyze land cover, and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	As explained above, the DEIS lacks a detailed discussion about the potential impact on lake sturgeon, which is up for federal listing consideration this year. Additionally, the DEIS assumes without support that in the event of a rupture, any mobile animals would simply move away from the point of rupture. This is inconsistent with the rupture modeling in Appendix G, which suggests that the rate at which CO ₂ is released in the event of a rupture would make it difficult for even highly mobile animals to escape quickly enough to avoid harm or death. ⁸¹	<p>USFWS recently announced (on April 23, 2024) that listing of the lake sturgeon is "not warranted" at this time. Therefore, the draft EIS discussion of potential impacts on all fish species potentially present applies to the lake sturgeon as well. However, additional language regarding lake sturgeon presence in the upper and lower reaches of the Otter Tail River was added to the Rare and Unique Resources section (5.7.5) and to the Wildlife section (5.7.10.1) in order to more fully describe the extent of lake sturgeon presence in the river.</p> <p>The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO₂, which could be toxic for species or individuals unable to leave the area of the release.</p>	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>On February 6, 2023, the Commission denied CURE’s petition for an EAW for the entire Minnesota footprint of the Midwest Carbon Express. According to the Commission, because there is no application currently before it on the Jackson to Kandiyohi and Martin County portions of the MCE, it cannot consider the impacts of those routes. CURE petitioned for reconsideration and the Commission again disagreed, maintaining its denial of CURE’s petition for an EAW.</p> <p>Since then, the applicant has made multiple public statements about its intent to submit applications for the Jackson to Kandiyohi and Martin County portions of its MCE project. The DEIS also recognizes the inevitability of those applications, saying: The project would connect to a larger CO₂ system known as the MCE Project....the applicant expects to submit additional routing permit applications in the future. The applicant anticipates having permits for all pending applications in hand to start construction for portions of the project by first quarter 2025 and plans to begin operation by early 2026.⁸²</p> <p>Undeniably, the Otter Tail to Wilkin project is the MCE Project. As CURE has stated multiple times, the MCE is a phased project, and</p>	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20242-203795-01

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			the environmental, human, economic, and other impacts of all 241.8 miles of the project must be considered cumulatively now, not through piecemeal environmental review over the next two years. ⁸³		
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>III. <i>The DEIS does not adequately consider the full environmental impacts of corn ethanol.</i></p> <p>The Greenhouse gas, Regulated Emissions, and Energy Use in Transportation (GREET) model was developed by the Argonne National Laboratory to “examine[] the life-cycle impacts of vehicle technologies, fuels, products, and energy systems.”⁸⁴ The GREET model can offer some insight into how to quantify and compare the carbon intensity of products, but is not designed to provide a comprehensive overview of all the impacts, including water quality and soil health.⁸⁵ The final EIS should more explicitly explain the externalities associated with ethanol production, not only the fuel’s carbon intensity.</p> <p>Additionally, as explained by Dr. Grubert in direct testimony, the DEIS incorrectly calculates the carbon intensity score of ethanol at the Green Plains plant with the project.⁸⁶ Not only does the DEIS use the wrong calculations, it also only measures the amount of carbon captured instead of the amount of CO₂ abated per megajoule (MJ) of ethanol. Because “an accurate CI score cannot be estimated without a clear understanding of the fate of captured CO₂, including pipeline leakage, storage leakage, and failure to permanently store CO₂,” the final EIS must estimate the amount of CO₂ abated instead of only the amount captured.⁸⁷</p>	<p>The EIS has been revised to include the proposed changes presented by Summit's response to commenters’ suggestion: (1) The draft EIS states, “[t]he project would reduce the ethanol plant’s CI score to 36.3.” The following sentence states, “The following equation shows how the project would change the CI score of the ethanol plant by serving as a credit that can be deducted from the overall score.” Those two statements are in conflict with each other. However, by changing “to” to “by” in the first sentence, they would no longer be in conflict. Accordingly, this language has been revised in the final EIS to more accurately reflect the Project’s impact on the CI score by stating, “[t]he project would reduce the ethanol plant’s CI score by 36.3.” (2) The calculations provided in the draft EIS (Chapter 6, Page 6-7) represent the CI score impact of capturing and storing fermentation CO₂ from the Green Plains Ethanol plant. The CI score determined in the draft EIS includes the direct and indirect emissions associated within the proposed design and construction of the project. Table 5-39 provides a summary of GHG emissions from the initial construction as well as the proposed ongoing annual operations from capture (abated), capture facility, and updated values for electricity use. Electricity use in the draft EIS was estimated to be 26,893 (MT CO₂e/yr) and was calculated using the California GREET model emission factor of 684.35 g CO₂e/kWh for the Midwest Reliability Organization West region, which includes Otter Tail and Wilkin Counties. The draft EIS estimated an annual project electricity use of 39,297,360 kWh. [CO₂e (metric tpy) = 39,297,360 kWh x 684.35g CO₂e/kWh x 0.0022046 lb CO₂/g CO₂/2000 lb/ton x 0.907185 metric ton/ton]. The annual project electricity use has been updated to reflect the design for 100 percent electrical use from an updated source at about 38.5 million kilowatt hours (kWh), an about 0.8 percent reduction in kWh (the 38.5 million kWh assumption is updated to reflect Summit’s response to Question 6 in Summit’s Response to Supplemental Information Inquiry 5). Utilizing the GREET emission factor for LREC of 132.2 g CO₂e/kWh, this results in emission sources of 5090 MT CO₂e (about 3 percent of the 0.19 metric tons per annum at 100 percent capture design rate). The equation in Section 6.1.4 has been edited to estimate the impact of the proposed project on the net CI score as suggested: (CI score without CCS) – (g CO₂/MJ abated). Table 6-2 has been added to include a range of net CI scores for various capture rate scenarios. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios for 100 percent, 70 percent, 40 percent, and 10 percent.</p>	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>IV. <i>The Rupture Analysis Does Not Provide Enough Information to be Relied Upon</i></p> <p>CURE is appreciative of the Department’s work to find and coordinate with an analyst to create the rupture study in Appendix G. Minnesota is the only state in the footprint of the applicant’s MCE project to have conducted independent modeling and made it publicly available. However, there are several issues with the analysis that must be addressed in the final EIS and prior to any decision the Commission makes on the route permit. The final EIS must “show its work” and prove the validity of its analysis.</p>	<p>Thank you for your comment.</p>	20242-203795-01

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CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p><i>IV. The Rupture Analysis Does Not Provide Enough Information to be Relied Upon (cont.)</i></p> <p>At public meetings in Breckenridge and Fergus Falls in February 2024, commenters identified a discrepancy in the reported estimated time for closing mainline valves (MLVs) during an emergency. The applicant states that it will be able to respond to an emergency situation and close the relevant valves within ten minutes of a rupture or release occurring. The final EIS should scrutinize the applicant’s assertions on this issue and require applicant to provide evidence supporting those assertions.</p>	<p>Text in Section 4.5 on valve closure time has been revised from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised, as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.</p>	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p><i>IV. The Rupture Analysis Does Not Provide Enough Information to be Relied Upon (cont.)</i></p> <p>As noted by Dr. John Gorman in direct testimony submitted on behalf of CURE, the CANARY software used in Appendix G does not apparently account for critical factors related to pipeline ruptures, including spatial or temporal variations in local windspeed, changes in terrain or obstacles, dynamic three-dimensional thermal-fluid phenomena like convection, and ruptures where the angle of release is primarily vertical.⁸⁸ Beyond the limitations of the model itself, Dr. Gorman notes that “any result from any model is only as good as the assumptions and inputs used.”⁸⁹ Unfortunately, Appendix G fails to “discuss the actual equations being solved or the assumptions the software uses to perform the analysis,” and does not appear to have undergone verification and validation activities to determine how accurate the results of the model may be.⁹⁰ Dr. Gorman identifies similar gaps in information for the Computational Fluid Dynamics model included in the rupture report.⁹¹ In sum, Dr. Gorman ultimately concluded that because of lack of detailed information, “it is impossible to determine whether the conclusion about potential impact areas is correct.”⁹²</p> <p>Because EERA has never conducted this type of environmental review before, and because this analysis is so important to the public’s overall understanding of this new technology, it is imperative that the EIS transparently demonstrate the validity of the modeling it purports to present. At this point there is not enough information in the DEIS for experts to be able to understand what is being presented, this undercuts the purpose of environmental review because neither decision makers nor the public can be confident of the results proffered.</p>	<p>The rupture analysis performed for the EIS by Allied uses CANARY software developed by Quest Consultants. CANARY uses publicly available equations. These equations along with a discussion of how they are applied are in the CANARY User Guide.</p> <p>Critical factors were accounted for in the Aerial and Thermal Dispersion Analysis Report and the CFD Analysis Report dated January 15, 2024 (Appendix G of the EIS). CURE filed Information Request No. 2 on February 15, 2024, after Dr. Gorman's testimony was filed on February 13, 2024. The Minnesota Department of Commerce, Energy Environmental Review and Analysis Unit provided a response on February 28, 2024, which is attached to this comment matrix (Appendix O). In the February 28, 2024, response, the Minnesota Department of Commerce and Allied responded to further questions about "critical factors" in questions 3-6, 8, 9, 13, 14, 16, and 17 of the CURE IR 002 EERA.</p> <p>The CFD Analysis Report in Appendix G explains how Allied validated the CANARY model against the CFD modeling. This is not the approach Dr. Gorman explained he would take, but it is a valid way to vet a model. Allied has provided additional information about the verification and validation of CANARY in Appendix C to the Aerial and Thermal Dispersion Analysis Report (Appendix G of the EIS).</p>	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p><i>V. The DEIS Inaccurately Describes the Role of PHMSA and the Commission in Regulating the Project</i></p> <p>The DEIS makes a number of errors in describing the potential human health impacts of a leak or rupture. This starts with the incorrect summary about the role PHMSA plays in regulating CO₂ pipelines included in both Chapter 8 and Appendix G. PHMSA is the federal agency tasked with regulating “the safe and secure movement of hazardous materials to industry and consumers by all modes of transportation, including pipelines.” PHMSA does not issue permits to individual operators to transport hazardous materials, though it does issue permits when an operator seeks a variance to the standard Hazardous Materials Rules. Instead, PHMSA sets standard regulations for various elements of pipeline construction and operation—most of which explicitly reference industry-established standards.</p> <p>PHMSA did not regulate CO₂ transported via pipeline until 1991, following a 1988 Congressional directive that was prompted by concerns over a massive natural carbon dioxide release in Lake Nyos, Cameroon in 1986. Ultimately, PHMSA decided not to set standards specifically applicable to supercritical CO₂, because there were so few CO₂ pipelines in existence at the time, and those that</p>	<p>Thank you for your comment. PHMSA regulations (that is, their appropriateness) and related standards for CO₂ pipelines are outside the scope of the EIS (Appendix A). Section 3.6 acknowledges that PHMSA is currently conducting rulemaking proceedings on proposed amendments to its pipeline safety rules, and the Commission states it would be prudent for EERA staff and the applicant to take that information into account, even if the updates have not been finalized. Appendix G of the EIS further summarizes the extensive and detailed PHMSA CO₂ pipeline regulations applicable to the construction, operation, and maintenance of such pipelines, and the status of pending PHMSA changes to such (see draft EIS, Appendix G.2 and G.3).</p>	20242-203795-01

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			were in operation were almost exclusively used for enhanced oil recovery. The limits of PHMSA’s rulemaking are now more apparent than ever, as more and more companies line up to put CO ₂ pipelines in the ground across the country. A 2022 report from the Pipeline Safety Trust explains these various gaps in regulation and why they are important to resolve before permitting the thousands of miles of CO ₂ pipelines currently proposed. Most important for this discussion is the fact that “current federal pipeline safety regulations do not provide any methodology for assessing the hazard zone for CO ₂ pipelines or require that pipeline operators adequately address this risk.”	EERA staff has been following PHMSA CO ₂ pipeline rulemaking proceedings before and since issuance of the draft EIS. As of July 5th, 2024, PHMSA has not published the Notice of Proposed Rulemaking that will describe the scope of new and amended regulations, and changes to existing rules and regulations are not known. Therefore, as ordered by the Commission, it is not possible for the EIS to include a “discussion of mitigation strategies and measures to ensure public safety including, but not limited to, measures consistent with the proposed and final federal rules to the extent available” (Commission. September 26, 2023. Order Approving Scope of Environmental Review and Denying Stay. eDockets No. 20239-199149-01). Section 3.6 and Appendix G of the EIS have been updated with the above information.	
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>There is also uncertainty about whether PHMSA’s regulatory authority extends to all CO₂ pipelines. PHMSA’s current definition of “carbon dioxide” does not include pipelines transporting CO₂ in liquid or gaseous phases, or streams that contain less than 90% CO₂. Here, the applicant has stated that the pressure and temperature of the pipe will be between 30 and 115 degrees Fahrenheit. The supercritical point for CO₂, or the pressure and temperature at which it enters a supercritical phase, is 88 F and 1070 pounds per square inch (psi). At temperatures below the supercritical point, “part of the fluid will condense to liquid with a higher density than the fluid.” And if pressure drops below 1070 psi, “part of the CO₂ will convert to a gas/liquid mixture depending on the temperature.” Based on the applicant’s provided information, the CO₂ in its pipeline may vary between a supercritical state and some combination of a liquid or gaseous state. Thus, it is unclear whether PHMSA regulations even apply to the applicant’s pipeline. But more importantly, because PHMSA regulations are designed with only supercritical CO₂ in mind, it is unclear whether the regulations are adequately protective in instances where CO₂ is not consistently held in a supercritical phase in the pipeline. The final EIS must acknowledge and discuss this discrepancy and what it might mean for the health and safety of those living along or near the applicant’s pipeline. The final EIS must clearly identify which Code of Federal Regulations provisions it relies upon if it is in fact asserting that this project will be covered by relevant PHMSA regulations. If EERA cannot cite any relevant law that would apply standards to a pipeline carrying liquid or gaseous CO₂, the environmental review should explain this and discuss the potential impacts of routing a liquid/gaseous CO₂ pipeline that is built without applicable federal standards.</p> <p>It is also worth noting that when announcing its intent to update its regulations, PHMSA specifically identified a need to update its emergency preparedness and response standards. To the extent that the DEIS assumes there are federal standards for emergency response, it should discuss how the lack of current standards will impact public safety in the pendency of PHMSA’s regulatory updates. Appendix G and the DEIS do correctly note that while PHMSA is in the process of updating its CO₂ pipeline regulations, those rules will likely not be complete for some time. And there are no assurances from the applicant, nor any condition proposed in the DEIS that construction on the project—if permitted—should not begin until PHMSA has completed its rulemaking. Given the gaps that currently exist in PHMSA’s regulation, it is unconscionable to consider permitting the proposed project and subject people, places, and environments in the vicinity of the project to the potentially life-threatening impacts of a CO₂ pipeline.</p>	<p>Thank you for your comment. The appropriateness and adequacy of PHMSA regulations and related standards for CO₂ pipelines is outside the scope of the EIS ordered by the Commission. (Appendix A).</p> <p>To EERA staff’s understanding, PHMSA’s regulatory authority extends to the project. PHMSA defines carbon dioxide as a <i>fluid</i> consisting of more than 90 percent carbon dioxide molecules compressed to a supercritical state (see 49 CFR Part 195.2) (emphasis added). The Applicant’s Route Permit Application (RPA) includes a description of the proposed project design specifications and operating parameters (see Table 2, Page 8, of the RPA) indicating an operating pressure of 1,200 pounds per square inch gauge (psig) to 2,150 psig (which is above the 1,070 psi [or 1,084.7 psig converted relative to atmosphere] noted by the comment, below which “part of the CO₂ will convert to a gas/liquid mixture depending on the temperature”) and an operating temperature of 115 to 30 degrees Fahrenheit. Section 3.2.1 of the RPA describes the proposed capture facility and how it would operate (see Page 10 of the RPA). The feed gas (emissions from the ethanol plant’s fermentation process) would be cooled, compressed, and dehydrated until it reaches a dense phase or supercritical state prior to entering the pipeline to allow the product to be transported more efficiently, with less energy, and in a smaller pipe relative to gas phase transportation. Since the CO₂ would enter the proposed pipeline in a supercritical state, it would meet the PHMSA definition of “carbon dioxide” and thus would be subject to PHMSA regulations.</p> <p>The Applicant indicates the proposed project will meet or exceed state and federal safety requirements and will be designed in accordance with 49 CFR Part 195, because the pipeline will be an interstate pipeline project (see Section 4.6, Page 25, of the RPA). The Applicant also states that operations and maintenance programs and integrity management programs (IMP) developed under 49 CFR Part 195 Subpart F (and associated Appendix C) will also be performed (see Section 4, Page 18, of the RPA).</p> <p>In Section 4.6.2 of the RPA, the Applicant states the project will comply with emergency response requirements set forth in 49 CFR Part 195.401(e) and included a draft Emergency Response Plan (ERP) with the</p>	20242-203795-01

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				RPA that would be finalized prior to placing the project in service (see Section 4.6.2, Page 26, and Appendix 6, of the RPA).	
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p>Finally, the DEIS incorrectly states that “EERA staff reiterates that the Commission cannot set safety standards.” While it is true that certain elements of pipeline safety are the exclusive jurisdiction of PHMSA—see the discussion above—the DEIS makes an improper and erroneous leap to conclude that the Commission is unable to consider and act upon any safety concerns related to the project. PHMSA itself has explicitly responded to this federal preemption issue in letters to the applicant and other pipeline companies, saying: <i>"PHMSA cannot prescribe the location or routing of a pipeline and cannot prohibit the construction of non-pipeline buildings in proximity to a pipeline. Local governments have traditional exercised broad powers to regulate land use, including setback distances and property development that includes development in the vicinity of pipelines. Nothing in the federal pipeline safety law impinges on these traditional prerogatives of local—or state—government."</i></p> <p>Minnesota statutes indicate that this kind of regulatory authority rests solely with the Commission:</p> <p>The issuances of a pipeline routing permit under this section and subsequent purchase and use of the route locations is the only site approval required to be obtained by the person owning or constructing the pipeline. The pipeline routing permit supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local, and special purpose governments.</p> <p>Therefore, the Commission—and only the Commission—has the authority to not only consider health and safety when routing a pipeline, but to also establish safety requirements or conditions for that pipeline, so long as the issue being regulated is not preempted by federal law. The final EIS must accurately reflect this relationship between the Commission and PHMSA in addressing the health and safety impacts of CO₂ pipelines and consider mitigative measures to ensure public safety, including setbacks and depth-of-cover. For these reasons it is inaccurate for the DEIS to say that state and local regulators cannot set safety standards, and the EIS should be amended to more accurately state the limited preemption that was clarified by PHMSA as stated above.</p>	<p>Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements. Section 3.4 of the EIS has been revised with this information.</p> <p>The appropriateness of PHMSA regulations and related standards for CO₂ pipelines is outside the scope of the EIS (Appendix A).</p> <p>In PHMSA’s letter to CO₂ pipeline companies (dated September 15, 2023), which is referenced in the comment, it states: “Congress vested PHMSA with authority to regulate the design, construction, operation, and maintenance of pipeline systems, including carbon dioxide pipelines, and to protect life, property, and the environment from hazards associated with pipeline operations.” The letter also stated that Congress determined pipeline safety is best promoted through PHMSA’s development of nationwide safety standards; PHMSA has promulgated comprehensive safety regulations at 49 CFR Parts 190-199, as summarized in the draft EIS (see Chapter 8 and Appendix G). In the September 2023 letter, PHMSA also clarifies that federal safety standards apply to both interstate and intrastate pipeline facilities, only PHMSA can regulate the safety of interstate pipelines, and federal pipeline safety laws expressly prohibit states from enacting or enforcing pipeline safety standards with respect to interstate pipelines (except one-call notification program regulations).</p>	20242-203795-01
CURE	Sarah Mooradian, Hudson Kingston	2024-02-23	<p><i>VI. The No Action Alternative is Preferable</i></p> <p>Although several issues need to be resolved before the final EIS, CURE does note that at this point, the No Action Alternative would have fewer negative impacts than any of the proposed alternatives and would create significant benefits. First, by not building the project, the state retains acres of wetlands, agricultural land, and native plant communities. As explained above, wetlands offer essential ecosystem and climate change benefits and once degraded, are extremely difficult to regain. Second, by not building the project, additional burdens on the local water supply will not be realized. Third, the No Action Alternative will ensure that there will be no project-related decreases in soil health or crop productivity/yield.</p> <p>None of the alternatives can stack up to the No Action Alternative, but even amongst the losers, RA-South seems to be an exceptionally poor choice. It crosses the greatest number of public and designated land, crosses the greatest number of wetlands and the second greatest number of surface waters, uses the least amount of existing ROW or ROW sharing and paralleling, and is located within one mile of 76 wells (as opposed to 56 wells and 42 wells for RA-North and RA-Hybrid, respectively).</p>	<p>Thank you for your comment.</p>	20242-203795-01
CURE	Secchi, Silvia	2024-02-13	<p>Q. What is the purpose of your testimony in this proceeding?</p> <p>A. My testimony provides a review of the socioeconomic, soil, and climate change impacts of the proposed project as presented in the Draft Environmental Impact Statement (DEIS).</p> <p>Q. Please summarize your conclusions.</p> <p>A. My overall conclusion is that the DEIS takes the project’s socioeconomic impacts directly from the applicant’s economic impact study. The study itself has a disclaimer that it should not be used for this purpose, and these types of studies are well known to overestimate benefits of pipeline projects. The soil impacts in the DEIS do not consider recent evidence from Iowa and Ohio that find</p>	<p>Section 5.4.11.2 has been revised to clarify that the conclusions in the EIS are not based on the conclusions of the Ernst and Young study prepared for the Midwest Carbon Express project. Information from the Ernst and Young study, as well as another study on the socioeconomic impacts of the Midwest Carbon Express project that was prepared by North Star Policy Action, is presented in Section 5.4.11.2. Information from these studies is presented but was not used to determine impacts.</p>	20242-203381-05

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			longer-term negative effects. The DEIS also does not consider recent compelling evidence that disputes and puts in question the climate change benefits of corn ethanol. As a result, the DEIS presents an unreasonably favorable picture of the impacts of the project.		
CURE	Secchi, Silvia	2024-02-13	<p>Q. What does the DEIS conclude about the proposed project’s potential impact on property values?</p> <p>A. The DEIS states that: “Although no studies related to the impacts of CO₂ pipelines on property values have been identified, there are several studies that assess the effects of natural gas pipelines and compressor stations on property values. While research demonstrates that property value impacts vary, most studies indicate that the presence of an underground natural gas transmission pipeline does not affect the sales price or value of residential properties.” (Page 5-40).</p> <p>Q. Do you agree with this conclusion?</p> <p>A. No. The most recent study presented in Table 5-11 in the DEIS is from 2016. But a more recent study has found that the proximity to facilities that can cause accidental chemical releases is associated with significantly lower home values. (1) It is important to note that this is regardless of whether incidents have occurred. The property value reduction is associated with the risk of an accident.</p> <p>(1) Guignet, Dennis, Robin R. Jenkins, James Belke, and Henry Mason. 2023. "The property value impacts of industrial chemical accidents." <i>Journal of Environmental Economics and Management</i> 120:102839. doi: https://doi.org/10.1016/j.jeem.2023.102839.</p>	A new section on property value impacts related to pipeline incidents has been added to Chapter 8. EERA staff does not agree with the relevance of the Guignet et al. study, as described in Section 8.3.1.3.	20242-203381-05
CURE	Secchi, Silvia	2024-02-13	<p>Q. In the study, were lower home values seen only after an incident had occurred?</p> <p>A. No. Home values were lower regardless of whether incidents occurred.</p> <p>Q. Why is that?</p> <p>A. The property value reduction is associated with the risk of an accident. Another recent study found that learning about the location of a pipeline negatively impacts a homebuyer’s willingness to pay for a house. (2) So the general conclusion of these more recent studies is that when the public is alerted to presence of pipelines and the risk associated with them, before incidents or through incidents, the values of impacted properties decreases.</p> <p>Q. What about pipeline incidents, do they also reduce property values?</p> <p>A. Most likely yes, because they inform the public about the risk associated with pipelines. A recent paper based on a national dataset that includes 864 incidents and 17 million house sales, comparing pre- and post-incident transactions, finds that the value of homes within 1 kilometer (km) decline by 4–6% compared to a control group of houses 1–2 km from an explosion. (3)</p> <p>Q. Were these differences short-term?</p> <p>A. No. Those conducting the study found that price divergence persisted for almost two years. And the risk of accidents is, of course, a permanent one, for as long as the pipeline is in operation. The risk of accidents is a separate issue from the negative effects of pipelines post-operations, which should also be considered.</p> <p>(2) Hilterbrand Jr, Charles M. 2020. "The Potential Impact Radius of a Natural Gas Transmission Line and Real Estate Valuations: A Behavioral Analysis." <i>Muma Business Review</i> 4:087-089.</p> <p>(3) Cheng, Nieyan, Minghao Li, Pengfei Liu, Qianfeng Luo, Chuan Tang, and Wendong Zhang. 2022. <i>Pipeline Incidents and Property Values: A Nationwide Hedonic Analysis</i>. SSRN.</p>	A new section on property value impacts related to pipeline incidents has been added to Chapter 8.	20242-203381-05
CURE	Secchi, Silvia	2024-02-13	<p>Q. What does the DEIS conclude about the potential socioeconomic impacts of the proposed project?</p> <p>A. The DEIS concludes that, based on a report commissioned by the applicant in 2022, the project’s total capital expenditures would be \$39,193,000 in Otter Tail County and \$42,631,000 in Wilkin County. The DEIS also states that the purchase of goods and services across the project footprint during construction would have “moderate short-term and negligible to minimal long-term beneficial impact on the local economy.” (Page 5-60). Finally, the DEIS concludes that the project would increase tax revenues in the short- and long-term, estimated to be \$894,000 in Otter Tail County and \$972,000 in Wilkin County during the first year of operation, resulting in minimal beneficial impacts on the counties.</p> <p>Q. Do you agree?</p> <p>A. I agree with the general conclusions that project would have negligible to minimal long-term beneficial impact on the local economy. I do not agree that is it appropriate to use the specific numbers of the applicant’s economic impact study in the DEIS.</p> <p>Q. Can you explain why you disagree with this conclusion?</p> <p>A. There is robust literature that shows that these applicant reports are rhetorical devices that use inappropriate methods. According to Professor Crompton at Texas A&M University, for example, these studies use “mischievous procedures that produce large numbers that study sponsors seek to support a predetermined position” coupled with “explicit and extensive qualifying statements”, with the</p>	Section 5.4.11.2 has been revised to clarify that the conclusions in the EIS are not based on the conclusions of the Ernst and Young study prepared for the Midwest Carbon Express project. Information from the Ernst and Young study, as well as another study on the socioeconomic impacts of the Midwest Carbon Express project that was prepared by North Star Policy Action, is presented in Section 5.4.11.2. Information from these studies is presented but was not used to determine impacts.	20242-203381-05

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			intent to buy “the aura of respect and integrity that accompanies the consultant’s name, anticipating that this will enhance the credibility and public and political acceptance of the results and quell any questioning of the procedures used.” (4) These studies of course only look at benefits and do not consider costs at all, and particularly opportunity costs, including alternative uses of the public funds the projects depend on. (5) It is inappropriate to use the applicant’s reported numbers without independent verification or vetting. (4) Crompton, John L. 2006. "Economic Impact Studies: Instruments for Political Shenanigans?" <i>Journal of Travel Research</i> 45 (1):67-82. doi: 10.1177/0047287506288870. (5) Crompton, John L, and Dennis R Howard. 2013. "Costs: The rest of the economic impact story." <i>Journal of Sport Management</i> 27 (5):379-392.		
CURE	Secchi, Silvia	2024-02-13	Q. Why is independent verification important? A. When independent experts perform rigorous analysis of the economic impacts of this type of project, the estimates of benefits are much lower. In the case of Keystone XL, for example, where the State Department performed a separate assessment, their job estimates “were nearly two-thirds lower than the first Keystone XL study”, as observed by my esteemed colleague Dave Swenson. (6) Q. Did independent experts verify the conclusions from the report referenced in the DEIS? A. No. Q. Is the applicant’s economic report reliable and sufficient evidence to support the economic cost and benefit of this project? A. No, by its very terms the report cannot be used as a full economic analysis. The report referenced included a specific disclaimer that read: “The report is intended solely for use by Summit Carbon Solutions. [...] we make no representation as to the sufficiency of the report and our work for any other purposes. Any third parties reading the report should be aware that the report is subject to limitations, and the scope of the report was not designed for use or reliance by third parties for investment purposes or any other purpose. We assume no duty, obligation, or responsibility whatsoever to any third parties that may obtain access to the report.” (7) Q. What are specific concerns regarding these studies that the public should be aware of? A. These studies depend largely on information provided by the applicant, which the consultant uses, assuming they are correct. This can be a problem in terms of job numbers, job characteristics and duration, purchases of materials and other project-specific information that is critical to the accuracy of the study. These studies also do not consider alternative uses of the public funding that the project will receive. (7) Ernst & Young, <i>Economic Contributions of Summit Carbon Solutions</i> , 1, https://summitcarbonsolutions.com/wpcontent/uploads/2022/04/Full-Report.pdf (Apr. 2022).	Thank you for your comment.	20242-203381-05
CURE	Secchi, Silvia	2024-02-13	Q. Does pipeline construction impact soil productivity? A. Yes. Q. How do you know this? A. Recent independent research—some of it from Iowa following the deployment of the Dakota Access pipeline—show that impacts can be long term. One such review study, attached here as Schedule SS-2, concludes that “from our quantitative synthesis that pipeline installation typically results in degraded soil and vegetation resources, and this can persist for many years following installation.” (8) The same authors last year found that soil degradation persisted 5 years after the installation of pipelines. (9) This study is attached as Schedule SS-3. The scientific evidence shows that the long-term impacts on soils—particularly if there is tile drainage— should not be discounted. Q. How does tile drainage relate to the potential impacts of the project on soil productivity? A. Tile drainage is important to keep soils dry so the crops can grow. In Otter Tail County, there are over 53,000 acres of land under tile drainage, and 34,000 in Wilkin County. If the pipeline impacts areas of tile drainage, the effects could be long-lasting and expensive for farmers to address. Such negative impacts to soils may also not be immediately apparent, and it might be difficult for the farmers to find recourse if the effects do not manifest soon enough to alert landowners and give them time to respond. (8) Brehm, Theresa, and Steve Culman. 2022. "Pipeline installation effects on soils and plants: A review and quantitative synthesis." <i>Agrosystems, Geosciences & Environment</i> 5 (4):e20312. doi: https://doi.org/10.1002/agg2.20312 . (9) Brehm, Theresa, and Steve Culman. 2023. "Soil degradation and crop yield declines persist 5 years after pipeline installations." <i>Soil Science Society of America Journal</i> 87 (2):350-364.	As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term. Section 2.4.6 states that any drain tiles damaged during pipeline construction would be repaired before backfilling the trench. Section 6.7 of the applicant's Minnesota APP (Appendix E) specifies the procedures and timelines for repair of drain tiles disturbed during construction. The APP notes that tiles disturbed or damaged by pipeline construction would be repaired to their original or better condition, and in accordance with the applicant's Minnesota ECP (Appendix D), permanent repairs would be completed within 21 days after the pipeline is installed. Section 5.5.1.3 has been revised to include a reference to this mitigation measure. Timeframes associated with landowner easement agreements are outside the scope of the EIS.	20242-203381-05

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CURE	Secchi, Silvia	2024-02-13	<p>Q. Will the proposed project have a significant effect on greenhouse gas (GHG) emission reductions?</p> <p>A. Based on available information it is too speculative to conclude the project will have any significant effect on GHG emission reductions.</p> <p>Q. Why are you unable to determine that?</p> <p>A. There is no guarantee that the applicant—or subsequent buyers of the carbon dioxide the company captures and transports—will permanently sequester the captured carbon dioxide (CO₂) in geologic storage.</p> <p>Q. How else might the captured CO₂ be used or disposed of?</p> <p>A. The applicant could sell some of the captured CO₂ for enhanced oil recovery (EOR) at any point after the pipeline would become operational.</p> <p>Q. What is EOR?</p> <p>A. Enhanced oil recovery, or EOR, is a process that allows for the recovery of additional oil from a depleted oil well. CO₂ is injected into a depleted well, where it is miscible, or able to mix in all proportions, with the trapped oil. When the oil and CO₂ are miscible, the physical forces holding them apart disappear, enabling the CO₂ to displace the oil from the reservoir and pushing the oil to a producing well. The oil would not otherwise be obtainable if it were not for the CO₂ being injected.</p>	Section 5.7.2.3 addresses the possibility that the captured CO ₂ transported by the project could be used for EOR.	20242-203381-05
CURE	Secchi, Silvia	2024-02-13	<p>Q. Why would the applicant or others use the captured CO₂ for EOR?</p> <p>A. The federal government has created tax credits, most often referred to as “45Q” credits after their section of the tax code, for all kinds of carbon capture, transportation, and sequestration activities. Both EOR and geologic sequestration are eligible for 45Q credits, with EOR’s credit being less generous but accompanying the extra income from potential oil sales. The differential in 45Q credits makes it plausible that, for high enough oil prices, EOR would be a more profitable use of the CO₂ than permanent sequestration.</p> <p>Q. Has this historically been the case with 45Q tax credits for geologic storage or EOR?</p> <p>A. Yes. Existing incentives for carbon sequestration and EOR largely led to CO₂ to be used for EOR and very little has historically been sent to geologic sequestration that does not produce oil.</p>	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20242-203381-05
CURE	Secchi, Silvia	2024-02-13	<p>Q. How would the CO₂ being used for EOR influence the GHG emission reductions impact described in the DEIS?</p> <p>A. Because the potential for the CO₂ in this project to be used for EOR, and because EOR directly relates to oil production—and specifically of oil that would have otherwise been unavailable— it is reasonable to conclude that the potential GHG emission reductions are much lower than reported in the DEIS. Worse, in some circumstances, there may even be a net GHG emission increase from CO₂ used in EOR activities.</p> <p>Q. How do GHG emissions relate to the carbon intensity score of ethanol?</p> <p>A. As the DEIS states, the project’s purpose is to “capture CO₂ from the ethanol plant and transport it to the North Dakota border, enhancing the marketability of the ethanol produced at the ethanol plant.” (Page 1-1).</p> <p>Q. How does the carbon intensity score increase the marketability of ethanol?</p> <p>A. The marketability is enhanced because California is willing to pay a premium for ethanol that has lower GHG emissions, as measured by lower carbon intensity score. The lower the emissions as measured by the carbon intensity score, the higher the premium offered by California’s gasoline producers regulated by this system.</p> <p>Q. What is a carbon intensity score?</p> <p>A. A carbon intensity score is the metric used to measure the lifecycle GHG emissions of a fuel per unit of energy, from cradle to grave. So, in the case of ethanol, this includes emissions from farm level operations to production, distribution, and consumption.</p>	While the EIS addresses the possibility that the captured CO ₂ transported by the project could be used for EOR in Section 5.7.2.3, the applicant indicates the project as proposed would permanently sequester the CO ₂ underground. The CI score was determined accordingly.	20242-203381-05
CURE	Secchi, Silvia	2024-02-13	<p>Q. How was carbon intensity measured in the DEIS?</p> <p>A. The DEIS uses the Greenhouse gases, Regulated Emissions, and Energy use in Transportation, or GREET model to calculate the carbon intensity score of the ethanol produced by the Green Plains Ethanol facility in Otter Tail County.</p> <p>Q. Do you believe this is an accurate way to measure the carbon intensity of ethanol?</p> <p>A. No. Recent scientific evidence shows that the GREET model underestimates land use changes and therefore overestimates the benefits of corn ethanol. (10) In fact, the GHG emission impacts of corn ethanol are under such dispute that the Environmental Protection Agency Science Advisory Board is concerned about the continuation of the Renewable Fuel Standard. (11) In light of all these considerations, and the absence of these details about the questionable carbon intensity scoring in the DEIS, it is legitimate to</p>	Section 6.1.3 has been revised to discuss the debate between Lark et. al. and GREET model authors.	20242-203381-05

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			<p>be concerned that the DEIS is presenting a biased picture that overestimates the climate benefits of ethanol and the climate change mitigation potential of the pipelines.</p> <p>Q. Do you believe the proposed project will provide the socioeconomic and GHG emission reduction benefits as described in the DEIS?</p> <p>A. No. In my professional opinion, there is substantial uncertainty on both those categories of benefits, and the DEIS is presenting results from the upper end of those ranges. The public should be aware that both sets of benefits could be substantially lower, and that there are alternative uses of the 45Q subsidies that would negate any reductions in GHG emissions.</p> <p><i>(10) Lark, Tyler J., Nathan P. Hendricks, Aaron Smith, Nicholas Pates, Seth A. Spawn-Lee, Matthew Bougie, Eric G. Booth, Christopher J. Kucharik, and Holly K. Gibbs. 2022. "Environmental outcomes of the US Renewable Fuel Standard." Proceedings of the National Academy of Sciences 119 (9):e2101084119. doi: doi:10.1073/pnas.2101084119.</i></p> <p><i>(11) Science Advisory Board to the U.S. Environmental Protection Agency, Commentary on the Volume Requirements for 2023 and Beyond under the Renewable Fuel Standard Program (RIN 2060-AV14), EPA-SAB-23-008, Sept. 29, 2023.</i></p>		
CURE	Secchi, Silvia	2024-03-14	<p>Q. Do you have any concerns about how Mr. Powell characterized the potential long-term agricultural impacts of the proposed project?</p> <p>A. Yes. Mr. Powell states that “permanent impacts to agricultural land (including cropland/pasture/hay/range lands) are only anticipated at aboveground facility locations that will be fenced and removed from current use.” (Powell Direct, page 6). But as I stated in my direct testimony, new research about the impacts of pipeline construction on agricultural lands has shown that it can extend well beyond the two-to-three-year period for crop loss payments anticipated by the applicant. To reiterate what those studies concluded: “pipeline installation typically results in degraded soil and vegetation resources, and this can persist for many years following installation.” (See Schedule SS-2 attached to my direct testimony). Mr. Powell’s testimony mischaracterizes the potential long-term or even permanent impacts of the proposed project along the entire route, not just at aboveground facility locations.</p>	As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term.	20243-204360-05
CURE	Secchi, Silvia	2024-03-14	<p>Q. Will the applicant permanently store CO₂ captured from the Green Plains Ethanol Plant?</p> <p>A. Mr. Powell states in his direct testimony that the project “will capture and permanently store” CO₂ from the Green Plains Ethanol Plant. (Powell Direct, page 4). But this contradicts what Mr. Powell has said previously before the Iowa Utilities Board. In September 2023, Mr. Powell stated that “if another carrier decided to use – or ask us to transport CO₂ for another purpose, like enhanced oil recovery, then that’s a possibility.” (Attached as SS-4, Page 1628). Because of this, I cannot say with any certainty that any of the CO₂ captured at the Green Plains Ethanol Plant will be permanently sequestered instead of being used for enhanced oil recovery.</p>	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204360-05
CURE	Secchi, Silvia	2024-03-28	<p>Q. Mr. Powell explains in his rebuttal testimony how Summit worked with Ernst & Young to complete an economic impact analysis of its project. What is your response?</p> <p>A. I appreciate that Mr. Powell agrees with what I expressed in my direct testimony—that Summit provided Ernst & Young with the “key assumptions,” such as the job numbers, job characteristics and duration, and purchases of materials, among other data, to conduct the economic impact analysis. Helpfully, Mr. Powell also confirms that no independent party has verified either the conclusions in the Ernst & Young report or the assumptions that inform the report. Mr. Powell’s rebuttal testimony also does not respond to my comment regarding the disclaimer in the Ernst & Young report itself that “Any third parties reading the report should be aware that the report is subject to limitations, and the scope of the report was not designed for use or reliance by third parties for investment purposes or any other purpose.” (1)</p> <p><i>(1) Ernst & Young, Economic Contributions of Summit Carbon Solutions, 1, https://summitcarbonsolutions.com/wpcontent/uploads/2022/04/Full-Report.pdf (Apr. 2022).</i></p>	Section 5.4.11 has been revised to clarify that the conclusions in the EIS are not based on the conclusions of the Ernst and Young study prepared for the Midwest Carbon Express project. Information from the Ernst and Young study, as well as another study on the socioeconomic impacts of the Midwest Carbon Express project that was prepared by North Star Policy Action, is presented in Section 5.4.11. Information from these studies is presented but was not used to determine impacts.	20243-204752-05
CURE	Secchi, Silvia	2024-03-28	<p>Q. Do you agree with Mr. DeJoia’s critiques of the Brehm and Culman studies you referenced in your direct testimony?</p> <p>A. No. The Brehm and Culman studies are not the only ones which provide strong evidence that pipeline construction has long-term impacts on crop yields and soil productivity. (2) Also, although Mr. DeJoia seems to take issue with the metanalysis in Brehm and Culman (2022), that analysis shows that reduced soil production and/or crop yield due to pipeline construction is a widespread issue.</p> <p>Q. Mr. DeJoia notes that Summit’s Agricultural Protection Plan is similar to those used in other states. Does that reassure you with regard to the potential impacts to soil and crops?</p> <p>A. Not at all. In fact, it does the opposite. As the research I have referenced here and in my direct testimony shows, existing methods for mitigating damage to soils and crops have in many instances been unsuccessful. The fact that Summit’s APP is apparently no different than what has been previously done should, in my opinion, give people pause.</p>	As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term.	20243-204752-05

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			(2) See, e.g., Ebrahimi et al., <i>Measured and Modeled Maize and Soybean Growth and Water Use on Pipeline Disturbed Land, Soil and Tillage Research</i> , June 2022, https://www.sciencedirect.com/science/article/abs/pii/S0167198722000265?via%3Dihub .		
Fergus Falls Area Chamber of Commerce	Workman, Lisa	2024-02-21	<p>As the President of the Fergus Falls Chamber of Commerce, I am happy to support Summit Carbon Solutions’ proposed pipeline in Fergus Falls, Minnesota.</p> <p>The construction and operation of Summit’s proposed pipeline will stimulate our local economy.</p> <p>As heard at the public meetings in February, Summit plans to hire local workers during both the construction and operational phases of the project. These workers will in turn spend a portion of their incomes at other local businesses in our community.</p> <p>Once the pipeline is operational, economic benefits will continue to pour into Otter Tail County via property taxes, which will be paid by Summit. This new tax revenue can be used to improve infrastructure and fund projects in Otter Tail County.</p> <p>The proposed pipeline will also support the Green Plains ethanol plant and its employees in Fergus Falls. By capturing the emissions from the ethanol plant, Summit will open the low-carbon fuel market for Green Plains’ ethanol, ensuring the plant and its employees are secure for decades to come.</p> <p>Summit’s proposed pipeline will bring millions of dollars of economic revenue to the Fergus Falls area. I urge the Public Utilities Commission to approve application and I look forward to the pipeline becoming operational in Fergus Falls.</p>	Thank you for your comment.	20243-204403-01
Green Plains Inc.	Mogler, Devin	2024-02-09	Sections 7.1.1 and 7.1.2 suggest that stable or decreasing ethanol production would lead to farming practices changes including no-till, cover cropping and precision farming. To the contrary, if the carbon capture and storage (“CCS”) project was implemented, the carbon intensity (“CI”) of the facility would be lowered to a point where it would be in the best interest of the ethanol producer and farmer to lower CI of production practices to capture more value from low-carbon markets, e.g. if the CCS reduces the CI of the plant from 54 to 25, every marginal reduction in CI would have value, whereas in a scenario where CCS is not in place, the ethanol produced at the plant may not be able to participate in low carbon fuels markets, and there would be little or no monetary incentive to expand regenerative agricultural practices.	With the passage of the Inflation Reduction Act, and in particular the creation of the Clean Fuel Production Credit under section 45Z, biofuel producers are eligible for a tax credit of \$0.02 per gallon for every CI point below 50 kgCO ₂ e/MMBtu, up to \$1.00 per gallon. The basis for the CI score calculation under this program is the most recent Argonne GREET model, as measured in kilograms of CO ₂ e per Metric Million British Thermal Units, or MMBtu. The current estimated (2023) Argonne GREET CI score of the Otter Tail ethanol facility is 59 kgCO ₂ e/MMBTU (equivalent to 56 gCO ₂ e/MJ). The RFS requires that a renewable fuel (or conventional biofuel; typically refers to ethanol derived from corn starch) must meet a 20 percent lifecycle GHG reduction compared to a 2005 petroleum baseline. The 2005 EPA average gasoline baseline for CI is 93.08 gCO ₂ e/MJ. The current estimated (2023) Argonne GREET CI score of the Otter Tail ethanol facility is meeting this requirement at an estimated 40 percent reduction.	20243-204403-02
Green Plains Inc.	Mogler, Devin	2024-02-09	Sections 7.1.1 and 7.1.2 contend that local corn prices to farmers would not be impacted from losing the ethanol plant as a market for their grain, with the exception of freight costs to ship the crop elsewhere, and alternatively that expanded ethanol production would not impact local crop prices. This does not take into consideration the basis impact, a cursory review of which clearly demonstrates that ethanol production positively impacts local corn bids. This is also refuted in Section 7.2.2.1.	Section 7.1.1 has been revised to better communicate the impact of ethanol production on crop pricing.	20243-204403-02
Green Plains Inc.	Mogler, Devin	2024-02-09	Section 7.1.1 suggests that the ethanol plant would remain in operation and compete in standard fuel markets outside of LCFS markets if the project is not constructed, which is possible in the short run, but given macroeconomic trends towards lower-CI fuels, including expanded policies at the state, federal and international level, it is unreasonable to assume the facility would continue operating in perpetuity without reducing the CI of the ethanol.	Section 7.1.1 has been revised to better communicate uncertainty associated with the ethanol plant.	20243-204403-02
Green Plains Inc.	Mogler, Devin	2024-02-09	Section 7.2.2.1 rightfully points out the socioeconomic value of agricultural communities, and the benefits they have derived from increased ethanol production over the past two decades. The uplift to corn prices, the wealth creation in rural communities and the reduction in government farm program payments cannot be overstated.	Thank you for your comment.	20243-204403-02
Green Plains Inc.	Mogler, Devin	2024-02-09	Section 7.2.2.2 infers that land, including grasslands, wetlands and conservation reserve land, is being converted to crop land to produce corn for ethanol production. This is both inaccurate and misleading. According to the Renewable Fuels Standard (“RFS”) statute, corn produced on converted crop land is not eligible for producing ethanol. ² None of the corn we process into ethanol comes from land converted to cropland from forests, grasslands or wetlands, in compliance with the RFS. Land use change in the U.S. is almost entirely attributable to urban sprawl, not agriculture. While corn production in the U.S. has increased over the past 100 years,	Section 7.2.2.2 has been revised to convey that while cropland has been in decline for Otter Tail County and Wilkin County, an increase in ethanol production would likely result in either direct or indirect land use change toward an increase in cropland. CARB’s LCFS program includes the assumption that ethanol production generates an indirect land use	20243-204403-02

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			the amount of land used to grow corn has actually decreased over time. Scientific and agronomic advances, notably precision agriculture and better seed genetics have contributed to marked increases in yield per acre. These increased yields have been accompanied by reductions in chemical, fertilizer and water inputs for every kernel grown, including a 50% reduction in the amount of nitrogen application since the 1970s, and the EIS is silent on this point, but rather points to potential negative impacts of fertilizer use on water quality. The inferences around neonicotinoid impacts on bee populations have not been definitively proven.	change impact. Since this project is attempting to reduce the CI score of the ethanol plant, assumptions consistent with LCFS guidance were made.	
Green Plains Inc.	Mogler, Devin	2024-02-09	Section 7.2.2.2 goes on to attribute land use change to GHG emissions, which again, does not come from agriculture. The section rightfully points to a study highlighting how conservation reserve program enrollment actually increased in areas with ethanol production after the federal renewable fuels mandate went into effect	Thank you for your comment.	20243-204403-02
Green Plains Inc.	Mogler, Devin	2024-02-09	Section 7.2.3.1 rightfully points out the economic impact that ethanol plants have on rural communities’ tax bases, employment and overall economic activity.	Thank you for your comment.	20243-204403-02
Green Plains Inc.	Mogler, Devin	2024-02-09	Section 7.2.3.2 discusses risks of ethanol leaks and impacts that would have on soil and groundwater. These impacts are largely speculative and leaks from corrosion of storage tanks occur rarely if ever. This section also discusses water usage for ethanol production. Our Otter Tail facility has reduced water consumption by 33% from 2019 to 2023, and recently installed a controlled backwash system that returns water previously discharged back into the process, further improving water efficiency. This section points out that upstream and on-site emissions for corn ethanol production is higher than that of gasoline, but is silent on the impact of the fossil carbon that is released from the combustion of gasoline. The section rightfully points out the improvements made to plant efficiencies from 2005 to 2019, the improvements made in on farm practices, and the most recent science around land use change according to Argonne National Laboratories. The section mentions coal powered ethanol plants having higher emissions, and Green Plains Otter Tail does not utilize coal, nor do our other biorefineries. Recent investments to further improve the efficiency of our Otter Tail facility have led to a 23% reduction in Natural Gas usage and a 27% reduction in electrical consumption (2019-2023).	Thank you for your comment.	20243-204403-02
Green Plains Inc.	Mogler, Devin	2024-02-09	Section 7.2.4.2 rightfully points out that ethanol spills during transport are very rare, and that when they do occur, the nature of the product allows it to biodegrade rapidly in soil, and completely dissolve in water. The section contemplates ethanol transport in a vacuum, rather than comparing it to the environmental impacts of transporting the alternative – fossil fuels and refined fuels – which can be more harmful to ecosystems in the event of a spill.	Thank you for your comment.	20243-204403-02
Green Plains Inc.	Mogler, Devin	2024-02-09	Section 7.2.5.1 rightfully points out that when ethanol is added to petroleum gasoline, it reduces emissions of harmful and toxic pollutants including CO, NOx, PM, VOCs and CO ₂ .	Thank you for your comment.	20243-204403-02
Health Professionals for a Healthy Climate	Schuler, Kathleen	2024-02-23	I am writing today on behalf of Health Professionals for a Healthy Climate to comment on the Draft Environmental Impact Statement (DEIS) for the Otter Tail to Wilkin CO ₂ Pipeline Project in Otter Tail and Wilkin Counties (Docket Number: 22-422). Health Professionals for a Healthy Climate (HPHC) is a network of over 500 nurses, doctors, public health experts, and allied health professionals across the state of Minnesota, dedicated to inspiring and activating health professionals to address climate change through interprofessional education, clinical practice, and public advocacy	Thank you for your comment.	20243-204403-01
Health Professionals for a Healthy Climate	Schuler, Kathleen	2024-02-23	HPHC is very concerned that CO ₂ pipelines are a false climate solution and we do not support installing CO ₂ pipelines in the ground in Minnesota. The urgency of the climate crisis requires that we pursue the most cost-effective strategies to reduce greenhouse gasses (GHGs). Fossil-fuel caused air pollution is responsible for 350,000 premature deaths in the U.S. each year. The faster we get to a zero-carbon economy, the faster we clean up air pollution, which results in more lives saved. The Intergovernmental Panel on Climate Change (IPCC) states, “The continued installation of unabated fossil fuel infrastructure will ‘lock-in’ GHG emissions.” The IPCC has also analyzed the cost-effectiveness of carbon capture and storage (CCS) and found that the cost per ton of GHGs reduced (GHG reductions per Gt CO ₂ equivalent) is \$100-200 compared with a cost of close to zero for solar, wind, and natural carbon sequestration. ¹ CO ₂ pipelines are sold as a climate solution, when in reality new CO ₂ pipelines are new fossil fuel infrastructure needed for enhanced oil recovery (EOR).	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
Health Professionals for a	Schuler, Kathleen	2024-02-23	Specific to the Summit pipeline DEIS, we ask that the Public Utilities Commission and Department of Commerce consider the following serious issues with the draft EIS to ensure a robust environmental review to protect the interests of all Minnesotans, especially communities impacted by these pipelines, first responders, and health professionals. While we are concerned about the adverse	Thank you for your comment.	20243-204403-01

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Healthy Climate			impacts of this project on land, water, and local economies, we will limit our comments to two areas of public health interest: CO ₂ emissions and health and safety.		
Health Professionals for a Healthy Climate	Schuler, Kathleen	2024-02-23	A. The DEIS consistently fails to properly account for the real CO ₂ emissions and climate impacts of the project. 1.Lifetime of Project: The applicant states that the anticipated lifetime of this project is 25 years. This means at the end of its life, the project could stop capturing the CO ₂ from the ethanol plant. Unless the ethanol plant will also cease operations at that point in time, it will continue to emit CO ₂ unabated into the future.	Section 2.7 describes project decommissioning. If the ethanol plant continues to operate beyond the life of the proposed project, its CO ₂ emissions would not be captured.	20243-204403-01
Health Professionals for a Healthy Climate	Schuler, Kathleen	2024-02-23	2. 100% CO ₂ Capture Rate: Summit states that the capture facility “is designed to capture 100% of the CO ₂ produced by the ethanol plant.” There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party. Additionally, the DEIS should emphasize that any CO ₂ capture is solely associated with emissions from the ethanol fermentation process and provides zero reductions on the significant emissions from the facility’s electricity use.	Section 2.1 has been revised to clarify that the captured CO ₂ is produced by the ethanol plant as part of its fermentation process, that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and that commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.	20243-204403-01
Health Professionals for a Healthy Climate	Schuler, Kathleen	2024-02-23	3. Added CO ₂ from electricity use: Carbon capture technologies are highly energy intensive and will significantly increase the carbon emissions at the facility from electricity use. The DEIS uses the Midwest Reliability Organization West Region average to calculate these emissions, which is unnecessarily inaccurate given the availability of the actual emissions factor from Great River Energy.	The CI from electricity use has been updated to reflect the grid mix from LREC in Sections 5.7.1.3, 6.1.4, 6.3.2, and 6.3.3.4. LREC serves the ethanol plant and represents the most localized data source available for the electricity use. The emission factor calculated for LREC is 291.4 lb CO ₂ e/MWh. GHG emissions were calculated using the projected electricity consumption of 38,501,733 kWh per year, as modeled by Summit Carbon Solutions. Historically, from 2021 to 2023, the Green Plains Ethanol Plant used 3,171,885 kWh of electricity on average per month over the past 24 months. This equates to an average annual electricity use of 38,062,620 kWh.	20243-204403-01
Health Professionals for a Healthy Climate	Schuler, Kathleen	2024-02-23	4. CO ₂ Storage: The DEIS assumes 100% of captured CO ₂ is being permanently stored underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols that would ensure it.	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
Health Professionals for a Healthy Climate	Schuler, Kathleen	2024-02-23	5. Enhanced Oil Recovery: The DEIS fails to explain whether the applicant can sell any of its captured CO ₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. The DEIS incorrectly states that “Production of oil through EOR would not be dependent on the availability of CO ₂ produced by the ethanol plant.” This claim is contradicted by countless public statements from public officials in North Dakota and oil industry representatives.	The text questioned by the commenter in Section 5.7.2.3 was prefaced with the following: "if all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO ₂ , other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
Health Professionals for a Healthy Climate	Schuler, Kathleen	2024-02-23	B. We are concerned about the safety and health impacts of the Summit pipeline, including how this project will affect the health of workers in impacted communities. The DEIS consistently underplays the known and unknown risks of transporting large amounts of CO ₂ at high pressures through a pipeline. CO ₂ is a hazardous material in high concentrations and CO ₂ pipelines pose unique problems for first responders and healthcare providers. 1. CO ₂ Rupture Impact Zone: According to the analysis in the DEIS, the potential impact radius for levels of CO ₂ that would be “immediately dangerous to life or health” is 617 feet. This expands to 910 feet for lower concentrations that cause dizziness, drowsiness, severe muscle twitching, and unconsciousness within a few minutes. Although Summit indicates that it will take 25 minutes for the system to shut off the relevant valves in the event of “abnormal operation,” the DEIS does not mention any meaningful safety measures for a rupture and instead suggests that it is “reasonable” for Summit to simply supply indoor CO ₂ detectors for residences within 1,000 feet of the project. But the rupture report in Appendix G states that “a full rupture results in	Text in Section 4.5 on valve closure time has been corrected from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency	20243-204403-01

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			<p>impact distances too quickly for an early warning device, such as an oxygen detector, to be effective.” This pipeline should not be approved without a clear understanding of the risks to human health and meaningful measures to ensure the safety of people and animals in the area.</p> <p>2. First responders and health professionals: CO₂ pipelines pose unique problems for first responders and health care providers. Because CO₂ is colorless and odorless, both victims and first responders have no way of knowing what is causing the health problems. In addition, first responders require special equipment, including non-internal combustion engines, to respond to a CO₂ disaster. The DEIS does not consider the burdens this will put on local EMS and health providers in the case of a pipeline rupture or accident or an assessment of how they should be prepared to respond given the unique needs. The DEIS includes Summit’s September 2022 Emergency Response Plan (Appendix N). This plan is not only outdated but also unclear as to how local EMS and first responders will interact with the applicant in the event of a leak or rupture. Though the plan talks of multiple company personnel as playing roles in an emergency response, it ignores the fact that the applicant only plans on having one full-time employee at the capture facility. Local first responders deserve more clarity about how they will be expected to respond to an emergency situation and what the applicant will do to ensure they are adequately equipped and informed for such an event.</p> <p>3. Compliance with PHMSA Rules: The DEIS accepts Summit’s assurances that it will “comply with federal emergency response requirements,” but as noted in a Pipeline Safety Trust report and by the Pipeline Hazardous Material Safety Administration (PHMSA) itself, the current emergency response requirements are dangerously outdated.</p> <p>4. Setbacks: The DEIS states that the PUC “cannot set safety standards” for Summit’s proposed pipeline. PHMSA has expressly said in public letters to CO₂ pipeline companies like Summit that state and local authorities can exercise their powers to regulate land use—including setback distances—and that “nothing in the federal pipeline safety law impinges on these traditional prerogatives of local—or state—government.” The PUC must consider where the pipeline is placed and what is the safest option for Minnesotans, which means the PUC can and should determine what routing, setback, and depth requirements are necessary to adequately protect Minnesotans.</p> <p>Thank you for your careful consideration of these critical concerns with the draft EIS.</p>	Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	
Land Stewardship Project	Koehler, Amanda	2024-02-23	Land Stewardship Project concurs with the comments offered by CURE and MN Interfaith Power & Light.	Thank you for your comment.	20242-203795-01
LIUNA Minnesota & North Dakota	Pranis, Kevin	2024-02-23	LIUNA Minnesota & North Dakota (“LIUNA”) appreciates the opportunity to offer comments on the Draft Environmental Impact Assessment for a Routing Permit for a carbon dioxide (“CO ₂ ”) pipeline that Summit Carbon Solutions LLC (“Summit”) has proposed to build in Otter Tail and Wilkin County.	Thank you for your comment.	20242-203792-01
LIUNA Minnesota & North Dakota	Pranis, Kevin	2024-02-23	We want to begin by thanking the Department of Commerce Energy Environmental Review and Analysis (“EERA”) staff and consultants for producing a Draft Environmental Impact Statement (“DEIS”) that thoroughly reviews the potential impact of the project and proposed alternatives and mitigation measures. While the direct impacts of installing just over 28 miles of four-inch pipeline in Minnesota are quite minor, the DEIS also provides context for understanding how this piece of pipe segment fits into a larger strategy for avoiding greenhouse gas (“GHG”) emissions, as well as what local communities unfamiliar with carbon management infrastructure need to know about local risks and mitigation measures.	Thank you for your comment.	20242-203792-01
LIUNA Minnesota & North Dakota	Pranis, Kevin	2024-02-23	LIUNA members strongly support the development of carbon management technologies, and believe that pipeline infrastructure on the scale proposed by Summit will be necessary to achieve climate goals, and to underpin the long-term economic success of Minnesota businesses and communities. Leading experts and institutions focused on climate agree that successful deployment of carbon capture and sequestration technologies is essential to meet state, national and international climate goals. The International Energy Agency, for example, projects that 8.6 billion tons of annual emissions reductions are needed from carbon capture by 2050, while the Intergovernmental Panel on Climate Change estimates that the cost of reaching net-zero would be 140 percent higher without use of carbon capture.	Thank you for your comment.	20242-203792-01
LIUNA Minnesota	Pranis, Kevin	2024-02-23	While Minnesota and the nation as a whole have made substantial progress toward decarbonizing electric power generation and have identified paths forward, decarbonization of transportation remains a substantial challenge. The DEIS provides evidence that strongly supports the potential for the proposed project to reduce carbon emissions associated with production of ethanol, therefore lowering the carbon intensity of E10 and other ethanol-blend fuels. As Table 5-39 shows, the project is expected to safely capture and store	Thank you for your comment.	20242-203792-01

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& North Dakota			roughly 140,000 metric tons of carbon dioxide (“CO ₂ ”) on an annual basis with lifetime avoidance of nearly 3.5 million tons. These figures are net of CO ₂ -equivalent emissions associated with construction and operation of the proposed facilities.		
LIUNA Minnesota & North Dakota	Pranis, Kevin	2024-02-23	The DEIS considers a wide range of alternatives, including No Action, alternative routes and alternative technologies for reducing carbon emissions such as adoption of climate-friendly agricultural practices for feedstock and implementation of process efficiency and energy use changes at the ethanol plant. Unsurprisingly, EERA’s analysis finds none of the alternatives meet the need to avoid CO ₂ emissions without comparable impacts, and that proposed technologies could supplement, but do not replace, carbon capture, transportation and storage.	Thank you for your comment.	20242-203792-01
LIUNA Minnesota & North Dakota	Pranis, Kevin	2024-02-23	Beyond reviewing climate impacts, the DEIS also carefully evaluates the potential impact of the project on environmental resources and human health. The DEIS finds that the proposed facilities can be expected to operate well within the state’s limits for a wide range of air pollutants as depicted in Table 5-38.	Thank you for your comment.	20242-203792-01
LIUNA Minnesota & North Dakota	Pranis, Kevin	2024-02-23	EERA also conducted dispersion modeling in order to assess the potential impact of an unplanned release of CO ₂ . Using the worst case scenario, a full “guillotine rupture” resulting in an uncontrolled release and assuming the worst possible atmospheric conditions (“a temperature of -22°F and a humidity level of 74.3 percent”) the DEIS found that the outside range of immediate danger to life and health would be 617 feet, which is well short of the minimum distance between the pipeline and any inhabited dwellings. The DEIS further identifies regulatory requirements and best practices that minimize the likelihood and potential impact of an unplanned release, and shows that the incidence of any type of release is extremely low for hazardous liquids pipelines in Minnesota (0.0013 incidents per mile).	Thank you for your comment.	20242-203792-01
LIUNA Minnesota & North Dakota	Pranis, Kevin	2024-02-23	In addition to climate, other environmental and safety concerns, the DEIS also comprehensively considers socioeconomic impacts to local communities and to the state. Based on our industry experience, we generally agree with the DEIS characterization of construction employment opportunities that would be associated with the project – at least half of which would be available to local residents based on the applicant’s commitment to use of local union labor.	Thank you for your comment.	20242-203792-01
LIUNA Minnesota & North Dakota	Pranis, Kevin	2024-02-23	We also generally agree with the summary of economic benefits provided by the applicant. While a North Star Policy Action (“NSPA”) analysis found that the Ernst & Young (“E&Y”) report likely overestimates local workforce share compared to the levels common for such projects, NSPA also finds that “E&Y” understates the value of jobs by assuming wage levels below those typically earned by union pipeline construction workers and neglecting the economic value of fringe benefits entirely. 1 1 https://northstarpolicy.org/capturingthemoment/	Section 5.4.11.2 has been revised to clarify that the conclusions in the EIS are not based on the conclusions of the Ernst and Young study prepared for the Midwest Carbon Express project. Information from the Ernst and Young study, as well as another study on the socioeconomic impacts of the Midwest Carbon Express project that was prepared by North Star Policy Action, is presented in Section 5.4.11.2. Information from these studies is presented but was not used to determine impacts.	20242-203792-01
LIUNA Minnesota & North Dakota	Pranis, Kevin	2024-02-23	While generally accurate, we believe that the DEIS could be strengthened by addressing the role of the project in creating opportunities for local workers to improve their earnings, skills and career prospects. Today, the median construction laborer working in Northwest Minnesota earns \$22.36 in hourly wages and based on anecdotal information from worker surveys, many receive little or nothing in fringe benefits.2 By contrast, a construction laborer working on the proposed project would earn at least \$37.02 per hour in taxable wages with full family health coverage, defined benefit pension and training benefits that bring hourly compensation up to \$55.13. As a consequence, the typical construction laborer living in Otter Tail County who secures a new job on the project could conservatively be expected to double his or her hourly compensation while gaining they experience and training needed to secure similar family-supporting wages and benefits once the project is complete. 2 https://mn.gov/deed/data/data-tools/oes	Section 5.4.11.2 has been revised to clarify that the conclusions in the EIS are not based on the conclusions of the Ernst and Young study prepared for the Midwest Carbon Express project. Information from the Ernst and Young study, as well as another study on the socioeconomic impacts of the Midwest Carbon Express project that was prepared by North Star Policy Action, is presented in Section 5.4.11.2. Information from these studies is presented but was not used to determine impacts.	20242-203792-01
LIUNA Minnesota & North Dakota	Pranis, Kevin	2024-02-23	We thank EERA for their work on the DEIS and the Commission for its consideration.	Thank you for your comment.	20242-203792-01
Lower Sioux Indian	Larsen, Robert	2024-02-24	The Summit CO ₂ pipeline project's proposed route is within Dakota Homelands. Lower Sioux Indian Community is directly associated to many areas of cultural importance and/or religious significance identified within the project area. The proposed route is located within an archaeologically dense area with a high volume of known cultural resources and/or significant sites. These resources and sites had, and continue to have, a significant cultural and spiritual role in the identity of Mdewakanton Dakota practices and lifeways,	Thank you for your comment. Potential impacts on cultural and archaeological resources are discussed in Sections 5.4 and 5.6 of the EIS.	20243-204403-02

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Communit y			We request that meaningful and diligent evaluation of project need be carefully considered. Such sites and resources are irreplaceable.		
Lower Sioux Indian Communit y	Larsen, Robert	2024-02-24	The Dakota Peoples have a strong spiritual connection to the lands and waters within the ancestral territories of the Dakota. Protection of natural and cultural resources is critically impottant not only now but for seven generations. Therefore, projects that impact the Waters, Air, Lands, wildlife and plant life need a thorough assessment as not to contaminate or destroy the natural environment. Further projects involving relatively new technology are patticularly concerning and should be thoroughly researched to avoid issues or consequences. The Lower Sioux Indian Community provided a letter (dated 05-16-2023) to the Dept of Commerce with our concerns reading the scoping EAQ and the draft scoping decision for the route permit application for this project (see attachment). We continue to have concerns and questions upon our review of the DEIS.	Thank you for your comment.	20243-204403-02
Lower Sioux Indian Communit y	Larsen, Robert	2024-02-24	The purpose of DEIS is to provide an overview of affected resources and discuss potential human and environmental impact and mitigation measures. We have concerns that the proper review hasn't been accomplished and have identified gaps in the impacts and mitigation measures. The following are the concerns regarding the impact to Cultural resources, waters, safety, land, climate change and greenhouse gas emissions, and cumulative impacts.	See responses to detailed comments on each topic below.	20243-204403-02
Lower Sioux Indian Communit y	Larsen, Robert	2024-02-24	Tribes are tasked with evaluating impacts to known cultural resources and cultural sites without relevant case studies, scientific analysis, and precedent to guide informed determinations on CO ₂ pipeline impacts. To consider for example subsurface artifacts, human remains or any organic material and how exposure and interaction to CO ₂ would affect them, yet such studies are not available and even more detrimental are not being required in the EIS. The purpose of an EIS is to provide such studies and info1mation. The Summit Carbon Solution pipeline route is a large-scale project, with many complex variables to consider when evaluating cultural resource impact, it is unreasonable for THPO's to review such considerations when key infonnation is absent. The DEIS fails to address cumulative landscape impacts as well as exposure and interaction studies (as cited above).	Thank you for your comment. A study focused on the interaction of CO ₂ and subsurface artifacts, human remains, or any organic material is outside the scope of the EIS (Appendix A). Potential impacts on cultural resources are discussed in Section 5.4.2. Cumulative potential effects are discussed in Chapter 10.	20243-204403-02
Lower Sioux Indian Communit y	Larsen, Robert	2024-02-24	The proposed project and the identified right-of-way will impact numerous streams, rivers, wetlands, aquifers, and other waterbodies. This includes the Pelican River, the Otter Tail River, and the Bois de Sioux River, and up to 44.6 acres of wetlands. We are concerned that the DEIS did not take an in-depth look at how the proposed project will impact the health and abundance of these water resources. The DEIS describes the potential impact of construction activity within or near these waterbodies as being short-term and minimal. But we know from past experiences with other pipelines, like Line 3, that the pipeline construction can have long-term and widespread impacts on both surface water and groundwater resources.	Section 5.7.8 and Section 5.7.9 describe the impacts of the project on water resources and wetlands.	20243-204403-02
Lower Sioux Indian Communit y	Larsen, Robert	2024-02-24	Additional questions that were mentioned in our comments on the scoping (attachment) included the need to identify the amount of water usage that is needed, what will be added to the water, and where will the water be discharged? Further, how will this project impact the medicinal and cultural plants, fish, macroinvertebrates, mammals, macrophytes, human health, surface water quality, wetlands/connected waterbodies, groundwater, etc.? What is the cumulative impact of the project over the course of the route? These are vital questions about this proposed project that have not been sufficiently investigated. In the past, Lower Sioux staff have reviewed the EIS documents of pipeline and renewal energy projects that addressed these types of questions with specific research and studies. It is not evident in the DEIS that these questions were addressed. Merely stating the project will have minimal impact is not adequate for the NEPA EIS process.	Thank you for your comment. Section 2.4 discusses water discharge locations and processes, Section 3.7 discusses water use and discharge permits that would be acquired, Sections 5.4.4 and 5.7.8 discuss impacts on water and water usage, Section 5.7.7 addresses impacts on vegetation, Section 5.7.10 addresses impacts on wildlife and habitats, Section 5.7.9 addresses impacts on wetlands, Section 5.4 addresses impacts on human settlement, and Section 5.4.8 specifically addresses health and safety. Native Minnesota plants and wildlife of significance to Tribes are discussed in Section 5.4.2. The project would temporarily impact the habitats of plants and wildlife of Tribal significance during construction until restoration of disturbed areas is complete. Additional studies on these topics are outside the scope of the EIS. Section 8.3 addresses effects on humans, health, wildlife, and the environment from an accidental release of CO ₂ . Chapter 10 describes the cumulative impacts of the project.	20243-204403-02
Lower Sioux Indian Communit y	Larsen, Robert	2024-02-24	The technology used to capture carbon can also require significant amounts of water. The DEIS states that the average annual water usage for the capture equipment will be 13 million gallons, and that such water will come from on-site wells at the ethanol facility. There is no information in the DEIS about how the additional water use from the ethanol plant will impact surrounding wells or other water resources. Also the DEIS does not consider the water usage in context of the nearby Communities and the impacts from this	Section 5.7.8 addresses impacts on water resources. Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In	20243-204403-02

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			new water demand on the current, existing water demands of the aquifers that serve as the source water for these Communities. This is particularly a concern as we have seen recent drought conditions the past few years.	addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	
Lower Sioux Indian Community	Larsen, Robert	2024-02-24	Consideration must also be given to the impact on surface and groundwater in the event of a pipeline leak or rupture. It is necessary to state what will be the response to minimize and remediate after such an event.	Potential impacts of a pipeline rupture on water resources are addressed in Section 8.3.4.	20243-204403-02
Lower Sioux Indian Community	Larsen, Robert	2024-02-24	We remain concerned about the potential risks to human and environmental health in the event of a leak or a rupture. High concentrations of CO ₂ are hazardous and can sicken and asphyxiate humans and animals. The DEIS has also confirmed that vegetation and soil near a leak or rupture could be significantly impacted, from slowing plant growth to freezing soils and killing off vegetation, soil microbes, mycorrhizae, and soil animals.	Potential impacts on human health, vegetation, and soils are discussed in Sections 8.3.1.2 and 8.3.4.3.	20243-204403-02
Lower Sioux Indian Community	Larsen, Robert	2024-02-24	Appendix G provides some information about what the potential impact radius of a rupture might be, but overall, the DEIS does not adequately address how the applicant will be able to guarantee the safety of those living along or near the project. The Pipeline and Hazardous Material Safety administration (PHMSA) has issued public statements that their regulations are not adequate to address the safety risks associated with CO ₂ pipelines. CO ₂ pipelines need special considerations because when a pipeline leaks or a rupture occurs it will release an asphyxiant that can suffocate people and prevent combustion-type vehicles from working. The equipment and training needs for Emergency response personnel to respond to a pipeline incident needs to be thoroughly addressed and placed into practice prior to pipeline construction. All responders will need additional training and equipment to safely respond. This includes replacing all the gasoline/diesel vehicles with Electric Vehicles. In many rural areas the first responders/emergency response are often volunteers. Communities near the route of the pipeline should not have to bear the expense of specialized equipment needed for response to a new hazard brought to the area by a commercial entity.	Section 3.6 acknowledges that PHMSA is currently conducting rulemaking proceedings on proposed amendments to its pipeline safety rules, and that the Commission states it would be prudent for EERA staff and the applicant to take that information into account, even if the updates have not been finalized. PHMSA regulations (that is, their appropriateness) and related standards for CO ₂ pipelines are outside the scope of the EIS. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-02
Lower Sioux Indian Community	Larsen, Robert	2024-02-24	The impact of the proposed project to the land is not fully addressed and needs additional research. Studies on the long-term impacts of Line 3 pipeline on the land have shown that the environment does not always recover as promised after construction and other major disturbances, despite assurances from companies that impacts will be short-lived. The degradation and loss of habitats is noted as one of the main reasons native plants are lost. The sensitivity of native and medicinal plants to disruption that will occur during construction is a concern that needs to be studied further before the project occurs. Also the impact of a leak or rupture of the pipeline to sensitive plants needs to be defined and mitigation measures need to be proposed if this type of event happens.	Section 2.4 discusses water discharge locations and processes, Section 3.7 discusses water use and discharge permits that would be acquired, Sections 5.4.4 and 5.7.8 discuss impacts on water and water usage, Section 5.7.7 addresses impacts on vegetation, Section 5.7.10 addresses impacts on wildlife and habitats, Section 5.7.9 addresses impacts on wetlands, Section 5.4 addresses impacts on human settlement, and section 5.4.8 specifically addresses health and safety. Native Minnesota plants and wildlife of significance to Tribes are discussed in Section 5.4.2. The project would temporarily impact the habitats of plants and wildlife of Tribal significance during construction. Additional studies on these topics are outside the scope of the EIS. Chapter 8 addresses effects on	20243-204403-02

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				humans, health, wildlife, and the environment from an accidental release of CO ₂ . Chapter 10 describes the cumulative impacts of the project.	
Lower Sioux Indian Community	Larsen, Robert	2024-02-24	In the DEIS, it is assumed that the applicant will be able to capture and permanently sequester 100% of the CO ₂ from the ethanol facility, but there is no evidence to support that assumption. Without the evidence to support 100% sequestration, it is not possible to know what the actual GHG emission reductions (if any) might be.	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-02
Lower Sioux Indian Community	Larsen, Robert	2024-02-24	Further, it is not stated length of the life of this project. If a project is for 25 years or perhaps 50 years, does this simply move the issue of greenhouse gases down the road for the future generations to deal with?	Section 2.7 describes project decommissioning. As noted in Section 2.7, the life of the project is anticipated to be 25 years.	20243-204403-02
Lower Sioux Indian Community	Larsen, Robert	2024-02-24	<p>The purpose is to make ethanol a green fuel to sell more of it and make it a viable energy source. Summit Carbon Solutions' full proposal is an extensive project with a 239.64-mile footprint in Minnesota, connecting multiple ethanol plants. It aims to impact the State's agricultural and ethanol industry. It is critical that the environmental concerns be addressed now as there may be more permit applications and environmental reviews of this type in the future.</p> <p>The DEIS does not consider the potential environmental and human impacts of the entire Minnesota portion of the applicant's CO₂ pipeline project. Because of this, we do not know the true cumulative impacts of this entire project on the water, soil, air, health, vegetation, and animals. The DEIS should look at all 240+ miles of pipeline the applicant has publicly proposed.</p> <p>The cumulative impacts of the carbon pipeline are more than listed in the DEIS. For example, the fresh gallons of drinking water currently used for ethanol production is around 3-3.5 gallons in the more efficient ethanol plants. In the year 2021 15 billion gallons of ethanol were reportedly produced. Multiply that number by 3 to get a total of 45 billion gallons of fresh drinking water used to produce the ethanol. Additionally, it is necessary to factor in the amount of natural gas used to manufacture ethanol. The current most efficient ethanol plant is using 37,883 btu's of natural gas to manufacture one gallon of ethanol about the equivalent to one cubic meter of natural gas now multiply those times 15 billion.</p> <p>This is an unlikely source of green energy with all the inputs of natural resources and safety concerns with ethanol carbon capture technology. This should also be for the whole "Midwest Carbon Express" pipeline project as the project described in the current DEIS is merely a pipeline to the North Dakota border with no known end connection point.</p>	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS. The appropriateness of federal and state policies regarding carbon capture and ethanol is outside the scope of the EIS.	20243-204403-02
Lower Sioux Indian Community	Larsen, Robert	2024-02-24	Based on the broad-reaching implications of this project, we respectfully request that the Commission appropriately broaden the scope of the DEIS to the Minnesota footprint of the "Midwest Carbon Express" project rather than studying the northern and southern portions of the pipeline in separate reviews. The "Midwest Carbon Express" is Summit's full proposed project- a pipeline across five states, connecting 30 ethanol plants to an underground storage location in North Dakota. In Minnesota, Summit plans to construct approximately 240 miles of pipeline; approximately 212 miles of that pipeline will connect six ethanol plants in southern Minnesota ("Southern Branch"). The project in the DEIS is only the smaller 28.1-mile branch in Otter Tail and Wilkin Counties, that will connect one ethanol plant to the pipeline network ("Northern Branch"). This proposal meets the Minnesota Environmental Policy Act's ("MEPA") definition of a "phased action," and the rules allow the Commission to include the entire Minnesota footprint. By reviewing the entire Midwest carbon express project in one environmental review would allow the Commission to fully understand and evaluate the impact the Carbon pipeline could have on land use conversion, the ethanol industry, environmental impacts, emergency response needs, and climate change.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-02
Lower Sioux Indian Community	Larsen, Robert	2024-02-24	The Summit project aims to significantly impact our state's ethanol production industry. It would be impossible to clearly evaluate those potential impacts without looking at Summit's full Minnesota footprint and all the ethanol facilities contracted to connect to the pipeline. This type of project has the potential to induce further proliferation of carbon capture facilities across the state, as well as impact land use. And, ultimately, this DEIS is precedent-setting. It would be unwise to examine a 28.1-mile segment out of the context of the planned 240-mile Minnesota footprint.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-02

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			We strongly urge that the Commission re-evaluate and research further into the environmental impact of this new type of project by considering the impacts of the entire MN footprint of the Midwest Carbon Express pipeline including impacts to cultural and natural resources along the proposed route.		
Lower Sioux Indian Community	O'Brien, Joseph	2023-05-18	With this project, the Public Utilities Commission ("PUC" or "Commission") is in the position to review the first proposed carbon capture pipeline in the State. These types of projects are being proposed across the Midwest, by Summit Carbon Solutions ("Summit"), and by other companies who are seeking to complete similar projects. Summit's full proposal is extensive with a 239.64-mile footprint in Minnesota, connecting six ethanol plants. It aims to impact the State's agricultural and ethanol industry. It is critical that environmental concerns be addressed now as there may be more permit applications and environmental reviews of this type in the future.	Thank you for your comment.	20243-204403-02
Lower Sioux Indian Community	O'Brien, Joseph	2023-05-18	Based on the broad-reaching implications of this project, we respectfully request that the Commission appropriately broaden the scope of review to the Minnesota footprint of the "Midwest Carbon Express" project rather than studying the northern and southern portions of the pipeline in separate reviews. The "Midwest Carbon Express" is Summit's full proposal - a pipeline across five states, connecting 30 ethanol plants to an underground storage location in North Dakota. In Minnesota, Summit plans to construct approximately 240 miles of pipeline; approximately 212 miles of that pipeline will connect six ethanol plants in southern Minnesota ("Southern Branch"). Summit proposes to study only the smaller 28.1-mile branch in Otter Tail and Wilkin Counties, which will connect one ethanol plant to the pipeline network ("Northern Branch"). This proposal meets the Minnesota Environmental Policy Act's ("MEPA") definition of a "phased action," and the rules allow the Commission to include the entire Minnesota footprint. Not only would this process be more efficient than studying the segments in separate EISs, but it would also allow the Commission to fully understand and evaluate the impact this project could have on land use conversion, the ethanol industry, environmental impacts, emergency response needs, and climate change.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-02
Lower Sioux Indian Community	O'Brien, Joseph	2023-05-18	The Summit project aims to significantly impact our state's ethanol production industry. It would be impossible to clearly evaluate those potential impacts without looking at Summit's full Minnesota footprint and all the ethanol facilities contracted to connect to the pipeline. This type of project has the potential to induce further proliferation of carbon capture facilities across the state, as well as impact land use. And, ultimately, this EIS is precedent-setting. It would be unwise to examine a 28.1-mile segment out of the context of the planned 240-mile Minnesota footprint.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-02
Lower Sioux Indian Community	O'Brien, Joseph	2023-05-18	The Summit CO ₂ pipeline project's proposed route is within Dakota Homelands. The Dakota Peoples have a strong spiritual connection to the lands and waters within the ancestral territories of the Dakota. Protection of natural and cultural resources is critically important not only now but for seven generations. Therefore, projects that impact the Waters, Air, Lands, wild life and plant life need a thorough assessment as not to contaminate or destroy the natural environment. The questions that need to be addressed are many. For example, what amount of water usage is needed, what will be added to the water, and where will be the discharged? How will this impact medicinal and cultural plants, fish, macroinvertebrates, mammals, macrophytes, human health, surface water quality, wetlands/connected waterbodies, groundwater, etc.? What is the cumulative impact of the project over the course of the route? These are vital questions about this proposed project that have not been sufficiently investigated.	Thank you for your comment. Section 2.4 discusses water discharge locations and processes, Section 3.7 discusses water use and discharge permits that would be acquired, Sections 5.4.4 and 5.7.8 discuss impacts on water and water usage, Section 5.7.7 addresses impacts on vegetation, Section 5.7.10 addresses impacts on wildlife and habitats, Section 5.7.9 addresses impacts on wetlands, Section 5.4 addresses impacts on human settlement, Section 5.4.2 addresses cultural resources, and Section 5.4.8 specifically addresses health and safety. Native Minnesota plants and wildlife of potential significance to Tribes are discussed in Section 5.4.2. Chapter 10 describes the cumulative impacts of the project. Applicable updates have been made to these chapters and sections in the EIS.	20243-204403-02
Lower Sioux Indian Community	O'Brien, Joseph	2023-05-18	Another concern is the safety risks associated with CO ₂ pipelines. The Pipeline and Hazardous Material Safety administration (PHMSA) has issued public statements that their regulations are not adequate to address the safety risks associated with CO ₂ pipelines. CO ₂ pipelines need special considerations because when a pipeline leaks or a rupture occurs it will release an asphyxiant that can suffocate people and prevent combustion-type vehicles from working. The equipment and training needs for Emergency response personnel to response to a pipeline incident needs to be thoroughly addressed and placed into practice prior to pipeline construction. All responders will need additional training and equipment to safely respond. This includes replacing all the gasoline/diesel vehicles with Electric Vehicles. In many rural areas the first responders/emergency response are often volunteers. Communities near the route of the pipeline should not have to bear the expense of specialized equipment needed for response to a new hazard brought to the area by a commercial entity.	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit	20243-204403-02

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				condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission.	
Lower Sioux Indian Community	O'Brien, Joseph	2023-05-18	In addition to broadening the scope of review, we request that the forthcoming Environmental Impact Statement ("EIS") contains a more accurate analysis of the expected climate impacts of the proposal. The EA W overestimates the carbon removal that can reasonably be expected from this project. Furthermore, the Draft Decision proposes to exclude any analysis of life-cycle emissions from ethanol. This is not only inconsistent with the purpose statement but will also inhibit Summit and the Commission from understanding the potential impacts of the project. And, finally, we ask the Commission to consider the ways in which the narrow purpose statement inhibits the Commission's ability to explore less harmful alternatives.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and that commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent. As directed by the scoping decision, the EIS reviews existing studies of the human and environmental impacts of ethanol production and provides a synthesized analysis of potential impacts on human and environmental resources. The CI score range presented in Chapter 6 includes potential emissions associated within the proposed project. Table 5-39 has been updated to provide a summary of GHG emissions from the initial construction as well as the proposed ongoing annual operations at capture facility, CO ₂ capture (abated), and electricity use. An alternative that does not include ethanol production was not studied in the EIS because it would not meet the purpose of the project.	20243-204403-02
Lower Sioux Indian Community	O'Brien, Joseph	2023-05-18	We strongly urge that the Commission consider the impacts of the entire MN footprint of the Midwest Carbon Express pipeline including impacts to cultural and natural resources along the proposed route. Thank you for the opportunity to comment on this issue. We hope the Commission will consider our above comments when determining the scope of the EIS.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-02
MCEA	Hencheck, Abigail	2024-03-26	<p>The new information outlined below is relevant to the FEIS because it demonstrates the high likelihood that the captured carbon will be used in EOR rather than being permanently sequestered. As MCEA outlined in its comments on the DEIS, if the CO₂ is used for EOR, the project could create more CO₂ than it captures,⁸ significantly affecting the potential environmental effects of the project. Because the information constitutes “substantial new information or new circumstances that significantly affect the potential environmental effects from the proposed project,”⁹ a supplemental EIS (“SEIS”) could be required under Minnesota Rule 4410.3000, subp. 3, if the information is not considered in the FEIS. By considering this information now, shortly after the comment period has closed and with considerable time before the FEIS is issued, EERA can eliminate the possibility of a costly and time-consuming SEIS process. This will help to keep the project on track with future deadlines and within budget proposals. Therefore, MCEA respectfully requests that the new information outlined below be added to the DEIS record and considered in preparing the FEIS. New Information Relevant to Summit’s Intent to Provide CO₂ for EOR.</p> <p>On March 11, 2024, Reuters published a news article¹⁰ regarding Summit’s “dual messages” regarding EOR, specifically in the Bakken. The article characterizes Summit’s public message as a pledge that its project won’t be used for EOR. However, the article goes on to describe its private message, saying “Summit has a different message for prospective clients...: If you want to use our project for [EOR]...just write a check.” More important than the article itself is the evidence that supports it. This evidence did not come to MCEA's attention until the article was released. This evidence highlights the increasing likelihood that Summit will use its CO₂ for EOR which would eviscerate the touted climate benefits of the project. The evidence referenced in the article is summarized below:</p> <ul style="list-style-type: none"> · On December 20, 2023, Summit attended an event put on by Friends of Ag and Energy. Friends of Ag and Energy is a North Dakota-based organization that supports the use of Fossil Fuels and advocates for the use of man-made carbon to benefit the oil, gas, and coal industries. At this event, organizers promoted the construction of CO₂ pipelines so they could be converted into transport for EOR purposes in the future. At this event, Summit was asked, “Enhanced Oil Recovery will ultimately be available from this, and Summit is a part of that, right?” Summit responded, “We’re building a common carrier pipeline, right, that will deliver CO₂ for fee. Today, we don’t have any shippers who want to ship CO₂ for EOR. When that changes, we will likely move it for that purpose.”¹¹ This exchange shows how Summit intends to use its captured CO₂ for EOR as soon as it has a buyer. 	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204682-01

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			<p>· On January 19, 2024, Summit filed a Post-Hearing Reply Brief with the Iowa Utilities Board (“IUB”).¹² In this filing, Summit asks the IUB to reject the suggestion that their permit should require sequestration of all CO₂ and prohibit the use of CO₂ for other purposes, including EOR.¹³ Summit argues that: Summit’s Project is a common-carrier pipeline, so it cannot control what future shippers ultimately choose to do with their product. Summit offers pipeline transportation for product meeting its specifications. While the currently contracted ethanol plants all currently seek to sequester all of their CO₂, and the economic realities dictate that is the most valuable decision, Summit does not ultimately control what future shippers may choose to do with their CO₂ shipped on the pipeline. This statement makes it clear that Summit has no intention of preventing its CO₂ from being used in EOR, and will allow it to be used for EOR at any point its customers want to do so.</p> <p>Based on Summit’s own comments, it is clear that using CO₂ for EOR is not only possible but “likely.” Because of the sizable impact this will have on the project’s environmental impacts, it should be fully and thoroughly studied. Therefore, MCEA asks that this information be added to the DEIS record and considered when developing the FEIS.</p> <p>[MCEA provided attachment to the Post-hearing reply brief of Summit Carbon Solutions, LLC Filed with the Iowa Utilities Board on January 19, 2024, HLP-2021-0001]</p>		
MCEA	Hencheck, Abigail	2024-02-23	<p>[attachments include: Attachment 1 EPA GHG Facility Details ADM 2022 Attachment 2 Archer Daniels Midland MRV Plan Attachment 3 Soil Science Soc of Amer J - 2022 - Brehm Attachment 4 to Soil Use and Management - 2020 - Tekeste]</p> <p>CO₂ pipelines are being proposed across the Midwest as a potential climate solution to reduce greenhouse gas emissions from the ethanol industry.² However, the claim that CO₂ pipelines have a net climate benefit is strongly debated³ and the public has raised many concerns about the human and environmental impacts of CO₂ pipelines. Given that this Project is the first of its kind in Minnesota, it is especially important for its environmental review to include a thorough investigation of this technology and its impacts. The public and decision makers need this information to make an informed decision about the propriety of this Project for Minnesota. MCEA appreciates the significant work of the Department of Commerce (“the Department”) in preparing this DEIS which addresses many key issues. However, MCEA believes additional content is needed in the final Environmental Impact Statement (“FEIS”) for it to be complete and legally sufficient under the Minnesota Environmental Policy Act (“MEPA”).</p> <p>Under MEPA, an EIS must provide useable information concerning the primary environmental effects of a proposed project,⁵ explore measures that could mitigate the environmental impacts, and analyze those effects that cannot be mitigated.⁶ Ultimately, the EIS must contain the pertinent information about a project such that it can be used as a guide by decision makers in issuing, amending, or denying a permit and taking other actions to avoid or minimize adverse environmental effects.⁷</p>	<p>The EIS is an analysis of the project to assist the Commission with making a routing permit decision. A study of carbon capture technology is outside the scope of the EIS as it would not aid the Commission's decision on issuing a route permit.</p>	20243-204403-02
MCEA	Hencheck, Abigail	2024-02-23	<p>The DEIS for this Project addresses many key issues, but it fails to adequately address several important impacts and possible mitigations for the Project that must be included pursuant to the requirements of MEPA.</p> <p>Specifically, the DEIS fails to provide a thorough analysis of the Project’s primary environmental effects if less than 100 percent of the CO₂ is captured by the Project, if any of the CO₂ is used for enhanced oil recovery, or if the Plant does not produce or capture enough CO₂ to safely operate the pipeline. The DEIS also does not explore measures that could mitigate the impacts of construction that causes reduced crop yields, nor mitigations for farmers that experience reduced yields over multiple years. In addition to these major concerns, the DEIS also does not fully address the use of an odorant as a possible mitigation, does not include important sources of greenhouse gas emissions in the discussion of the Project’s emissions, does not address the environmental impacts of an accidental release of drilling fluid, and does not do enough to ensure meaningful consultation with tribal governments. This missing information is necessary for the Commission to make a reasoned decision about the potential for, or significance of, the Project’s environmental effects, and the DEIS must be revised accordingly.</p>	<p>See responses to detailed comments on each topic below.</p>	20243-204403-02
MCEA	Hencheck, Abigail	2024-02-23	<p>I. The DEIS Does Not Adequately Discuss the Carbon Capture Feasibility of the Project</p> <p>The DEIS analyzes the Project using a carbon capture rate of 100 percent.⁸ To the best of MCEA’s knowledge, it is unlikely that this capture rate can be realized. To our understanding, the best performing ethanol carbon capture project known to date is capturing a very small percentage of the carbon produced by that plant.⁹ It does not appear that the Applicant is proposing any new technology or operating procedures that would explain such a significant increase in performance for this Project.¹⁰ The DEIS also does not produce any data-driven evidence of this capture rate being possible, despite its claim that the rate is “proven.”¹¹ The DEIS only</p>	<p>The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios for 100 percent, 70 percent, 40 percent, and 10 percent. Section 2.1 has been revised to clarify that the amount of CO₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and that commenters have questioned the feasibility of this capture rate given the performance of</p>	20243-204403-02

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			analyzes the Project using the 100 percent carbon capture rate; it does not consider alternatives where less than 100 percent of the carbon from the Plant is captured. ¹² Given the questionable nature of the 100 percent capture rate, the FEIS must provide evidence that capturing 100 percent of the carbon is possible and study the environmental impacts of the Project if it does not achieve the 100 percent capture rate using a high-medium-low framework. [continued below]	existing capture facilities. Finally, Section 5.7.2.3 has been revised to include ranges of the amount of oil that could theoretically be produced with EOR using CO ₂ captured by the project, based on lower capture rates scenarios.	
MCEA	Hencheck, Abigail	2024-02-23	<p><i>A. It Is Improper to Assume a 100 Percent Capture Rate Without Evidence Demonstrating the Feasibility of 100 Percent Capture</i></p> <p>In its Environmental Assessment Worksheet, the Applicant estimates it will capture 185,454 metric tons of CO₂ from the Plant each year.¹³ This is the maximum potential annual CO₂ emissions from the wet scrubber at the Plant.¹⁴ Thus, the Applicant estimates a 100 percent capture rate at its capture facility. Citing the capture facility’s design, the DEIS assumes this capture rate of 100 percent.¹⁵ This capture rate represents an 89 percent increase from the most successful ethanol plant carbon capture rate known to date.</p> <p>MCEA’s understanding is that the most successful known carbon capture project applied to an ethanol plant is at the Archer Daniels Midland ethanol plant in Decatur, IL.¹⁶ That facility emits a little more than 4.1 million metric tons of CO₂ each year.¹⁷ The capture facility, in that case, was designed to capture 26 percent of the overall emissions.¹⁸ In 2022, the Archer Daniels Midland plant captured 428,580 metric tons of carbon, which is only 40 percent of the carbon it was designed to capture.¹⁹ In other words, in the most successful example of carbon capture technology used at an ethanol plant, the project was only able to capture 11 percent of the overall CO₂ emissions. To the best of MCEA’s knowledge, the Applicant is not capturing carbon using any new technology or procedure that would explain an 89 percent increase in the success rate of their carbon capture technology.²⁰ If the Applicant is using new or different technology, this should be made explicit in the FEIS, along with data supporting the ability of this technology to achieve a 100 percent capture rate. At present, the DEIS only explains the Project’s 100 percent capture rate by citing to the capture methodology.²¹ The Project methodology uses a “tie in connection at the CO₂ scrubber stack and then process[es] the CO₂ to the desired chemistry to transport or store the CO₂.”²² It describes this technology as the “industry standard methodology to capture the most CO₂ at an ethanol plant.”²³ The DEIS goes on to explain that the Applicant would capture 100 percent of the CO₂ by “adhering to the standard operating procedures and minimizing equipment downtime through preventative maintenance programs.”²⁴ This is not sufficient to explain how the “industry standard methodology” for carbon capture and the “standard operating procedure” at the capture facility would capture 89 percent more carbon than the most successful capture facility in the industry. In sum, the FEIS must provide support for a 100 percent capture rate. It must show that this capture rate is feasible by producing data-driven evidence that something near this capture rate has been achieved at some point by some project using the technology and operating procedures proposed for this Project. [continued below]</p>	The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios for 100 percent, 70 percent, 40 percent, and 10 percent. Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and that commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Finally, Section 5.7.2.3 has been revised to include ranges of the amount of oil that could theoretically be produced with EOR using CO ₂ captured by the project, based on lower capture rates scenarios.	20243-204403-02
MCEA	Hencheck, Abigail	2024-02-23	<p><i>B. It Is Improper to Assume a 100 Percent Capture Rate Will Be Achieved When Assessing the Project’s Environmental Impacts</i></p> <p>When assessing the possible environmental impacts of the Project, the DEIS bases its analysis on the assumption the project will achieve a 100 percent capture rate.²⁵ For example, the DEIS relies on the 100 percent capture rate in finding a net decrease in the greenhouse gas emissions for the Project,²⁶ a net positive impact on climate change,²⁷ and the carbon intensity score for the Project.²⁸ All of these assumptions would be impacted in the likely event that the Project does not capture all of the CO₂ produced. The intensity of the impact would, of course, depend on how much CO₂ was captured. However, given the 89 percentage point difference between this Project’s proposed capture rate and the next best-performing ethanol carbon capture project, the impact could be significant; up to 89 percent of the benefits assumed by the DEIS could fail to materialize.</p> <p>Unless there are multiple studies that can confirm the feasibility of the projected 100 percent capture rate for the Project’s capture technology, the FEIS must acknowledge that the actual carbon capture rate of the Project is speculative and that there is a substantial possibility that less than 100 percent of the CO₂ is captured.</p> <p>The FEIS must study how this would affect the environmental impacts of the Project, particularly the Project’s climate impact. To accomplish this, MCEA suggests the FEIS study the impact of a range of potential capture rates using a high-medium- low framework (ex: 10% of emissions captured, 40% captured, 90% captured) to provide the Commission with bookends that show the Project’s impacts if different capture rates come to fruition. The Commission will not have usable information that addresses the Project’s significant environmental issues unless the FEIS contains a complete picture of climate benefits that may or may not be achieved by the Project.³⁰ Without this information, the Commission cannot make a fully informed decision about the Project. Thus, the FEIS must fully support its use of a 100 percent capture rate and study alternatives where less than 100 percent of the CO₂ is captured, using a high-medium-low framework.</p>	The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios for 100 percent, 70 percent, 40 percent, and 10 percent. Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and that commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Finally, Section 5.7.2.3 has been revised to include ranges of the amount of oil that could theoretically be produced with EOR using CO ₂ captured by the project, based on lower capture rates scenarios.	20243-204403-02

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MCEA	Hencheck, Abigail	2024-02-23	<p>II. The DEIS Does Not Adequately Consider that CO₂ May be Used for Enhanced Oil Recovery</p> <p>In this Project, the Applicant proposes to transport the captured CO₂ to North Dakota and inject it underground for permanent sequestration.³¹ However, captured CO₂ can also be used for Enhanced Oil Recovery (“EOR”).³² This is a highly controversial process where CO₂ is injected into oil reservoirs to recover oil that is unreachable by primary recovery processes.³³ The U.S. EPA estimates that, in 2022, approximately 60 percent of all captured CO₂ was, in fact, used for EOR.³⁴ There is evidence that this percentage will increase due to tax credits for carbon capture and the false narrative that EOR supports climate goals by avoiding additional fossil fuel drilling projects.³⁵ But this discounts the risk associated with using CO₂ injection for EOR. EOR projects have raised environmental concerns over leakage into adjacent groundwater and soils, the impacts of chemicals leaching from wells, the high-intensity water usage rates of EOR injection wells, and the impacts on communities surrounding EOR sites.³⁶ The Applicant has stated that it does not propose or plan to use CO₂ from this project for EOR.³⁷ However, there is no permitting mechanism that prevents the Applicant from using the CO₂ for EOR once the Project is built, as the Commission does not retain jurisdiction at the pipeline’s endpoint in North Dakota.</p> <p>Additionally, the Applicant’s parent company has expressed an interest in using the captured CO₂ for EOR.³⁸ Yet the DEIS does not fully investigate how the environmental impacts of the Project would be altered if the CO₂ was used for EOR. A full and robust FEIS must consider the possibility that the CO₂ may be used for EOR by analyzing the climate effects of additional oil production, considering how the environmental impacts of the project change if not all the CO₂ is permanently sequestered, and providing the information needed to determine the likelihood of the CO₂ being used for EOR.</p>	As indicated in Section 5.7.2.3, it is possible that CO ₂ captured from the ethanol plant could contribute to further fossil fuel extraction through its use for EOR; however, it would be speculative to conclude whether the availability or absence of CO ₂ from the ethanol plant would have a significant effect on future oil production. Section 5.7.2.3 has been revised to include an estimate of emissions from oil produced with EOR using the CO ₂ captured from the ethanol plant.	20243-204403-02
MCEA	Hencheck, Abigail	2024-02-23	<p><i>A. The DEIS Fails to Consider the Likelihood that the Applicant Will Use the CO₂ for EOR</i></p> <p>The DEIS acknowledges the connection between carbon capture projects and EOR, including the use of EOR in North Dakota.⁴⁰ The DEIS states, “EOR methods used in the Bakken Formation (the shale oil formation in North Dakota) include CO₂ injection....”⁴¹ However, it fails to acknowledge the proximity of EOR sites in North Dakota to the termination point of this pipeline. The proximity of the pipeline to known EOR sites is concerning because it increases the ease with which the Applicant can divert CO₂ from its sequestration sites to the EOR sites, thus increasing the likelihood that the captured CO₂ is not, in fact, permanently sequestered.</p> <p>This concern is exacerbated by comments from the CEO of the Applicant’s parent company, Summit Agricultural Group. He has publicly stated that Summit is exploring not just storing CO₂ but also using it for EOR.⁴² Given that federal tax credits are available for both sequestration and EOR, these comments raise genuine concerns that the Applicant may use its CO₂ either partially or wholly for EOR.</p> <p>The Commission cannot understand the environmental impact of the Project without understanding the likelihood of it becoming involved with EOR. Therefore, the FEIS must discuss the proximity of EOR sites to the planned sequestration site. This information will be critical for the Commission to understand the significant impact EOR participation could have on the Project’s alleged benefits.</p>	Section 5.7.2.3 has been revised to include ranges of the amount of oil that could theoretically be produced with EOR using CO ₂ captured by the project that are based on several capture rate scenarios. Information regarding the location of the sequestration facilities relative to oil and gas fields has also been added to this section.	20243-204403-02
MCEA	Hencheck, Abigail	2024-02-23	<p><i>B. The FEIS Must Consider the Climate Impacts of Using CO₂ for EOR</i></p> <p>The DEIS does not adequately address the environmental impacts of increased oil production in the event the captured CO₂ is used for EOR. It opines that the climate impacts that would occur if the Project CO₂ is used for EOR are too speculative to analyze because the amount of CO₂ needed to produce a barrel of oil is site-specific.⁴³ While this may be true, the DEIS also provides “for illustrative purposes” that the Project could help produce 316,700 to 633,300 barrels of oil per year if the CO₂ was used for EOR.⁴⁴ This number is based on the estimated amount of CO₂ used for EOR in the United States in 2019.⁴⁵ The DEIS could have used these estimated barrels of oil to study the climate effects of using the CO₂ for EOR, but it did not.</p> <p>According to the EPA, 316,700 to 633,300 barrels of oil annually would produce between 136,181-272,319 metric tons of CO₂ emissions annually.⁴⁶ At best, this Project will capture 185,454 metric tons of CO₂ annually.⁴⁷ And this is only in the unlikely scenario that the Project captures 100 percent of the CO₂ produced.⁴⁸ In other words, if the captured CO₂ is used for EOR, there is a good chance that the Project will result in more CO₂ emissions than it captures. This would render many assertions in the DEIS inaccurate, specifically the assertion that the Project is a net benefit for emissions and the climate.⁴⁹ [49 See DEIS at 5-93, 5-98 to 5-99, 6-6.] Given that the use of the Project’s CO₂ for EOR is not, and will not be prohibited, and that use for EOR would turn the current DEIS findings on their head, the FEIS must study this possibility in order to sufficiently inform the Commission of the possible environmental effects of this Project.</p>	Section 5.7.2.3 has been revised to include ranges of the amount of oil that could theoretically be produced with EOR using CO ₂ captured by the project that are based on several capture rates scenarios. Additionally, statements regarding the net benefit of the project have been clarified as applicable, such as section 5.7.2, which has been revised to note that the project would contribute to a net beneficial effect on climate change as it would capture and store CO ₂ emissions from the ethanol plant.	20243-204403-02

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MCEA	Hencheck, Abigail	2024-02-23	<p><i>C. The FEIS Must Consider How Much CO₂ Could Be Released During the EOR Process</i></p> <p>The DEIS acknowledges that the EOR process fails to sequester all the CO₂ injected into oil wells.⁵¹ It states, “[i]f CO₂ was used for EOR, it is likely not all the CO₂ would be sequestered.”⁵² However, the DEIS fails to analyze how much CO₂ would escape sequestration or how that would affect the overall environmental impacts of the Project.⁵³ It states that it cannot complete such an analysis because the amount of CO₂ that would escape is too speculative.⁵⁴</p> <p>Specifically, it states that “[b]ecause there are multiple variables that would affect the retention of CO₂ in the subsurface during the EOR process, the amount of CO₂ that would be released at the surface cannot be quantified with a reasonable degree of certainty.”⁵⁵</p> <p>Given the prevalence of EOR, it is likely that data is available concerning the general amount of CO₂ or a range of CO₂ that is not sequestered during EOR. The Department can use this data or use an estimation to create a reasonable range of the high, medium, and low amounts of CO₂ at risk of not being permanently sequestered through the EOR process. With these scenarios in hand, the FEIS can provide information regarding how the CI score of the Project would change if some or all of the captured CO₂ were used for EOR.</p> <p>Permanent sequestration is a pivotal piece of the Project and central to determining its environmental effects. Understanding the likelihood that the CO₂ is not sequestered, and the environmental impacts of that possibility will be essential information for the Commission. To provide usable information for the Commission in its decision-making, the FEIS needs to provide information regarding the likelihood that the Applicant will participate in EOR, including information regarding the prevalence of EOR and the proximity of EOR to the pipeline and its sequestration site. The FEIS must also analyze the environmental impacts if any of the CO₂ is used for EOR, including the impacts of additional oil production resulting from this Project’s CO₂ and the impacts of CO₂ being released in the EOR process rather than sequestered.</p>	<p>Use of CO₂ for EOR is not purported to be an effective method to sequester CO₂. The discussion in Section 5.7.2.3 is intended to disclose potential impacts in the event that the captured CO₂ is used for EOR rather than being sequestered, as proposed. One of those impacts is that not all of the CO₂ is likely to remain in the subsurface. Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO₂ is contained in the storage reservoir.</p> <p>Section 5.7.2.3 addresses the possibility that the captured CO₂ could be used for EOR instead of being sequestered and includes estimates of the amount of oil that could theoretically be produced based on different capture rates. Additionally, estimates of the amount of GHGs that would result from the produced oil have been added to Section 5.7.2.3.</p>	20243-204403-02
MCEA	Hencheck, Abigail	2024-02-23	<p>III. The DEIS Does Not Consider the Effect that Reduced CO₂ Production or Capture Would Have on the Safety of the Pipeline</p> <p>The DEIS observes that this Project must operate at a minimum pressure in order to be safe.⁵⁶ To obtain this pressure, the Project must collect and transport a minimum throughput to safely operate the pipeline.⁵⁷ The Applicant can shut in or isolate the pipeline and close the mainline valves (“MLVs”) to accommodate temporary reductions in throughput and pressure,⁵⁸ for example, due to maintenance or unforeseen plant closures. However, “[p]ermanent reductions in throughput would result in changes in operational parameters that could impact the ability to safely operate the pipeline. Permanent reductions in throughput could also hamper the ability to perform in-line pipeline integrity inspections because the inspection tool could not move at its designed rate to optimally inspect the pipeline.”⁵⁹</p> <p>In other words, the safe operation of the pipeline requires a minimum amount of CO₂ to be continuously pushed through the pipeline, in turn requiring a minimum amount of CO₂ to be produced and captured at the Plant. The DEIS does not state what minimum pressure would be required for safe operations, nor does it state the metric tons of CO₂ that would be needed daily to support the required pressure.⁶⁰</p> <p>This is concerning because Minnesota’s climate goals (or federal climate policies) could result in reduced ethanol usage and therefore reduced CO₂ production by the Plant, which could undermine the safety of the pipeline. The State of Minnesota has a statutory goal of reducing greenhouse gas emissions to net zero economy-wide, by 2050.⁶¹ In furtherance of these goals, Minnesota is likely to implement policies, regulations, and incentives over the next 26 years that work towards meeting this goal. These actions could have a significant impact on ethanol markets, the amount of ethanol produced in the State, and consequently, the amount of CO₂ produced through ethanol production. For example, the move toward electric vehicles and other alternative means of transportation, as outlined in the Minnesota Climate Action Framework,⁶² could impact the ethanol industry, causing less ethanol to be produced in the State. Additionally, the Plant could choose to or be required to implement technology alternatives, like those considered in the DEIS.⁶³</p> <p>Regardless of the specific policies implemented, the fact remains that Minnesota’s climate goals are likely to bring about a reduction in the amount ethanol produced and therefore the amount of CO₂ produced by this industry. This could mean that the Plant does not produce enough CO₂ to safely operate the pipeline.</p> <p>If there is not enough CO₂ to safely operate the pipeline, there are two potential outcomes, both of which the FEIS must address. First, the pipeline could cease operations much earlier than planned by the Applicant. This would alter the environmental benefits that would be realized by the Project. The intensity of this change would depend on how long the pipeline was operational before it was decommissioned. What are the environmental implications if the pipeline is only operational for five years? Ten years? 15 years? The</p>	<p>If less CO₂ becomes available in the future, it is anticipated that the flow rate would be reduced, not the pressure. Federal law requires that the pressure always remain at levels conducive to safe operations. There are other options that can be exercised to compensate for reduced product flow.</p>	20243-204403-02

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			<p>answer to these questions will change the risk-benefit analysis for the Project, and the FEIS must answer them in order to provide the Commission with all the information needed to make an informed decision on this Project.</p> <p>Second, the pipeline could continue to operate but in an unsafe manner, increasing the risk of a rupture or other negative environmental effects. The FEIS must consider the potential environmental impacts of the pipeline operating below the minimum safe pressure. Additionally, due to the financial resources required to initiate this Project, the FEIS must consider that the Applicant is at risk of choosing this option in order to operate the pipeline longer and recoup more of its costs. The DOC-EERA should request information from the Applicant to better understand how long the pipeline must remain operational in order to be profitable.</p> <p>The FEIS must fully address the safe operation of the pipeline. To do so, it must address the amount of CO₂ needed to safely operate the pipeline and consider the potential outcomes if that amount of CO₂ is not available.</p>		
MCEA	Hencheck, Abigail	2024-02-23	<p>IV. The DEIS Must Include Information on the Efficacy of Mitigations to Reduce Impacts to Cropland and Crop Yields</p> <p>The DEIS contains information showing the Project’s construction will have a potentially significant impact on cropland that could last for years after construction is complete and could reduce crop yields in a way that would impact the livelihoods of Minnesota farmers. Therefore, pursuant to Minn. Stat. § 116D.04, subd. 2a(a), Minn. R. 4410.0200, subd. 51, Minn. R. 4410.2300(I), and Minn. R. 4410.2800, subp. 4, the FEIS must contain information about the efficacy of discussed and planned mitigation measures to reduce this potentially significant impact. This information must be included in the FEIS in order for it to “provide usable information to the project proposer, governmental decision makers and the public.</p> <p>The DEIS makes clear that if construction of the pipeline were permitted, it would have a potentially significant impact on area cropland. The land that would be disturbed during construction is predominantly cropland.⁶⁶ When construction occurs on cropland, compaction of the soil and mixing of the topsoil with other soils can reduce the ability of that land to successfully grow crops, and these impacts can last for multiple growing seasons after construction has taken place.⁶⁷ Unfortunately, the cropland that would be disturbed by this Project is considered some of the best in the State, as 90% or more of the land along each of the routes is designated as “prime farmland.”⁶⁸, ⁶⁹ Indeed, Figure 5-10 of the DEIS shows that nearly all the land along the 3 routes is either prime farmland, farmland of statewide importance, or prime farmland if drained.⁷⁰</p> <p>In addition to being valuable agricultural land, the DEIS also reports that the croplands impacted by the Project are the type of lands that are especially susceptible to impacts from construction. The DEIS notes that soils that are most susceptible to the negative impacts from construction include: (1) prime farmland, (2) compaction-prone soils,⁷¹ and (3) soils with poor revegetation⁷² among others.⁷³ The routes where proposed pipeline construction would take place are 90% or more prime farmland and have 70% or more acres that are compaction-prone, and 13% or more acres with revegetation concerns where achieving adequate vegetation following construction and restoration may not be possible.⁷⁴ Given these characteristics of the land, if the Project is allowed, the impacts to farmers could be significant.</p> <p>The most basic impact to these lands is lost crop yields during the period of construction— estimated to be approximately one growing season.⁷⁵ However, the DEIS identifies multiple impacts of construction that could alter future agricultural productivity of the land for as long as five years after construction. Moreover, recently published studies show these impacts can last even longer.⁷⁶ The DEIS identifies the following impacts to croplands from construction:</p> <ul style="list-style-type: none">• The removal of topsoil during construction could expose soils that are classified as prime farmland and farmland of statewide importance to wind and water erosion causing this topsoil that is classified as some of the best in the State be lost to erosion.⁷⁷• Mixing of topsoil with other soils during the backfilling process could alter the properties of the soil which in turn could affect the ability of crops to reestablish for multiple growing seasons (up to 5 years) after restoration activities are complete.⁷⁸• Soil compaction and rutting would occur from the use of heavy construction vehicles.⁷⁹ Soil compaction is known to cause reduced crop yields.⁸⁰ Effects typically last for 2 to 3 years but can last up to 5 years (or even longer) depending on impacts on soils from construction disturbance.⁸¹• These impacts from construction have the potential to lead to financial impacts, for example, lost farm revenue.⁸²	<p>As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term.</p>	20243-204403-02
MCEA	Hencheck, Abigail	2024-02-23	<p>Given the potentially serious impacts to the productivity of farmland and farmers’ livelihoods that can last for years, the DEIS must provide more information about how well these conditions can be mitigated. MEPA foundationally requires that the EIS “explore[] methods by which adverse environmental impacts of an action could be mitigated.”⁸³ Mitigation is defined as “avoiding impacts altogether by not undertaking a certain project or parts of a project; . . . rectifying impacts by repairing, rehabilitating, or restoring the affected environment; . . . compensating for impacts by replacing or providing substitute resources or environments; or . . . reducing or avoiding impacts by implementation of pollution prevention measures.”⁸⁴ An EIS is required to contain a section on mitigation</p>	<p>The EIS acknowledges that crop production would be affected by changes to soils from construction disturbance. Text in Chapter 5 has been revised to indicate that impacts on crop production would be long term. Measures to minimize these impacts are described in the applicant's Minnesota ECP and Minnesota APP, which are provided as appendices. These measures include standard best management</p>	20243-204403-02

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			<p>measures which “shall identify those measures that could reasonably eliminate or minimize any adverse environmental, economic, employment, or sociological effects of the proposed project At present, the DEIS makes reference to multiple other documents and permits the permittee is required to comply with, but it does not actually identify the mitigation measures that can or must be implemented according to those plans and permits, nor does it report whether those mitigation measures can actually minimize the impacts of concern. For example, as a mitigation the DEIS references the terms in the sample routing permit which state, “[c]ompaction of agricultural lands by the Permittee must be kept to a minimum and mitigated in accordance with its agricultural protection plan [if applicable].”⁸⁶ However, given the high sensitivity of the lands on the construction route, 70% of which are designated as compaction-prone, is it even possible for the applicant to “keep compaction to a minimum” or “mitigate it?” The DEIS does not provide further discussion on what mitigation practices could be implemented, and whether they would be effective, especially in this highly sensitive area. Instead, the DEIS says, “[c]onstruction practices that would minimize impacts on soils, such as erosion and mixing of topsoil and subsoil, are described in detail in the applicant’s Minnesota ECP (Appendix D) and Minnesota APP (Appendix E).”⁸⁷</p> <p>Those documents mention some specific actions the Applicant plans to take, for example, the APP mentions the use of deep-tillage to alleviate compaction of the subsoil and/or deep subsoil ripping.⁸⁸ However, the FEIS must indicate whether these practices are effective at addressing soil compaction and decreased crop yields, how effective they are expected to be (25% effective? 100% effective?), and over what timeline. This analysis is especially critical in light of recent studies that have found persistent soils issues years after pipeline installation resulting in reduced crop yields despite the use of best management practices like double-lift excavation to address soil mixing and deep ripping to address soil compaction.⁸⁹</p>	<p>practices (BMP), such as erosion and sediment control, topsoil segregation, and soil decompaction. An analysis of the effectiveness of these BMPs is outside the scope of the EIS. Additionally, impacts on agricultural production can be mitigated through landowner agreements. These agreements are outside the scope of the EIS.</p>	
MCEA	Hencheck, Abigail	2024-02-23	<p>The FEIS must also include information about the applicant’s proposed mitigation to compensate farmers for lost crops due to construction.⁹⁰ Currently, the DEIS states “[c]ompensation for crop loss would be negotiated between the applicant and the landowner. These agreements are outside the scope of this EIS.”⁹¹ This analysis is insufficient given the requirement that an EIS must include a section on mitigation measures that “shall identify those measures that could reasonably eliminate or minimize any adverse environmental, economic, employment, or sociological effects of the proposed project.</p> <p>Given the significant economic and employment impacts from lost revenue to farmers, MEPA requires the FEIS to identify whether the proposed compensation regime is actually a meaningful mitigation such that it would eliminate or minimize the adverse effects of lost crop yield. To provide a legally sufficient analysis, the FEIS needs to include more details about this proposed mitigation, including but not limited to:</p> <ul style="list-style-type: none">• Whether landowners are notified that they can seek compensation for lost crop yields in their easement agreement;• What formulas or methods are used to determine compensation for lost crops, or what are average compensation amounts;• Whether landowners are informed that crop losses could extend for more than just the year of construction, and yields could in fact be impacted as long as 5 or more years after construction;• Whether landowners can be compensated for lost crops or reduced yield beyond the year of construction in easement agreements (does the Applicant plan to allow for this); and• Which state agency (if any) has jurisdiction to address ongoing issues with lost or diminished crop yields after construction has been completed. <p>The purpose of MEPA is to “look before you leap.” The EIS is meant to “provide usable information to the project proposer, governmental decision makers, and the public”⁹³ and to serve as a guide to decision makers in issuing, amending, or denying permits so that adverse effects to the environment and communities can be minimized.⁹⁴ Understanding the true impact to farmers’ livelihoods is key information the public and decision makers require and is undoubtedly information the Commission will want to understand before making a decision on this Project.</p>	<p>Thank you for your comment. Landowner agreements are outside the scope of the EIS. The EIS discusses potential impacts on agricultural production, soils, etc. This information can be used by landowners when negotiating easement agreements. Should ongoing issues with lost or diminished crop values occur, an individual can file a complaint with the Commission. This information has been added to Section 5.5.1.2.</p>	20243-204403-02
MCEA	Hencheck, Abigail	2024-02-23	<p>V. The DEIS Contains Other Inadequacies that Should Be Addressed</p> <p>In addition to the above major concerns, MCEA believes the FEIS would be improved by analyzing whether an odorant is a feasible and effective mitigation, including land use change emissions in the Project’s emissions calculation, further discussing the environmental impacts of an accidental release of drilling fluid, and doing more to reach tribal governments.</p>	<p>See the responses to the more detailed comments on these topics below.</p>	20243-204403-02
MCEA	Hencheck, Abigail	2024-02-23	<p><i>A. The DEIS Did Not Investigate Adding an Odorant as a Possible Mitigation</i></p> <p>Public concerns about the Project have largely centered around the possibility of a pipeline leak or rupture.⁹⁶ The DEIS acknowledges receiving comments about the possibility of adding an odorant to the CO₂ to help mitigate this concern.⁹⁷ However, the DEIS did not adequately address whether this is a feasible or effective mitigation measure.⁹⁸ The FEIS must address the concerns of the public, in</p>	<p>As indicated in the EIS, CO₂ is odorless at low concentrations but has a sharp, acidic odor at very high concentrations, such as would occur in the event of a rupture. EERA staff evaluated the addition of an odorant, as described in Section 8.5.2. Adding an odorant would fall under safety</p>	20243-204403-02

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			part, by exploring the efficacy in mitigating the effects of a rupture by adding an odorant to the CO ₂ . Rather than addressing whether an odorant can mitigate potential harms from a rupture, the DEIS simply states that “[t]here are no PHMSA regulations that require use of odorants in CO ₂ pipelines . . . and the applicant does not propose to add an odorant.” ¹⁰⁰ While this is true, it is not, on its own, sufficient grounds to not study the mitigation measure. While there may be no PHMSA regulations requiring the use of odorants, it also does not appear to be prohibited. Thus, whether this is a feasible and effective mitigation is relevant, helpful, and requested information. While the DEIS correctly states that only PHMSA can set levels for allowable impurities in CO ₂ pipelines and that the Commission cannot set safety standards, ¹⁰¹ the scope of environmental review is broader than just those mitigations or conditions that the Commission has authority to order. ¹⁰² The purpose of environmental review is to understand the full impacts of a project on Minnesotans’ environment, health, and livelihoods. ¹⁰³ If adding an odorant is possible and effective, but the Applicant has simply chosen not to do so, this is important information for the public and the Commission to consider when assessing whether this Project is safe for Minnesotans. ¹⁰⁴ To know this, the FEIS must provide this information The DEIS currently relies on the Applicant’s vague assertion that it would be too difficult to add an odorant because it would “require multiple injection facilities and would introduce additional logistic and design changes needed for the safe storage and overland transport of the odorant.” ¹⁰⁵ The DEIS does not verify these statements. ¹⁰⁶ The FEIS should fact-check these assertions and consider the feasibility and efficacy of adding an odorant by analyzing whether it is technologically feasible and what impact it would have on reducing the impacts from a pipeline rupture.	standards. The Commission cannot set safety standards for pipeline construction or operation. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements.	
MCEA	Hencheck, Abigail	2024-02-23	<p><i>B. The Section on Greenhouse Gas Emissions Must Include Emissions from Land Use Change to Accurately Reflect the Project’s Climate Impact</i></p> <p>The DEIS correctly recognizes that if land is converted from its current use to agricultural land that is growing feedstocks for ethanol, this will emit greenhouse gas emissions.¹⁰⁷ Moreover, the DEIS recognizes that market mechanisms can incent changing a land’s use to growing ethanol feedstocks because market signals provide incentives to grow more feedstocks for ethanol production.¹⁰⁸ The California Air Resources Board (“CARB”) has also identified land use change as a key element in understanding the climate consequences biofuels like ethanol.¹⁰⁹ CARB has found the emissions impacts from land use change are so significant that failing to account for them when assessing the carbon intensity of biofuels would create such an inaccurate picture of their climate consequences that it could actually jeopardize the ability of California’s low carbon fuels market to achieve carbon reductions.¹¹⁰ In studying land use change, CARB found that increasing worldwide demand for biofuels will stimulate a corresponding increase in the price and demand for the crops used to produce those fuels. In order to meet that demand, farmers will either grow more biofuel crops on existing land by reducing or eliminating crop rotations, will convert existing land from food to fuel crop production, will convert non-agricultural land to fuel crop production, or will try to increase yields on existing land.¹¹¹ Many of these changes will result in increased greenhouse gas emissions from the release of carbon sequestered in soils and land cover vegetation.¹¹²</p> <p>The DEIS sections discussing the Project’s greenhouse gas emissions and impact on climate change do not account for the emissions that will occur if land is converted from its current use to fuel crop production for use at the ethanol plant. Low carbon fuel markets are being increasingly proposed in various states (including Minnesota). And this Project plans to make ethanol more competitive in low carbon fuel markets. As such, it is unreasonable to assume that conversion of lands to fuel crop production as a result of this Project over its lifetime will be zero.</p> <p>This is especially true given that the DEIS notes that the capacity of the capture facility was determined based on current ethanol production and “potential growth at the ethanol plant.”¹¹³ If growth of the ethanol facility’s capacity is contemplated, the corresponding land use change needed to feed that growth should also be accounted for. The impact of potential land use change as a result of this Project is also an important impact for the public and decision makers to understand in light of Minnesota’s policy to reduce its greenhouse gas emissions economy-wide to net zero during the lifetime of this Project.¹¹⁴ As the DEIS recognizes, agriculture is one of the top three sectors that produce the most greenhouse gas emissions in Minnesota¹¹⁵ and reducing emissions from this sector is necessary to reach our statewide goals.¹¹⁶ If reducing agricultural emissions is critical to achieving state goals, decision makers need to understand if this Project is actually increasing emissions in this sector as a result of land use change. The DEIS currently states that this Project would have “a net beneficial effect on climate change,”¹¹⁷ but this statement is unsupported by the DEIS in its current form given that the land use impacts are not currently being considered in its greenhouse gas emission calculation. Similar to the DEIS’s recognition that the lifecycle emissions of fuels (expressed as carbon intensity scores) guide stakeholders, policymakers, and industries in their efforts to reduce carbon emissions, so too is this information important to decision makers to understand consequences of this Project on achieving Minnesota’s climate policy objectives.¹¹⁸ The DEIS cannot assert this Project has a net climate benefit when it has only examined a snapshot of the Project’s emissions.</p>	<p>Consistent with the scoping decision, the EIS does not attempt to predict future ethanol production at the ethanol plant, but does discuss variable levels of production under the no action alternative in Chapter 7. As stated in Section 7.1.3, production of corn would not be expected to increase if the ethanol plant were to increase production; rather, a shift in corn sales to the ethanol plant from other markets would likely occur. Section 7.2 states, "impacts from ethanol production are expected to be proportional to the amount of ethanol produced. An increase or decrease in ethanol production would result in a relatively proportional increase or decrease in potential impacts."</p> <p>To analyze impacts of the proposed project (Chapter 5), the EIS assumes the current level of ethanol production is maintained. Chapter 6 analyzes two alternative technologies—a suite of agricultural practices and a suite of energy use and efficiency changes—and assumes the current level of ethanol production is maintained with no land use change associated with expanded crop conversion from forestland, wetlands, or grazing lands. All cropland analyses assume historical persistence of conventional management pre-1980s for the region supplying feedstock to the ethanol plant. Emissions associated with introducing another variable (increase or decrease in ethanol production) would needlessly complicate the analysis of these alternative technologies. Section 6.1.3 has been revised to discuss the debate between Lark et. al. and GREET model authors. In addition, Section 5.7.2 has been revised to note that the project would contribute to a net beneficial effect on climate change as it would capture and store CO₂ emissions from the ethanol plant.</p>	20243-204403-02

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MCEA	Hencheck, Abigail	2024-02-23	<p><i>C. The DEIS Does Not Sufficiently Consider the Negative Impacts of an Accidental Release of Drilling Fluid</i></p> <p>The DEIS identifies four locations within the Project area at which the Applicant intends to utilize horizontal directional drilling (“HDD”) to crossroads and rivers. These locations are the Pelican River, Otter Tail Valley Railroad / State Highway 210, Otter Tail River, and BNSF Railway / US Highway 75.119 Accidental releases of drilling fluid are a known risk of HDD construction methods and should be thoroughly analyzed in the FEIS. The recent construction of a crude oil pipeline in northern Minnesota resulted in accidental releases of drilling fluid at 67 percent of the HDD sites. The DEIS states that “[d]rilling fluids and additives used for the HDD would be non-toxic to the aquatic environment and humans.”121 However, non-toxic does not mean non-damaging; independent analysis of inadvertent release sites for previous HDD construction in Minnesota has shown high levels of iron pollution and the Minnesota Pollution Control Agency (“MPCA”) has advised the public that the undisclosed chemicals in previous released slurry had the potential to “cause respiratory and skin irritation.”122 The bentonite clay that makes up the bulk of the slurry “is a very fine sediment that . . . can clog the gills and suffocate aquatic life like mussels, insects, and fish,” as well as degrade the aquatic habitat.123 The MPCA considers the drilling mud (which “can create turbid water/nuisance conditions”) and the chemicals it contains to be pollutants.124 These pollutants should be disclosed and analyzed in the EIS to adequately assess the risks of construction.</p> <p>The DEIS also provides contradictory information about the provision of an inadvertent release contingency plan, stating in Chapter 2 that “[t]he applicant would develop a contingency plan to address an inadvertent release of drilling fluid at the ground surface should one occur during HDD,”125 and in Appendix D that development of this plan would instead be the responsibility of a construction contractor.126 Parties and the public deserve both clarity on what entity will be responsible for producing this report and the opportunity to review it. In light of the above, the following changes should be made to the FEIS:</p> <ul style="list-style-type: none"> • The FEIS should include disclosures from the Applicant about the specific chemicals to be included in the HDD drilling fluid. • The FEIS should include the accidental release plan for review, whether developed by the Company or a contractor, and the plan should contain a commitment to ongoing regular environmental monitoring at any site where an accidental release is suspected following any such incident; and • The FEIS should further analyze the risks of a release at each of the sites. 	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5. As stated in Chapter 2, "The applicant is designing the project but would hire contractors to construct the pipeline, restore the right-of-way (ROW), and other activities. Because the applicant would direct the work of the contractors, the EIS refers to the applicant as the entity that would conduct all project activities." The inadvertent release contingency plan would be prepared by the HDD contractor and is not available to include in the EIS. As stated in Section 5.7.3.4, an assessment of the potential for an inadvertent release of drilling mud is part of the feasibility analysis and design for HDDs.	20243-204403-02
MCEA	Hencheck, Abigail	2024-02-23	<p><i>D. The DEIS Lacks Sufficient Input from Tribal Governments</i></p> <p>Finally, the DEIS received input from only one tribal government (Mille Lacs Band of Ojibwe),127 despite acknowledging that the affected land is in the traditional homelands of the Ojibwe and Dakota people, and fourteen tribes—including in Minnesota the Leech Lake Band, Lower Sioux Indian Community, Prairie Island Indian Community, and the six tribal governments encompassed by the Minnesota Chippewa Tribe—have cultural and ancestral ties to the project area.128 This lack of engagement is indicative of an ineffective process, and should not be considered adequate for this caliber of environmental review. The FEIS should be based on input from a variety of affected tribal governments, which may require the DOC-EERA to use engagement methods such as in-person consultation meetings with tribal staff or receiving input via transcribed phone call to achieve adequate meaningful input.</p> <p>For the foregoing reasons, MCEA requests that the EIS for the Project be revised to incorporate the suggestions contained herein.</p>	As described in Section 3.2.2 of the draft EIS, in its scoping Order, the Commission requested EERA staff “coordinate with the Minnesota Office of Pipeline Safety along with other state agencies and Tribal governments to ensure that their expertise is reflected in the EIS.” As detailed in the draft EIS (Appendix J), EERA staff provided the opportunity for all recognized Tribes in Minnesota to provide comments on a preliminary draft EIS. Comments were received from the Shakopee Mdewakanton Community, Mille Lacs Band of Ojibwe, and the White Earth Nation. Section 12.3 of the EIS (Contributing Tribes and Minnesota State Agencies) has been revised to reflect the three Tribes who provided comments on the preliminary draft EIS chapters indicated above. Additionally, Tribes have provided comments on the draft EIS (Appendix O).	20243-204403-02
Midwest AG Future	Franzen, Doug; Schwartz, Craig; Harney, Paul; Bunes, Taylor; Johnson, Scott; Gunderson, Jeremy; Pell, Kenneth; Brown,	2024-02-23	<p>I am writing today in support of the proposed carbon capture pipeline project from the Green Plains Ethanol Plant in Otter Tail County to Wilkin County, along the Minnesota & North Dakota border. Docket Number 22-422. Last year, Governor Walz signed legislation establishing the lofty goal of being carbon-free by 2040. In order to meet those goals and others, it is imperative that we invest in infrastructure that will allow us to reduce carbon emissions and accomplish the carbon-free standards.</p> <p>As the draft EIS states, there is a net benefit to this project with the CO₂ sequestered through the operation of this pipeline would far outweigh any emissions during construction. Additionally, the EIS notes the beneficial impact this carbon capture project would have on climate change.</p> <p>Throughout the draft EIS, there is a common theme: the benefits outweigh any negatives. From minimal impact to communities or farming in the area, to overwhelming benefits once completed, it is evident that this project should be granted its permits and allowed to proceed.</p>	Thank you for your comment.	20242-203761-01

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	Shadly; Thomas, Roy; Neisinger, Nate; Witt, George; Walters, Kenneth; Swenson, Steven; Maki, Jason; Eastlick, Kevin; Boys, Corey		<p>This project also provides great employment opportunities for the men and women of the pipeline trades. It will create a huge number of construction jobs that carry the wages and benefits needed to sustain a Minnesota family.</p> <p>I encourage you to move forward with the carbon capture pipeline on the route proposed by Summit Carbon Solutions. Thank you for your consideration.</p>		
Midwest AG Future	Heinzer, Donald; Cuta, Joseph; Maresch, Brodie; Stelter, Aaron; Wachlin, Victor; Etzler, Chad; Kolpien, Gregory; Connor, Michael; Koch, Brandon; Lowrey, Rick; Grzeskowiak, Steven; Kraus, Adam; Randolph, Ryan	2024-02-23	<p>I am writing today in support of the proposed carbon capture pipeline project from the Green Plains Ethanol Plant in Otter Tail County to Wilkin County, along the Minnesota & North Dakota border. Docket Number 22-422. Last year, Governor Walz signed legislation establishing the lofty goal of being carbon-free by 2040. In order to meet those goals and others, it is imperative that we invest in infrastructure that will allow us to reduce carbon emissions and accomplish the carbon-free standards.</p> <p>As the draft EIS states, there is a net benefit to this project with the CO₂ sequestered through the operation of this pipeline would far outweigh any emissions during construction. Additionally, the EIS notes the beneficial impact this carbon capture project would have on climate change.</p> <p>Throughout the draft EIS, there is a common theme: the benefits outweigh any negatives. From minimal impact to communities or farming in the area, to overwhelming benefits once completed, it is evident that this project should be granted its permits and allowed to proceed.</p> <p>This project also provides great employment opportunities for the men and women of the pipeline trades. It will create a huge number of construction jobs that carry the wages and benefits needed to sustain a Minnesota family.</p> <p>I encourage you to move forward with the carbon capture pipeline on the route proposed by Summit Carbon Solutions. Thank you for your consideration.</p>	Thank you for your comment.	20242-203762-01
Midwest AG Future	Siemers, Rick; Curley, Thomas; Snidarich, Daniel; Kenmir, Brian	2024-02-23	<p>I am writing today in support of the proposed carbon capture pipeline project from the Green Plains Ethanol Plant in Otter Tail County to Wilkin County, along the Minnesota & North Dakota border. Docket Number 22-422. Last year, Governor Walz signed legislation establishing the lofty goal of being carbon-free by 2040. In order to meet those goals and others, it is imperative that we invest in infrastructure that will allow us to reduce carbon emissions and accomplish the carbon-free standards.</p> <p>As the draft EIS states, there is a net benefit to this project with the CO₂ sequestered through the operation of this pipeline would far outweigh any emissions during construction. Additionally, the EIS notes the beneficial impact this carbon capture project would have on climate change.</p> <p>Throughout the draft EIS, there is a common theme: the benefits outweigh any negatives. From minimal impact to communities or farming in the area, to overwhelming benefits once completed, it is evident that this project should be granted its permits and allowed to proceed.</p> <p>This project also provides great employment opportunities for the men and women of the pipeline trades. It will create a huge number of construction jobs that carry the wages and benefits needed to sustain a Minnesota family.</p>	Thank you for your comment.	20242-203848-01

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			I encourage you to move forward with the carbon capture pipeline on the route proposed by Summit Carbon Solutions. Thank you for your consideration.		
Midwest AG Future	Thomssen, Garritt; Sheridan, Tim; Kuitunen, John; Gustafson, Evan; Lahr, Brent; Kucera, Steve; Root, Jason; Schultze, Alan; Szafranski, Michael	2024-02-23	<p>I am writing today in support of the proposed carbon capture pipeline project from the Green Plains Ethanol Plant in Otter Tail County to Wilkin County, along the Minnesota & North Dakota border. Docket Number 22-422. Last year, Governor Walz signed legislation establishing the lofty goal of being carbon-free by 2040. In order to meet those goals and others, it is imperative that we invest in infrastructure that will allow us to reduce carbon emissions and accomplish the carbon-free standards.</p> <p>As the draft EIS states, there is a net benefit to this project with the CO₂ sequestered through the operation of this pipeline would far outweigh any emissions during construction. Additionally, the EIS notes the beneficial impact this carbon capture project would have on climate change.</p> <p>Throughout the draft EIS, there is a common theme: the benefits outweigh any negatives. From minimal impact to communities or farming in the area, to overwhelming benefits once completed, it is evident that this project should be grated its permits and allowed to proceed.</p> <p>This project also provides great employment opportunities for the men and women of the pipeline trades. It will create a huge number of construction jobs that carry the wages and benefits needed to sustain a Minnesota family.</p> <p>I encourage you to move forward with the carbon capture pipeline on the route proposed by Summit Carbon Solutions. Thank you for your consideration.</p>	Thank you for your comment.	20242-203760-01
Midwest AG Future	Turner, Jonathan; Young, Jonathan; Geislinger, Junior; Mathison, Matthew; Coburn, Tristan; Gullikson, Thomas; Voxland, Adam; Fuchs, Adam; Stenquist, Eric; Maxson, Dale; Heinrich, Paul; Richter, Eric; Lagerquist, Theodore; Lafountain, Christopher; Tangeman, John	2024-02-23	<p>I am writing today in support of the proposed carbon capture pipeline project from the Green Plains Ethanol Plant in Otter Tail County to Wilkin County, along the Minnesota & North Dakota border. Docket Number 22-422. Last year, Governor Walz signed legislation establishing the lofty goal of being carbon-free by 2040. In order to meet those goals and others, it is imperative that we invest in infrastructure that will allow us to reduce carbon emissions and accomplish the carbon-free standards.</p> <p>As the draft EIS states, there is a net benefit to this project with the CO₂ sequestered through the operation of this pipeline would far outweigh any emissions during construction. Additionally, the EIS notes the beneficial impact this carbon capture project would have on climate change.</p> <p>Throughout the draft EIS, there is a common theme: the benefits outweigh any negatives. From minimal impact to communities or farming in the area, to overwhelming benefits once completed, it is evident that this project should be grated its permits and allowed to proceed.</p> <p>This project also provides great employment opportunities for the men and women of the pipeline trades. It will create a huge number of construction jobs that carry the wages and benefits needed to sustain a Minnesota family.</p> <p>I encourage you to move forward with the carbon capture pipeline on the route proposed by Summit Carbon Solutions. Thank you for your consideration.</p>	Thank you for your comment.	20242-203757-01
Midwest Ag Future	Davies, Ryan; Tighe, Brad; Peil, Daniel;	2024-02-23	I am writing today in support of the proposed carbon capture pipeline project from the Green Plains Ethanol Plant in Otter Tail County to Wilkin County, along the Minnesota & North Dakota border. Docket Number 22-422. Last year, Governor Walz signed legislation	Thank you for your comment.	20243-204403-01

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	Koch, Sherry; Johnson, Warren; Wagener, Peter; Gilbert, Dan; Nick, Brian; Nybo, Michael; Boege, Thomas; Kreuser, Tara		<p>establishing the lofty goal of being carbon-free by 2040. In order to meet those goals and others, it is imperative that we invest in infrastructure that will allow us to reduce carbon emissions and accomplish the carbon-free standards.</p> <p>As the draft EIS states, there is a net benefit to this project with the CO₂ sequestered through the operation of this pipeline would far outweigh any emissions during construction. Additionally, the EIS notes the beneficial impact this carbon capture project would have on climate change.</p> <p>Throughout the draft EIS, there is a common theme: the benefits outweigh any negatives. From minimal impact to communities or farming in the area, to overwhelming benefits once completed, it is evident that this project should be grated its permits and allowed to proceed.</p> <p>This project also provides great employment opportunities for the men and women of the pipeline trades. It will create a huge number of construction jobs that carry the wages and benefits needed to sustain a Minnesota family.</p> <p>I encourage you to move forward with the carbon capture pipeline on the route proposed by Summit Carbon Solutions. Thank you for your consideration.</p>		
Midwest Ag Future	Holmes, Josh; Todavich, Greg; Barnes Elizabeth; Omang, Brenda; Nelson, Brady; Peterson, Anthony; Grannes, Michael; Nuss, Greg; Vynckt, Joe Van; Kontz, Kim; Moy, Jeremy	2024-02-22	<p>I am writing today in support of the proposed carbon capture pipeline project from the Green Plains Ethanol Plant in Otter Tail County to Wilkin County, along the Minnesota & North Dakota border. Docket Number 22-422.</p> <p>Last year, Governor Walz signed legislation establishing the lofty goal of being carbon-free by 2040. In order to meet those goals and others, it is imperative that we invest in infrastructure that will allow us to reduce carbon emissions and accomplish the carbon-free standards. As the draft EIS states, there is a net benefit to this project with the CO₂ sequestered through the operation of this pipeline would far outweigh any emissions during construction.</p> <p>Additionally, the EIS notes the beneficial impact this carbon capture project would have on climate change.</p> <p>Throughout the draft EIS, there is a common theme: the benefits outweigh any negatives. From minimal impact to communities or farming in the area, to overwhelming benefits once completed, it is evident that this project should be grated its permits and allowed to proceed.</p> <p>This project also provides great employment opportunities for the men and women of the pipeline trades. It will create a huge number of construction jobs that carry the wages and benefits needed to sustain a Minnesota family.</p> <p>I encourage you to move forward with the carbon capture pipeline on the route proposed by Summit Carbon Solutions. Thank you for your consideration.</p>	Thank you for your comment.	20243-204403-01
Midwest Ag Future	Omang, DJ; Hansen, Rick; Fournier, Matt; Rickard, Nate; Garay, Jorden; Rothe, Todd; Seger, Bart; Siefert, Martin; Neumayer, Shannon; Runke, Nathaniel; Gruhot, Brad; Darif, Timothy	2024-02-23	<p>I am writing today in support of the proposed carbon capture pipeline project from the Green Plains Ethanol Plant in Otter Tail County to Wilkin County, along the Minnesota & North Dakota border. Docket Number 22-422. Last year, Governor Walz signed legislation establishing the lofty goal of being carbon-free by 2040. In order to meet those goals and others, it is imperative that we invest in infrastructure that will allow us to reduce carbon emissions and accomplish the carbon-free standards.</p> <p>As the draft EIS states, there is a net benefit to this project with the CO₂ sequestered through the operation of this pipeline would far outweigh any emissions during construction. Additionally, the EIS notes the beneficial impact this carbon capture project would have on climate change.</p> <p>Throughout the draft EIS, there is a common theme: the benefits outweigh any negatives. From minimal impact to communities or farming in the area, to overwhelming benefits once completed, it is evident that this project should be grated its permits and allowed to proceed.</p> <p>This project also provides great employment opportunities for the men and women of the pipeline trades. It will create a huge number of construction jobs that carry the wages and benefits needed to sustain a Minnesota family.</p> <p>I encourage you to move forward with the carbon capture pipeline on the route proposed by Summit Carbon Solutions. Thank you for your consideration.</p>	Thank you for your comment.	20243-204403-01

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Midwest Ag Future	Warden, Shane; Smallman, Connie; LaFriniere, Sheila; Grapetin, Joseph; Becker, Levi; Carson, John; Sarvie, Stven	2024-02-23	<p>I am writing today in support of the proposed carbon capture pipeline project from the Green Plains Ethanol Plant in Otter Tail County to Wilkin County, along the Minnesota & North Dakota border. Docket Number 22-422. Last year, Governor Walz signed legislation establishing the lofty goal of being carbon-free by 2040. In order to meet those goals and others, it is imperative that we invest in infrastructure that will allow us to reduce carbon emissions and accomplish the carbon-free standards.</p> <p>As the draft EIS states, there is a net benefit to this project with the CO₂ sequestered through the operation of this pipeline would far outweigh any emissions during construction. Additionally, the EIS notes the beneficial impact this carbon capture project would have on climate change.</p> <p>Throughout the draft EIS, there is a common theme: the benefits outweigh any negatives. From minimal impact to communities or farming in the area, to overwhelming benefits once completed, it is evident that this project should be granted its permits and allowed to proceed.</p> <p>This project also provides great employment opportunities for the men and women of the pipeline trades. It will create a huge number of construction jobs that carry the wages and benefits needed to sustain a Minnesota family.</p> <p>I encourage you to move forward with the carbon capture pipeline on the route proposed by Summit Carbon Solutions. Thank you for your consideration.</p>	Thank you for your comment.	20243-204403-01
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	<p>Though the permit application by Summit Carbon Solutions says it has no plans to use the CO₂ captured at the ethanol plant for enhanced oil recovery, there is a great deal of evidence that would suggest the captured CO₂ would inevitably be used for enhanced oil recovery to facilitate the extraction of more oil than would otherwise be accessible. Statements made by Summit Carbon Solutions Company representatives have said enhanced oil recovery could be facilitated by this pipeline:</p> <p>“If another carrier decided to use, or ask us to transport CO₂ for another purpose, like enhanced oil recovery, then that's a possibility.”</p> <p>- Jimmy Powell Summit Carbon Solutions COO, Sept. 5, 2023, IUB hearing¹ “Summit is also exploring other options, including injecting the gas into depleted oil fields to boost oil production.”</p> <p>- Bruce Rastetter, CEO of Summit Carbon Solutions AG, March 2, 2021, MPR News article² State Work Group Report (2017) outlining plan for using CO₂ from ethanol plants for EOR</p> <p>A December 2017 report prepared by the State CO₂ - EOR Deployment Work Group articulated the business plan to take CO₂ captured at ethanol facilities through a to-be-built network of pipelines to oilfields so the CO₂ can be used for Enhanced Oil Recovery. The Table of Contents includes the role Low Carbon Fuel Standards play in supporting this business plan [see figures attached].</p> <p>Oil Industry Demand for CO₂ for Enhanced Oil Recovery</p> <p>Representatives of the oil industry in North Dakota and their allies have said they need CO₂ to get more oil from their marginally producing oil fields.</p> <p>President of the North Dakota Petroleum Council, Ron Ness, said: “The use of EOR (enhanced oil recovery) techniques is critical to our future success. By injecting CO₂ in wells as they decline in productivity, EOR will substantially extend the life of a well and the amount of oil that can be recovered from that well.” Ness has also said: "We have the opportunity to extend the life of the Bakken another 30 to 50 years, and produce another 5 to 8 billion more barrels, just because of technology."</p> <p>Covering a decision by the North Dakota Public Services Commission to deny a permit for Summit Carbon Solutions, KFYY-TV reported the Director of the North Dakota State Department of Mineral Resources, Lynn Helms, saying of using CO₂ for enhanced oil recovery: “We’ve got to find a way for carbon capture and utilization to become a part of North Dakota’s economy or we will leave billions of barrels of oil in the ground.”</p> <p>John Harju, Vice President of Strategic Partnerships at the Energy and Environmental Research Center in Fargo, North Dakota, has stated: "I think if we don't get adequate volumes of CO₂ to our Bakken system, we're going to leave 90-plus percent of the oil in the ground." Importantly, industry allies have explicitly stated that North Dakota will need to get this CO₂ from other states.</p>	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-02
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	<p>Proximity of CO₂ pipeline end points to oil fields</p> <p>The proposed pipeline project will deliver carbon to the direct vicinity of oil wells, as shown in the map below from the ND Public Services Commission/ND Oil and Gas Division [see figure attached]. Map Courtesy of ND Public Services Commission/ND Oil and Gas Division, republished in South Dakota Searchlight, “Critics Allege CO₂ Pipelines Farm the Government for Climate Money While Helping Oil Industry” November 10, 2023.</p> <p>As a pipeline is considered a “Common Carrier,” there is no way to ensure that the CO₂ captured and transported via those pipelines will not end up being used for EOR.</p>	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR, and a description of the sequestration facility location relative to oil and gas fields was added.	20243-204403-02

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			To suggest that the CO ₂ captured in Minnesota and taken to North Dakota by pipeline will not have a strong chance of being used for EOR is to ignore the facts of the situation. It is incumbent upon the EIS to acknowledge there is a very strong likelihood that the CO ₂ captured at the ethanol plant in Minnesota will be used for enhanced oil recovery and further perpetuate the burning of fossil fuels.		
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	Emissions Result from the Pipeline Delivering CO ₂ for Enhanced Oil Recovery Must Be Calculated and Attributed to this Pipeline It is imperative that emissions from oil extracted through enhanced oil recovery be included in the emissions assessments and carbon intensity scores for this document and others. The impact of continued burning of fossil fuels has significant environmental implications – not just for our ability to meet climate goals, but also for the communities who suffer from the pollution fossil fuels create – including extraction, refining, transportation and burning.	Section 5.7.2.3 addresses the possibility that the captured CO ₂ could be used for EOR. An estimate of resulting GHG emissions has been added.	20243-204403-02
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	Sequestration Discussion Must Acknowledge CO ₂ Leakage Potential and the Increased Probabilities for Leaks if Not Monitored and Repaired Continuously The DEIS is calculating emissions on the assumption that carbon sequestration will have a positive impact on climate and carbon emissions. This is not an appropriate assumption with accounting for potential leakage during and after the sequestration process. “Sequestered” CO ₂ leaks into the atmosphere in a variety of ways, as shown by the graph below from a Nature study and the carbon emissions from this leakage must be calculated and attributed to this proposed pipeline project [see figure attached]. In addition, the DEIS should note that continued sequestration requires substantial monitoring and maintenance, a responsibility that industry has indicated a desire to discharge. For instance, in the Texas state legislature proposed bills “would allow operators to pass on their liability to the state 10 years after their injections end. Similar laws are already in place in North Dakota and Wyoming”. Monitoring sequestration sites is a massive and expensive job. Without investment in proper and continuous monitoring for hundreds of years, the sequestered CO ₂ is likely to escape.	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-02
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	Carbon Intensity Values Must Not Be Grounded in Flawed Science. One of the most serious concerns surrounding the establishment of a market framework for reducing emissions is that industry stakeholders might try to rig the game in their favor. It is therefore imperative to demonstrate scientific trustworthiness by rejecting those studies that lack integrity. The Scully et al. study (2021) is deeply flawed and should not be allowed to inform the assignment of carbon intensity scores for the ethanol plants or producers under review in this or other proposals. Two examples illustrate how the Scully study is not a credible review of the state of the science of corn ethanol for purposes of assigning carbon intensity. Scully deconstructs then recombines data ¹² from different studies to arrive at its own estimate for the carbon intensity of land use change to corn production – which is lower than any of the studies in the range of estimates it considered – then labels this new lower number a “central best estimate.” [see attached figure] Figure 1. Boxplot of all the studies initially considered by Scully et al (represented by blue and beige dots), as well as the much lower estimate the Scully et al authors advance after reviewing these studies (represented by the red dot). Each dot shows the total land use change carbon intensity estimate from a particular study. These values were taken from figure 2 of Scully et al. 2) Scully creates its own model to predict that the conversion of pastureland to cropland results in soil carbon sequestration instead of losses. Scully achieves this by assuming the land history to be “50 years as cropland followed by 25 years of pasture and 25 years of cropland” — essentially pre-depleting baseline soil organic carbon stocks then misleadingly calling it conversion from pastureland to cropland. The Scully study was funded by Poet, a large biofuels producer, and has been widely cited by industry interests as determining that corn ethanol is up to 46% less carbon intensive than gasoline. The flawed methodologies and assumptions underlying this study should make its findings ineligible for use in determining carbon intensity scores. For a more detailed analysis of the Scully Study please reference Appendix A or view a full file here. Please note: the DEIS mistakenly states on page 6-5 that the values in Table 6-1 do not account for land use change. In fact, flawed as it is, the Scully Study does portray itself as determining carbon intensity values that incorporate land use change.	Section 6.1.3 has been revised to discuss the debate between Lark et. al. and GREET model authors.	20243-204403-02
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	The EIS Should replace the Scully study findings with the Lark study findings in all tables, graphs, calculations and analysis. The DEIS creates unwarranted confusion about different studies, wrongly suggesting that some incorporate land use changes while others don’t. Table 6-1 should list the two fuels relevant to the analysis of the value of the proposed pipeline: <ul style="list-style-type: none"> ● Corn ethanol ● Gasoline The carbon intensity score should be based on the Lark study which the DEIS references (“Research funded by the National Wildlife Federation and DOE found that ethanol is likely at least 24 percent more carbon-intensive than gasoline due to emissions from land	Section 6.1.3 has been revised to discuss the debate between Lark et. al. and GREET model authors.	20243-204403-02

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			use change associated with corn cultivation practices”) but fails to apply to the fuels receiving carbon intensity scores (page 6-5). Furthermore, the carbon intensity score found in the Lark study represents a floor, not a ceiling. The statement: “Conventional fuels such as gasoline and diesel, which have the highest CI scores” is not grounded in the research it cited just words before. (Page 6-5) Without the flawed Scully Study, but instead using the DEIS’s acknowledgement of the study indicating that “ethanol is likely at least 24 percent more carbon-intensive than gasoline”: the carbon intensity value assigned in Table 6-1 must reflect that the carbon intensity of corn ethanol is most likely significantly higher than gasoline. Carbon intensity comparisons and emission calculations must be based on credible science.		
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	EIS must acknowledge that the system of creating value for CO ₂ pollution from ethanol production creates a perverse feedback loop: the more you burn, the more you earn. The DEIS should acknowledge that building pipelines for the commodification of CO ₂ pollution encourages the continued production of ethanol and CO ₂ pollution, even in the context of market forces that might otherwise diminish its production. Creating value for pollution creates an incentive to keep creating the pollution: the more you burn, the more you earn.	As described in Section 1.2, the project’s purpose is to capture CO ₂ from the ethanol plant and transport it to the North Dakota border, enhancing the marketability of the ethanol produced at the ethanol plant.	20243-204403-02
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	The DEIS acknowledges the need to minimize impact on groundwater resources, but defers providing information by placing this responsibility on the Department of Natural Resources permitting. Independent calculations should measure the impact of this project on groundwater and this information must be provided as part of the EIS. Making the assumption that the DNR permitting system will stop any long-term impacts on water resources as explained in the DEIS Page 5-126 is not appropriate. In 2021, Enbridge quickly exceeded their water permits and eventually applied for a ten-fold increase for dewatering. The impact on groundwater is important and far-reaching and deserves to be analyzed and reported to the public. Minnesota continues to suffer the consequences of drought and over-commitment of water supplies. The DEIS must have a project specific assessment done on how this project throughout its lifetime, including the carbon capture technologies used, will impact these current drought conditions.	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has also been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-02
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	Communities rely on accurate and quantifiable data to assess the environmental impacts of drilling and pipeline projects. Horizontal Directional Drilling (HDD) is destructive and polluting to ecosystems and it is incumbent on the EIS to fully acknowledge and explain this. Despite Line 3 permit application claims that there was only a “low” probability that HDD drilling would result in a frac-out, it happened: 28 times. From the MPCA spill data shared on August 9, 2021, Enbridge had thus far in the construction caused: - 28 unique spill incidents in 21 water crossings - 63% (12 out of 21) of the HDD crossings were polluted with drilling fluid - 80% of the rivers crossed with HDD were impacted	Thank you for your comment. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5.	20243-204403-02
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	Aquifer breaches are another outcome from pipeline construction, as we have seen from Line 3. This must be discussed in the EIS.	Aquifer breaches are addressed in Section 5.7.8.2.	20243-204403-02
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	Also, it is simply not accurate for the EIS to portray HDD as being a benefit to wildlife and stream health as it seems to do on page ES-10: “Most impacts on wildlife would be highly localized, short-term, and negligible. Impacts on freshwater species would be minimized by the use of HDD techniques and sediment controls. Operation of the project would have minimal impact on wildlife and their habitats”	Use of the HDD method for crossing waterbodies avoids direct disturbance to streambeds, banks, and riparian vegetation. The applicant would use HDD to cross larger waterbodies, thereby reducing overall construction impacts on aquatic species.	20243-204403-02
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	Drilling mud at the surface of the water is like the tip of an iceberg – it is connected to a whole lot more underwater. Enormous plumes of drilling mud remain in the water unless it is removed. The DEIS should explain how the drilling mud will be tracked and then removed from the water or land when it is inadvertently leaked, not just from the top of the water where the drilling mud surfaces, but from the point of the leak. Merely collecting what is at the surface leaves most of the drilling mud polluting the water, impacting water quality, habitat, vegetation and wildlife. The EIS should discuss the impacts of this drilling mud on ecosystems, including consultation with ecosystem and species specialists about the impact of polluted water on the health of the ecosystem, not just in the immediate area but in the areas that are downstream from and connected to the area of pollution and degradation.	In the event of an inadvertent return to a waterbody, drilling mud would not "float" on the water surface. It would be suspended within the water column, creating turbidity that would be carried downstream and/or settle out, depending on water flow. An inadvertent return in an upland area could be contained and cleaned up more easily. Additional detail regarding inadvertent returns has been added to Section 5.7.8.2.	20243-204403-02

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Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	<p>Definitions are critically important: they can help us understand or they can serve to camouflage important information. The report uses the term ‘minimal’ over 60 times to describe the estimated impact on agriculture, environmental aesthetic, property value, public health, infrastructure, recreation, socioeconomics, air quality, topography, animal and vegetation habitat loss, soils and ecosystems, and the environment broadly. However, the DEIS defines “minimal” to cover a very broad range of significant impacts, thereby not providing an understandable assessment of what landowners or the public might expect. According to the definitions, even “negligible” impacts are “short-term impacts that affect common resources.” “Minimal” is more than “negligible” and could affect “common resources over the short- or long-term.” It is disingenuous for a long term impact to be called minimal. Using the term “minimal” in this EIS disguises in every instance the nature of the damage and how long it might be expected to last. Quoting from the report on page 5-2: Impact intensity levels are as follows:</p> <ul style="list-style-type: none"> ● Negligible impacts do not alter an existing resource condition or function and are generally not noticeable to an average observer. These short-term impacts affect common resources. ● Minimal impacts do not considerably alter an existing resource condition or function. Minimal impacts might, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short- or long-term. “Minimal,” used dozens of times through the DEIS, varies in its definition. For example, ‘minimal’ means anywhere from 2-3 years to 5 years of interrupted crop production (ES-6). This language is contradictory and confusing. The use of ‘temporary’ suffers from the same problem. The DEIS uses ‘temporary’ over 40 times, with no consistent definition (page 5-38). The point of the EIS is to help people understand the impact of the proposed project: it is incumbent on the EIS to use language that clarifies the range of impacts possible for each category that is explored. Instead of using words like “minimal” or “temporary” the description should say name the impact itself and how long it is possible the impact could be affecting the ecosystem. 	Thank you for your comment. As noted in Section 5.1 of the EIS, the EIS defines the terms used to characterize potential impacts in order to ensure common understanding among readers and to compare potential impacts among alternatives.	20243-204403-02
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	Further investment in ethanol production infrastructure incentivizes its continued use and maintains or grows the environmental consequences associated with that system. Pesticide application to corn crops is one such issue. Pesticide treated seeds also can cause harm, particularly if waste from these seeds are not disposed of properly. An ethanol plant disaster in Mead, Nebraska in 2021 is a poignant example of environmental and human health harm from neonicotinoids in treated corn seed: significant water contamination and poisoning of the ecosystem. The rapid decline of bee colonies near Mead was an early warning sign, prompting investigations that uncovered unsafe levels of neonic compounds. Overall, the Mead ethanol plant disaster underscores the interconnectedness between ethanol production, environmental sustainability, and public health. A complete EIS would consider these risks. Understanding the effects of pesticide contamination on water quality and ecosystem health is important for informed decision-making and effective mitigation strategies.	Thank you for your comment. Impacts of current agricultural practices are outside the scope of the EIS.	20243-204403-02
Minnesota Interfaith Power & Light	Wolff, Sara	2024-02-23	Water is interconnected: depletion in one area can have rippling consequences nationwide. Minnesota's drought and lack of groundwater retention, exacerbated by the depletion of aquifers, have far-reaching implications extending beyond state lines. As we remove water from the ground, soils compress and collapse, leading to sinking land surfaces. This phenomenon especially threatens cities built on drained marshland or fill. Lack of groundwater also impacts surface waters – consequences which are felt from the top to the bottom of a watershed. The decrease of freshwater flow downstream from the Mississippi River is resulting in saltwater creeping upstream. This “slow-motion crisis” has devastating effects on communities and their drinking water and now is merely 25 miles away from New Orleans. Peter LaFontaine with Friends of the Mississippi River, a Minnesota environmental organization, interviewed Matt Rota of Healthy Gulf, an environmental nonprofit working to strengthen environmental justice and protection in Louisiana and the lower Mississippi basin. Rota said that “when it comes to long-term resiliency, the farm landscape of the Midwest has these extensive drainage systems designed to get the water off the ground as quickly as possible. [If] we changed that to make sure the water is held in the ground as long as possible, [it] would buffer against both droughts and floods.” This problem has a clear link to groundwater and drought issues in the Midwest. The design of the Midwest's extensive drainage systems exacerbates groundwater depletion and stifles the downstream flow of freshwater, in turn threatening the accessibility to clean drinking water in Louisiana. Minnesota farms exceeded pumping permits by a staggering 6 billion gallons in 2021, putting into question the state's ability to sustainably manage its water resources. The EIS must acknowledge and analyze the role depleting groundwater resources.	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has also been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-02
MN Department of Natural Resources		2024-02-23	Page 5-112. A Natural Heritage review request was submitted and completed for RA-South only. All route alternatives should have undergone a formal natural heritage review by the DNR prior to writing of the draft EIS. With that said, DNR natural heritage staff reviewed the information within the draft EIS and conducted reviews of the route alternatives discussed.	Section 5.7.5.1 was revised to note that Natural Heritage Information System (NHIS) data for the RA-South route was obtained by EERA staff through a licensed use, as that was the route originally proposed by the applicant. After receiving DNR comments on the draft EIS, EERA staff obtained Conservation Planning Reports for the RA-North and RA-Hybrid	20242-203780-01

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				routes, which are included in Appendix O. EERA staff also consulted NHIS records through a licensed use to identify listed species in the project area.	
MN Department of Natural Resources		2024-02-23	The following comments apply to the “State-Listed Species section” starting on page 5-112: <ul style="list-style-type: none"> • We recommend modifying the second paragraph to more accurately describe the potential for impacts (suggestions are bolded) “The potential for take of state-listed bird species is confined to highest in native habitat types, especially short-grass prairie, wet-mesic prairie, wet meadows, and marsh areas. Marbled godwits will nest in short crop or roadside ditch cover, if near larger wet prairie/wetland areas. Take of other state-listed bird species in agricultural areas and woodlots is unlikely to occur, as no state-listed species use that they are not likely to nest in these habitats are known to occur within the ROIs of any of the route alternatives.” 	The proposed revisions to the paragraph have been made.	20242-203780-01
MN Department of Natural Resources			The following comment also applies to the “State-Listed Species section” starting on page 5-112: Third paragraph, last sentence. We recommend providing more robust discussion regarding impacts to local bird populations. Since these species are already rare, losing nests may have a local impact, especially if nest loss might happen multiple times, and over a longer duration, such as during the construction phase and during operational maintenance.	Revisions have been made to Section 5.7.5.2.	20242-203780-01
MN Department of Natural Resources			Page 5-113. “The potential for direct take of state-listed plants is confined to native habitat types, specifically wet prairie, mesic prairie, and wet meadows.” This statement needs to be revised, as there are several mapped occurrences of small-white lady’s slipper, a state-listed species of special concern, within the Region of Influence (ROI), and some within a few hundred meters of the project area that are not within native habitat types (as defined by being an Native Plant Community or within an identified Minnesota Biological Survey site of biodiversity significance).	Revisions have been made to Section 5.7.5.2.	20242-203780-01
MN Department of Natural Resources			Pg. 5-113. First full paragraph, second to last sentence. A more robust discussion of the potential impacts to local rare plant populations is needed, accounting for the issue that a decrease of plants that are already rare could have more than a short-term impact on local populations. A discussion on life-cycle of each relevant rare plant species would be helpful in developing a more robust assessment of impacts.	Revisions have been made to Section 5.7.5.2.	20242-203780-01
MN Department of Natural Resources			In addition, the DNR is aware that in 2022 and in 2023, surveys for state-listed butterfly and plant species were conducted. Suitable habitat for Dakota skipper, powesheik skipperling, and western-prairie fringed orchid (all state-listed as endangered) was found to be present within the survey area. Surveys were also conducted for small-white lady’s slipper (state-listed as special concern), with several plants documented within the survey area. The final EIS should discuss these surveys, the results, impacts, and proposed mitigation. (The DNR is currently reviewing the survey report submitted and will provide a response to the applicant.)	The information requested by DNR regarding field surveys for state-listed butterfly and plant species was added to Section 5.7.5.1 .	20242-203780-01
MN Department of Natural Resources			The draft EIS does not seem to discuss the distinction between state-listed species, and state-protected species. Providing this discussion within the EIS could aid in understanding of impacts as they relate to state law, and state-listed species, and in understanding discussion of required mitigations or needs for Take permits from the State of Minnesota.	Revisions have been made to Section 5.7.5.2.	20242-203780-01
MN Department of Natural Resources		2024-02-23	Page 5-116, Chapter 7.7.6. Soils. Soils in parts of the Red River Valley (such as between Detroit Lakes and Fargo) are very corrosive to metals (such as sewer pipes). The EIS should discuss the potential risk of some soil types to cause corrosion of the underground pipeline as well as the proposer’s plans to mitigate or minimize potential for degradation of infrastructure.	Text has been added to Section 5.7.6.2 to address corrosive soils and measures to protect against corrosion.	20242-203780-01
MN Department of Natural Resources		2024-02-23	Page 5-126. The EIS should clearly identify which surface waters are DNR public waters. Table 5-45 includes the numbers of public waters crossed for each route alternative, however, the following tables and discussions on each route alternative do not clearly identify which of those are DNR public waters. This distinction is important for discussion, because regulatory requirements differ between DNR public waters and other surface water types.	Tables 5-48, 5-49, and 5-50 have been revised to add a column indicating whether each listed surface water is on the Public Waters Inventory (and thus a protected public water).	20242-203780-01
MN Department of Natural Resources		2024-02-23	Page 5-136. In addition to the stated potential risk of sheet pile causing a breach in a confining layer, the proposed depth of excavation for the pipeline may also be deep enough to compromise shallow confining layers, if present. This may be of heightened concern through the beach ridge system or near wetlands and surface water features. The EIS should discuss these potential impacts, as well as proposed mitigation.	The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. This information has been added to Section	20242-203780-01

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				5.7.8.2. Furthermore, as described in Section 5.7.8.2, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur.	
MN Department of Natural Resources		2024-02-23	Page 5-139. Pipeline construction design should consider the prevention of French drain effects via the pipeline trench across the entire project, and especially in the beach ridge area. At a minimum, Pennsylvania standards for trench breaker placement should be used and additional knowledge gained from more expansive subsurface site characterization may provide further guidance on where to place trench breakers most effectively.	The applicant provided a detailed discussion regarding French drain effects and Pennsylvania standard for trench breaker placement relative to the proposed project in response to Question 5 of Supplemental Information Inquiry 12 (see Appendix I). Text regarding trench breakers has been added to Section 5.7.8.2.	20242-203780-01
MN Department of Natural Resources		2024-02-23	Page 5-146. The discussion on fish and wildlife present within the proposed project area lacks sufficient detail. The Otter Tail River supports a diverse community of native fish and mussel species, so more detailed discussion would better inform how natural features could potentially be impacted from the proposed project.	Text based on a published 1995 North Dakota State University (NDSU) Masters Thesis habitat study describing mussel species abundance and habitat has been added to Section 5.7.10.1. Section 5.7.10.1 discusses the major fish and wildlife species present in the project area. Section 5.7.10.2 discusses potential impacts on fish, mussel, and wildlife populations. Potential impacts on fish, mussels, and wildlife are also discussed in Chapter 8.	20242-203780-01
MN Department of Natural Resources		2024-02-23	Page 5-151. Chapter 5.7.10 Wildlife and their Habitats: In addition to the mitigations discussed in Chapter 5.7.10.3, the DNR recommends that any open trenches incorporate escape routes so that any animals that enter the trench can escape, such as by including moderate grade ramps. The DNR also recommends that trenches are inspected are inspected immediately prior to backfilling, and that any trapped animals present be removed.	Section 5.7.10.3 was updated, based on DNR recommendations and the applicant's commitment, to note that "Plugs of subsoil in the ditch would be left as moderate grade ramps," and "Trenches would be inspected immediately prior to backfilling in order to locate and remove any trapped animals present."	20242-203780-01
MN Department of Natural Resources		2024-02-23	Page 5-137. The EIS describes the purposes of water use needed during construction (such as the installation of HDDs, hydrostatic testing, and dust control), however, it does not clearly describe annual water use during operation at the capture facility. The EIS should include a description of annual operational water use and describe where the 13 million gallons of water would come from. If the 13 million gallons is proposed to be obtained from an existing DNR Water Appropriation Permit, then an application for an amendment to an existing permit may be required. If an amendment is not requested, then a new permit would be needed.	Additional information has been added to Section 5.7.8.2 to address the source of water use for the capture facility as well as the need to amend an existing DNR Water Appropriation Permit, or obtain a new permit, for the capture facility's operational water needs. Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20242-203780-01
MN Department of Natural Resources		2024-02-23	Page 5-138, 5-145, and sample routing permit, Appendix H. The sample routing permit states, "Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area." This statement is repeated in the mitigation sections on pages 5-138 and 5-145. However, this statement seems to contradict needed trench restoration. Soil that is excavated from wetlands and riparian areas must be used to restore excavated trench. The DNR recommends that this statement be refined or further explained.	"Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area" means that, during construction, the contractor may not store trench soils in wetlands—trench soil must be stored in uplands. When necessary in the construction process, these soils are taken from the upland and used to restore the trench. Text in Section 5.7.8.3 and Section 5.7.9.3 has been revised: "Soil excavated from wetlands and riparian areas shall be contained in uplands and not placed back into the wetland or riparian area until necessary to restore the excavated trench."	20242-203780-01

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MN Department of Natural Resources		2024-02-23	Page 8-19. The EIS states that CO ₂ leaks would be unlikely to impact fish and freshwater mussels. The conclusion of this is dependent of limestone buffering ability of soils, which is not applicable to soils within the Red River Basin. The EIS should discuss the alkalinity and chemical characteristics of the waterbodies that would be crossed by the proposed project to assess risks present. The EIS should examine the impacts a change in CO ₂ would have in varying conditions, such as water flows, temperatures, amounts of CO ₂ released, and alkalinity present, and discuss the downstream distances where fish mortality could occur.	Chapter 8 discusses impacts on fish and freshwater mussels from two perspectives—effects from CO ₂ leaks and effects from a CO ₂ pipeline rupture. We defer to the DNR's expertise and authority regarding fish and wildlife. Consistent with this authority, EERA staff believes that a special permit condition requiring the applicant to prepare monitoring protocol to identify potential impacts on fish and wildlife, water resources, and other environmental resources should an accidental release (leak or rupture) of CO ₂ occur is reasonable. This protocol should be developed in coordination with DNR.	20242-203780-01
MN Department of Natural Resources		2024-02-23	Page 9-1 Chapter 9.1.1 Unavoidable Impacts: Construction states that, “Intermittent waterbodies such as drainage ditches would experience temporary and unavoidable increases in turbidity during open cut construction.” Increases in turbidity could be avoided if an isolated crossing technique (e.g. dam and pump) is used under flowing conditions, or, if water is present but not flowing, then temporary dams could be used. The EIS should consider additional options on how to avoid turbidity during open cut construction.	The applicant has clarified that it would use the isolated dry-trench crossing method on delineated waterbodies with perceivable water flow during construction. The flowing open-cut crossing method would not be used for the project. Sections 5.7.8.2 and 5.7.10.2 have been revised accordingly.	20242-203780-01
MN Department of Natural Resources		2024-02-23	Chapter 10. Cumulative potential effects. It is not clear if the Fargo-Moorhead Diversion project was considered for inclusion for discussion on cumulative potential effects, but the DNR offers this suggestion for inclusion.	The Fargo-Moorhead Diversion project was added to Chapter 10 for analysis for potential cumulative impacts.	20242-203780-01
MN Department of Natural Resources		2024-02-23	Appendix D. Environmental construction plan (ECP) • Page 5. The DNR recommends that erosion control mesh be limited to materials that specify only natural fibers, with no plastic.	The applicant has stated, “The Contractor will select wildlife-friendly erosion control fabric that contains biodegradable netting (Category 3N or 4N natural fibers) and will avoid the use of plastic mesh following MnDOT’s 2020 Standard Specifications for Construction (or more recent edition) for rolled erosion control materials that specify only natural fibers with no plastic mesh be used.” See response to Supplemental Information Inquiry 12 in Appendix I (Supplemental Information Inquiries and Responses) and applicant-proposed mitigation in Sections 5.7.5.3 and 5.7.10.3	20242-203780-01
MN Department of Natural Resources		2024-02-23	• ECP Page 7, trench breakers. The DNR previously provided recommendations to follow Pennsylvania standards for trench breaker placement. The draft EIS includes these recommendations in sections 4.6 and 5.7.83, which discuss mitigation measures offered during scoping. The DNR continues to recommend that Pennsylvania standards for trench breakers be utilized, and recommends that the ECP be updated.	The applicant provided a detailed discussion regarding French drain effects and Pennsylvania standards for trench breaker placement relative to the proposed project in response to Question 5 of Supplemental Information Inquiry 12 (see Appendix I). Text regarding trench breakers has been added to Section 5.7.8.2. Trench breaker/plug placement would be tailored to site-specific conditions and would be at least as protective as the Pennsylvania standards.	20242-203780-01
MN Department of Natural Resources		2024-02-23	The ECP should clarify if travel lanes will be used on HDD river crossings. If a travel lane is used across waterbodies, significantly more vegetation removal and disturbance will occur, including bridge construction. The DNR recommends that no travel lanes be utilized across waters that use HDD.	As described in several resource sections in Chapter 5, vegetation between HDD entry and exit points would not be cleared during construction, aside from hand trimming necessary to set the HDD guidewires or a pump for water withdrawal. Text has been added to Section 2.4.8 to clarify that no travel lanes would be used between an HDD entry and exit.	20242-203780-01
MN Department of Natural Resources		2024-02-23	[ECP]• Where trench crossings are used for streams, we recommend segregating the streambed surface material for restoring streambed surface material that is usually courser than underlaying material (similar to how topsoil is segregated in uplands).	In response to comments from DNR, the applicant states that it will add the following statement to Section 4.8 of the Minnesota ECP: “Where trenched crossings were used, the Contractor will restore the stream by first replacing underlying streambed materials in the trench before replacing streambed surface/substrate materials to support the consistency of the disturbed stream bottom relative to undisturbed areas.” Section 5.7.8.3 has been updated.	20242-203780-01

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MN Department of Natural Resources		2024-02-23	[ECP]• The DNR recommends not using flowing open cut method for any stream crossing.	The applicant has clarified that it would use the isolated dry-trench crossing method on delineated waterbodies with perceivable water flow during construction. The flowing open-cut crossing method would not be used for the project. Sections 5.7.8.2 and 5.7.10.2 have been revised accordingly.	20242-203780-01
MN Department of Natural Resources		2024-02-23	<ul style="list-style-type: none"> • The ECP should address trench crowning/subsidence. The ECP should address post construction monitoring for topography and crowning/subsidence, vegetation restoration, erosion, and monitoring groundwater expressions along the project route. 	In response to Supplemental Information Inquiry 12, the applicant stated that it would include details in the ECP for preventing excessive crowning or subsidence above the restored centerline. If uneven settling occurs or surface drainage problems develop as a result of pipeline construction, the applicant would provide additional land leveling services after receiving a landowner's written notice, weather and soil conditions permitting. As indicated in Section 8.2 of the ECP, the applicant would monitor areas where stabilization and restoration methods are implemented in accordance with requirements in state permits and landowner agreements. Monitoring would identify areas where remedial measures are required to establish a stable surface for reclamation to be successful. This may include re-grading, re-seeding, re-mulching, and additional monitoring. Monitoring of groundwater expressions was added to Section 5.7.8.2 as a DNR-recommended mitigation.	20242-203780-01
MN Department of Natural Resources		2024-02-23	<ul style="list-style-type: none"> • ECP Page 14. The ECP states that HDD drilling fluids and additives will be nontoxic to the aquatic environment and humans. Toxicity is primarily related to magnitude of release, as larger amounts of even “nontoxic” drilling fluids could be harmful to aquatic life. The contingency plan to address inadvertent release response should include equipment such as a functioning vac-truck on site and other equipment/materials. This contingency plan should be in coordination with the DNR utility license application. 	Section 5.7.8.2 summarizes the components of the contingency plan to address the unintended release of drilling mud to the environment that the applicant would develop prior to conducting HDD. Containment, response, and clean-up equipment would be available at both sides of an HDD crossing location prior to beginning the HDD to assure a timely response in the event of an inadvertent release. Text has been added that the contingency plan should be in coordination with the DNR utility license application at locations where a utility crossing license is required.	20242-203780-01
MPCA	Green, Chris	2024-02-20	<p>Dear: Craig Janezich</p> <p>Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (DEIS) for the Otter Tail to Wilkin CO₂ Pipeline Project (Project) located in Wilkin, Otter Tail County, Minnesota. The Project consists of approximately 28.1 miles of 4-inch diameter CO₂ pipeline and associated facilities in portions of Wilkin and Otter Tail counties. The Project would capture CO₂ from the Green Plains Ethanol Plant near Fergus Falls and transport it to the North Dakota and Minnesota border south of Breckenridge. The Project would interconnect to a larger proposed CO₂ pipeline network, referred to as the Midwest Carbon Express Project, to transport the CO₂ to a sequestration area in North Dakota. The Minnesota Pollution Control Agency (MPCA) staff has reviewed the EAW and have no comments at this time. We appreciate the opportunity to review this project. Please be aware that this letter does not constitute approval by the MPCA of any or all elements of the Project for the purpose of pending or future permit actions by the MPCA. Ultimately, it is the responsibility of the Project proposer to secure any required permits and to comply with any requisite permit conditions. If you have any questions concerning our review of this DEIS, please contact me by email at Chris.Green@state.mn.us or by telephone at 507-476-4258.</p> <p>Sincerely, Chris Green</p>	Thank you for your comment.	20243-204403-01
Operating Engineers Local 49	Runke, Nathan	2024-02-23	The International Union of Operating Engineers Local 49 (IUOE Local 49) is a construction labor union in Minnesota representing heavy equipment operators and mechanics, along with stationary engineers. Our members have extensive experience constructing and maintaining pipeline infrastructure in the state of Minnesota and we welcome the opportunity to provide comments on the Draft Environmental Impact Statement (DEIS). We appreciate the Department of Commerce's (DOC) work on the DEIS and believe it is a complete and accurate description of the potential impacts of the Summit Carbon project.	Thank you for your comment.	20243-204403-01

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			<p>The construction and maintenance of pipeline infrastructure is an important industry for members of IUOE Local 49. Our members have constructed pipelines for the transportation of oil, natural gas, and other substances. The use of pipelines has consistently been shown to be the safest and most cost effective means of transporting liquids, gasses, and slurries.</p> <p>As Minnesota seeks to reduce its greenhouse gas emissions, carbon capture, utilization and storage (CCUS) technologies will become increasingly important to the ongoing decarbonization efforts. This is especially the case as we seek to decarbonize the transportation and industrial sectors. Carbon dioxide pipelines are a needed component of most CCUS systems and it will be critical to construct these pipelines in Minnesota if we are to achieve the state’s greenhouse gas emission reduction goals. This is reflected in the DEIS discussion of impacts on air quality and greenhouse gas emissions. As the DEIS correctly notes, the use of low-carbon fuels has been identified as one of the strategies in Minnesota’s Climate Action Framework to meet the state’s climate goals. Carbon pipelines are the most effective ways to reduce the carbon intensity of ethanol production and are the most feasible pathway to significant carbon dioxide reductions in liquid fuels.</p>		
Operating Engineers Local 49	Runke, Nathan	2024-02-23	<p>As the DEIS discusses, 100% of the construction workforce for the project will be unionized with most of the workers coming from the local area or within the state of Minnesota. As such the project would be built safely by highly skilled construction workers and the majority of the employment benefits will return to Minnesota workers and their families.</p> <p>We, again, thank the DOC for their work on the DEIS and the opportunity to provide comment. We look forward to continuing to support this project throughout the permitting process.</p> <p>Sincerely, Nathan Runke Regulatory & Political Affairs Coordinator, International Union of Operating Engineers Local 49</p>	Thank you for your comment.	20243-204403-01
SHPO	Beimers, Sarah J.	2024-02-23	<p>Chapter 3 Regulatory Framework</p> <p>On Table 3.1 Potential Federal Permits, Approvals and Consultations – Pipeline Facilities the SHPO, along with our partner agency the Office of the State Archaeologist, is correctly identified as having a consulting role under Minnesota Statutes Chapter 138 (Minnesota Field Archaeology Act and Minnesota Historic Sites Act). Since there may be other possible federal undertakings associated with the Project, and because Section 106 of the National Historic Preservation Act (NHPA) is mentioned in the corresponding “Description” cell, it would be beneficial to include reference to Section 106 of the NHPA in the “Type” cell as well. Also, most importantly, the DEIS is incorrect in stating that consultation with Tribes or the Tribal Historic Preservation Offices is “facilitated by SHPO.” This government-to government tribal consultation, whether it be under Section 106 of the NHPA or pursuant to Minnesota’s tribal consultation statute, is carried out by the lead federal agency and/or the lead state agency which may be providing assistance, approval, permits, or licenses for the Project, not the SHPO.</p>	Section 106 of the National Historic Preservation Act has been added to the "Type" column of Table 3-1, Potential Federal Permits, Approvals, and Consultations – Pipeline Facilities. The text in the "Description" column associated with the State Historic Preservation Office (SHPO) and Office of the State Archaeologist (OSA) has also been updated to clarify that Tribal consultation is carried out by the lead federal agency and/or lead state agency.	20243-204403-01
SHPO	Beimers, Sarah J.	2024-02-23	<p>Chapter 4 Alternatives</p> <p>We understand by this chapter that, along with the No Action Alternative, the DEIS has evaluated the applicant’s proposed route (RA-South) and two (2) alternative routes (RA-Hybrid and RA-North) which are all clearly described and documented on maps included in the DEIS.</p>	Thank you for your comment.	20243-204403-01
SHPO	Beimers, Sarah J.	2024-02-23	<p>Chapter 5 Potential Impacts and Mitigation for Alternative Routes</p> <p>Section 5.6 Archaeological and Historic Resources</p> <p>Although not specifically stated in the DEIS, we acknowledge that our office has consulted with Summit Carbon Solutions (Permittee) since September 2021 as the company and their consultants have completed and submitted to our office for review and comment the archaeological and historic/architectural field surveys within their preferred pipeline route, which is referenced in survey reports as MNL-321 and identified as RA-South in the DEIS. It is important to note that while our office has reviewed and commented on the eligibility of recorded archaeological sites for listing in the National Register of Historic Places (NRHP) within the ROI for RA-South (MNL-321), to date, we have not reviewed or provided comment on the archaeological survey methodology as we have not been asked to do so by the Permittee.</p>	In a letter dated October 14, 2021, SHPO indicates that it reviewed the survey methods proposed in the "Archaeological Survey Methodology and Protocols for Minnesota, Summit Carbon Solutions" (9/20/2021) and assessed them as appropriate for the project. The SHPO letter is included in Appendix G of the Scoping Environmental Assessment Worksheet (EAW) (filed April 10, 2023, eDockets file no. 20234-194670-02). Section 5.6 of the EIS has been updated to reference this previous consultation with SHPO.	20243-204403-01
SHPO	Beimers, Sarah J.	2024-02-23	<p>Section 5.6.1 Archaeological Resources</p> <p>We understand that, for RA-Hybrid and RA-North, the DEIS has utilized recorded archaeological site data from both the SHPO and the OSA, which is appropriate since these two route alternatives have not yet been subject to comprehensive archaeological field survey for the specific Project. It is important to note that there was minimal information provided in the DEIS related to previous archaeological survey area coverage and how it may overlap, or not, with the Project area/route width for each of these alternatives.</p>	<p>Survey coverage for each alternative is summarized in Section 5.6.1.2 of the EIS based on the defined corridor for each alternative (89 percent of RA-South, 60 percent of RA-Hybrid, and 1 percent of RA-North).</p> <p>Since landowner permission is needed to complete surveys, it is not typical to complete surveys and evaluations on all route alternatives other than those proposed by the applicant at the environmental review</p>	20243-204403-01

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			<p>Based upon information provided in Table 5-23 Archaeological Resources within the RA-North Project Area and Table 5-25 Archaeological Resources within the RA-Hybrid Project Area, we understand that there is one (1) previously recorded site identified within RA-North and there are four (4) previously recorded sites within RA-Hybrid.</p> <p>It would be helpful if Section 5.6.1.1 Existing Conditions provided a detailed assessment of whether the Permittee’s surveys conducted to date were completed to the guidelines and standards outlined in the SHPO’s “Guidelines for Archaeological Projects in Minnesota” and the Secretary of the Interior’s Standards for the Identification of Historic Properties. If the information collected in these surveys was not completed to existing guidelines and standards, there leaves open the question of whether all of the archaeological resources within the proposed route and route alternatives have been identified accurately.</p> <p>Under Section 5.6.1.2 Potential Impacts there are references to the fact that RA-North and RA-Hybrid route widths have only been partially surveyed for archaeological resources. It is important to note that, due to this incomplete survey, a full evaluation of either alternative’s potential to impact archaeological resources cannot be determined until those surveys have been completed.</p> <p>When SHPO was asked to review Permittee’s Phase I archaeological reconnaissance reports for MNL321 (RA-South), we were only asked to comment on/concur with the NRHP eligibility recommendations in the reports. We understand that the survey was completed by one archaeological consultant (Merjent) and the DEIS was prepared by a different archaeological consultant (HDR Inc.). In other states, 3 it is standard practice to have reports independently peer-reviewed by separate archaeological consultants to ensure the survey was complete and carried out consistent with state and federal standards/guidelines.</p> <p>It would also be useful in the final EIS to have complete evaluations for all the archaeological sites within the route width for the three route alternatives evaluated. If RA-South has the most sites, but all of those sites are “not eligible” for listing in the NRHP and RA-North has the fewest sites and the lowest potential for new sites, but one of the sites within the route width had been determined “eligible” for listing in the NRHP, RA-South would be the preferred option to avoid the eligible site (aka the Historic Property). This includes an evaluation of archaeological sites 21WL0029 and 21WL0005. It may be useful to have other sites in the project area evaluated as well if it is possible that these sites will be impacted by the Project. While we understand that the PUC recommends avoidance of all archaeological sites, SHPO would recommend avoidance of NRHP-eligible archaeological sites in preference over sites that have been determined not eligible for listing in the NRHP. SHPO recommends further clarification to the proposed “Commission Sampling Routing Permit” which should also require continued consultation with our office and others to ensure that archaeological field methodology was carried out consistent with state standards and guidelines, and all parties interested in the results of field survey, including THPOs, are given ample opportunity to review and comment on survey reports and results.</p>	<p>stage. Therefore, information regarding known archaeological resources and the potential for unknown archaeological resources to exist is used to inform comparison of the potential impacts of alternative routes being considered. However, as stated in Section 5.6.1.3, survey of the route alternative selected by the Commission is recommended by EERA staff. In addition, the Mitigation Recommended by EERA Staff section has been revised to clarify that the survey should be completed to meet state standards and guidelines. Also, the text has been clarified to reference continued consultation with the OSA, in addition to the Tribes and SHPO, regarding the results of additional survey to determine if additional studies to evaluate the National Register of Historic Places (NRHP) eligibility of the resource are warranted and to develop appropriate avoidance or treatment plans.</p> <p>In a letter dated October 14, 2021, SHPO indicates that it reviewed the survey methods proposed in the "Archaeological Survey Methodology and Protocols for Minnesota, Summit Carbon Solutions" (9/20/2021) and assessed them as appropriate for the project. The SHPO letter is included in Appendix G of the Scoping EAW (filed April 10, 2023, eDockets file no. 20234-194670-02). The survey protocol was designed following Minnesota state methodological guidelines as defined in the Minnesota State Historic Preservation Office Manual for Archaeological Projects in Minnesota (SHPO 2005) and the State Archaeologist's Manual for Archaeological Projects in Minnesota (OSA 2011). Methods used during the archaeological survey align with the protocols SHPO approved prior to survey initiation. Section 5.6.1 of the EIS has been updated to reflect this previous consultation with SHPO.</p>	
SHPO	Beimers, Sarah J.	2024-02-23	<p>Section 5.6.1 Historic Architectural Resources</p> <p>The narrative summary and tables associated with existing conditions appear to accurately reflect data included in our state historic inventory records. Similar to our recommendation above as it relates to archaeological survey, we recommend completion of survey of historic and archaeological resources within the route corridors for each of the Project alternatives Please contact me at sarah.beimers@state.mn.us if you have any questions regarding this comment letter.</p> <p>Sincerely, Sarah J. Beimers Environmental Review Program Manager</p>	<p>Section 5.6.2.2 has been revised to state, "No properties listed in State or National Register of Historic Places, nor the State Historic Sites Network, have been previously inventoried within the route widths for the route alternatives. Therefore, further review pursuant to the Minnesota Historic Sites Act is not warranted. If federal permits are needed, compliance with Section 106 may be required, historic architectural surveys will be completed if determined by the lead federal agency as needed."</p>	20243-204403-01
Sierra Club North Star Chapter	Levin, Margaret	2024-02-23	<p>The Sierra Club North Star Chapter is deeply concerned about the Summit proposal and about carbon dioxide pipeline proposals generally because: they fail to address other emissions and pollution from fossil fuel extraction and industrial agriculture; allow for the extension of fossil fuel extraction through enhanced oil recovery; and because of the risks that a pipeline leak or break could harm surrounding communities and first responders. Specifically:</p>	<p>Thank you for your comment.</p>	20243-204403-01
Sierra Club North Star Chapter	Levin, Margaret	2024-02-23	<p>The DEIS underplays the risks of a pipeline rupture that could endanger first responders and communities, and safety measures that would need to be in place.</p>	<p>Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that</p>	20243-204403-01

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				would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	
Sierra Club North Star Chapter	Levin, Margaret	2024-02-23	The DEIS discounts the direct and long term impacts of pipeline construction on lands and soil, and fails to accurately assess the risks and dangers to water, wetlands, aquifers, and critical habitat.	Thank you for your comment.	20243-204403-01
Sierra Club North Star Chapter	Levin, Margaret	2024-02-23	The DEIS does not properly and accurately account for the real carbon dioxide and nitrous oxide emissions and climate impacts of the proposed project, including the relationship to enhanced oil recovery and the growing of corn for ethanol.	Thank you for your comment.	20243-204403-01
Sierra Club North Star Chapter	Levin, Margaret	2024-02-23	The DEIS fails to account for the cumulative impacts of the Summit project on Minnesota. The practice of segmenting permitting requests for individual segments will prevent a thorough review.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
Sierra Club North Star Chapter	Levin, Margaret	2024-02-23	We ask that the Public Utilities Commission and Department of Commerce take these issues as well as the concerns raised by other commenters into account, in order to ensure that the forthcoming Environmental Impact Statement (EIS) is a factual and thorough account of the project impacts. Minnesotans need a robust environmental review that includes properly weighing the State’s greenhouse gas emissions goals in Minnesota Statute 216H.02. We also need transparency,accountability, and regulatory oversight to ensure the greater public good and interests of communities impacted by these pipelines and across our state are respected and protected.	Thank you for your comment.	20243-204403-01
Summit Carbon Solutions	DeJoia, Aaron	2024-03-14	Q. Do you believe that Summit’s APP adequately addresses impacts to agricultural lands? A. Yes, Summit’s APP represents best practices regarding topsoil separation and replacement, erosion, and revegetation. Summit’s APP is similar to agricultural impact mitigation plans/agreements that I have written, reviewed, and executed in other states throughout the nation including in South Dakota, Iowa, Missouri, Illinois, Wisconsin, Indiana, Ohio, and Pennsylvania. Moreover, I am aware that the Minnesota Department of Agriculture has also reviewed the APP and found that “the treatment of agricultural lands is well addressed in the required Agricultural Impact Mitigation Plan.” (1) <i>(1) Minnesota Department of Agriculture Comments, In the Matter of the Application of Summit Carbon Solutions, LLC, for a Routing Permit for the Otter Tail to Wilkin Carbon Dioxide Pipeline Project in Otter Tail and Wilkin Counties, PUC Docket Number: IP-7093/PPL-22-422 (May 13, 2023), eDockets ID No. 20235-195961-01.</i>	The applicant's Minnesota APP is provided as Appendix E.	20243-204356-06
Summit Carbon Solutions	DeJoia, Aaron	2024-03-14	Q. Please respond to Dr. Dolph’s assertion that the RA-North route alternative is preferable to RA-South because it will present the least risk to soil degradation. A. Having designed and/or implemented reclamation on over 10,000 miles of pipeline right-of way throughout the country, in my professional experience, the potential for soil degradation is more likely due to poor planning and construction techniques than small changes in soil physical and chemical composition identified in USDA-NRCS SSURGO data. The different routes identified have very similar soils characteristics and approximately the same percentage of soil compaction, water erosion, hydric soil, wind erosion, and revegetation soil concerns. In my professional opinion, the differences in soils and potential for soil degradation along the three different routes, based on the SSURGO data, are inconsequential as long as the APP is implemented. The soils data included in the DEIS is critical to evaluate potential impacts to soils, but soil actually disturbed by pipeline construction, weather during construction, and construction practices used are ultimately going to determine if reclamation can be achieved. I am in agreement with the MDA in that if the APP is implemented the soils along the final route will returned to preconstruction productivity and functionality. In my professional opinion based on the information available, there is no difference in soil degradation potential between the route alternatives as long as the APP is followed.	Section 5.7.5 concludes that the route alternatives generally share similar soil characteristics.	20243-204356-06
Summit Carbon Solutions	Lange, Alexander	2024-02-13	Q. The DEIS evaluates both a worst-case rupture scenario and a leak scenario. Are there any clarifications you would like to make regarding Summit’s emergency response actions for a leak (as compared to rupture)? A. Yes. As I was reviewing the DEIS at 8-21, where the DEIS describes Summit’s emergency response actions, I noticed that we had not previously highlighted an important aspect of our response to a small release, or leak. When emergency conditions indicate a small	Thank you for your comment.	20242-203374-05

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			leak, in addition to closing valves and isolating the pipe segment, Summit’s operations team would also open vents and complete a controlled blowdown at the MLV site to safely evacuate the pipeline segment of product such that the duration of the leak would be much shorter than described in the DEIS.		
Summit Carbon Solutions	Lange, Alexander	2024-02-13	How many MLVs are planned along Summit’s Preferred Route (RA-South)? A. When Summit filed its Application, it initially proposed four MLV locations – one at the capture facility and three along the pipeline route. Since filing the Application, Summit has added an additional MLV near milepost (MP) 4.8, bringing the total number of MLVs in Minnesota to five. Each of these MLVs were evaluated in the DEIS.	Thank you for your comment.	20242-203374-05
Summit Carbon Solutions	Lange, Alexander	2024-02-13	Q. Why did Summit add an additional MLV? A. As Summit continued to gather information about resources and potential impacts along its Preferred Route, Summit refined the boundaries of the Other Populated Areas (OPAs, as defined in 49 CFR 195.450) along the Preferred Route and identified that the refined boundary of the City of Fergus Falls created another “could affect” high consequence area (HCA). Summit identified that an additional valve location was then needed to meet the spacing interval requirements of 49 10 CFR 195. The specific location near MP 4.8 was selected because it meets and exceeds federal requirements 49 CFR 195 for maximum valve spacing, is accessible via existing road access, has electric power available to serve the location, and is located on land Summit has under voluntary easement. Q. During the scoping process, members of the public asked why Summit did not propose MLVs on either side of the Pelican River. Can you please discuss why MLVs are not proposed at that location? A. Title 49 CFR 195.260 requires pipeline operators to install valves on each side of one or more adjacent water crossings that are more than 100 feet wide from high water mark to high water mark. Under this regulation, a valve must be placed outside of the 100-year floodplain, and the maximum spacing between the valves that protect multiple water crossings cannot exceed one mile in length. Summit conducted a survey at the Pelican River and found that the ordinary high water mark width of the Pelican River is about 70 feet, thus 49 CFR 195.260 does not require valves at this location. It is important to recognize, however, that valves proposed for the Applicant’s Preferred Route (RA-South) will be able to isolate the segment of the pipeline that crosses under the river as needed.	Thank you for your comment.	20242-203374-05
Summit Carbon Solutions	Lange, Alexander	2024-02-13	Q. Have you reviewed the DEIS? A. Yes. I focused my review on DEIS Chapter 8 and Appendix G related to the potential impacts of an accidental release of CO ₂ . Q. Do you have any comments on the DEIS discussion of accidental releases? A. Overall, the independent evaluation of Summit’s CO ₂ dispersion model in air contained in the DEIS confirmed Summit’s “methodology and results are valid,” and the independent modeling completed by Allied Solutions, while more conservative in some respects than Summit’s analysis, was not materially different than Summit’s dispersion modeling for the Project. I did notice what appear to be several internal inconsistencies in the DEIS and some areas where further information could provide additional context related to the potential impacts associated with an accidental CO ₂ release. Summit is providing separate DEIS comments containing additional discussion of these items. In this testimony, I provide additional explanation and context regarding several of the more significant issues.	Thank you for your comment.	20242-203374-05
Summit Carbon Solutions	Lange, Alexander	2024-02-13	Q. What are your observations regarding the assumptions used in Allied Solutions’ air dispersion modeling? A. For the most part, Allied Solutions used assumptions that are similar to those used by Summit. As discussed in the DEIS, in several instances, Allied Solutions used assumptions that resulted in more conservative (i.e., greater area of potential impact) than Summit’s assumptions. However, these differences did not result in material differences in the modeling results.	Thank you for your comment.	20242-203374-05
Summit Carbon Solutions	Lange, Alexander	2024-02-13	Q. Were any of the modeling assumptions used in the Allied Solutions’ dispersion model unreasonable in your opinion? A. Yes. Allied Solutions assumed a product temperature of -20 degrees Fahrenheit. (1) Summit assumed 30 degrees in its modeling. (2) Q. Why do you believe the product temperature assumption is unreasonable? A. The DEIS justifies this assumption stating, “Due to a measured soil temperature at burial depth being subzero and the existence of aboveground valve sets, this temperature should be nearly the same as the air temperature.” (3) It cites “NOAA. Soil Temperature Maps by Depth: History data in CSV” as the source for this justification. (4) In my experience, only soil surface temperatures can experience temperatures this extreme. The further below grade you go, the better insulated the soil is from air temperature fluctuations. It would take many weeks, if not months, of colder than -20 degrees Fahrenheit days to result in soil temperature near this value, at a depth of 54-inches. Further, I could not confirm a -20 degrees soil temperature assumption in the cited source. To the contrary, when pulling 10-year data from four USDA Natural Resources Conservation Service soil temperature probes (Mandan #1,	Thank you for your comment.	20242-203374-05

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			<p>Glacial Ridge, Crescent Lake, and Eros Data Center), the minimum annual temperature at 40-inch depth ranged between 30-35 degrees Fahrenheit. With Summit’s pipeline proposed depth of cover at 54-inches, it is expected that actual soil temperatures around the pipeline would be slightly above these levels. Once the product enters the pipeline, no additional energy is added and thus the product will begin cooling and ultimately equalizing with surrounding soil temperature. As was discussed in the DEIS, colder ambient conditions result in a more conservative dispersion model, which is why both Summit as well as Allied Solutions utilized winter conditions. However, based on the discussion above, Summit believes a soil temperature and, in turn, product temperature of 30 degrees Fahrenheit represents a “reasonable worst-case temperature”.</p> <p><i>(1) DEIS App. G at Aerial and Thermal Dispersion Analysis at Table 7 (Jan. 23, 2024) (eDocket No. 20241-202530-04).</i></p> <p><i>(2) DEIS App. G at Aerial and Thermal Dispersion Analysis at Table 6.</i></p> <p><i>(3) DEIS App. G at Aerial and Thermal Dispersion Analysis at Table 7.</i></p> <p><i>(4) DEIS App. G at Aerial and Thermal Dispersion Analysis at Table 7.</i></p>		
Summit Carbon Solutions	Lange, Alexander	2024-02-13	<p>Q. Do you believe the Allied Solutions’ dispersion modeling should be revised with an updated product temperature in the FEIS?</p> <p>A. No. The stated objective of the independent modeling was to provide a more conservative worst-case representation of potential release impacts. <i>(5) An overly conservative ground and product temperatures results in very conservative results. Revising this assumption will not materially change the outcome of this conservative modeling analysis.</i></p> <p>Q. Why raise an issue with this temperature assumption if you do not recommend revising the modeling?</p> <p>A. Several individuals have asked about the potential risk to the pipeline related to frost heave. As we have previously stated, frost heave is not a risk to the pipeline because it will be buried at a depth of at least 54 inches for this Project, <i>(6) which under all years and locations reviewed, would be well below the frost line. In addition, as discussed in the Frost Heave Study, in a situation where frost could reach depths below the pipeline, the amount of movement expected at such a depth would be very small given the relation to the thickness of any underlying ice lenses and the unconstrained expansion that would occur above. (7) Today’s materials and construction practices have evolved, including the introduction of more ductile steels, allowing greater allowable deformation (strain) due to external loads (frost heave). (8) I was concerned that if we did not raise this issue, individuals concerned about the risk of frost heave may misinterpret this modeling assumption to suggest that, in fact, the frost line could be significantly below our pipeline. As I stated above, none of the soil temperature data collected by USDA over the last ten years would support this conclusion.</i></p> <p><i>(5) DEIS App. G at Aerial and Thermal Dispersion Analysis at 3.</i></p> <p><i>(6) Route Permit Application at 5 (Sept. 12, 2022) (eDocket No. 20229-189023-02) (Route Permit Application).</i></p> <p><i>(7) DEIS App. I at Response to EERA Inquiry No. 5-2 at Frost Heave Study at 7.</i></p> <p><i>(8) DEIS App. I at Response to EERA Inquiry No. 5-2 at Frost Heave Study at 7.</i></p>	<p>Additional information on frost heave has been added to Section 5.7.6.2. As noted in Section 5.7.6.3, the applicant has committed to conducting a Phase I Geohazard Assessment to identify areas surrounding the pipeline that may be prone to large earth movement, as recommended by PHMSA in its June 2022 Advisory Bulletin, and EERA staff recommends that the results of the Phase I Assessment, and any subsequent assessments, should be provided to the Commission.</p>	20242-203374-05
Summit Carbon Solutions	Lange, Alexander	2024-02-13	<p>Q. Allied Solutions recommended and completed computational fluid dynamics (CFD) modeling as part of its analysis. Why didn’t Summit Carbon complete CFD modeling on the Project?</p> <p>A. While Summit acknowledges and appreciates the value that CFD modeling can provide, the shortcomings are also important to understand. CFD modeling requires a wide range of input values and complex parameters be identified by the analyst. For this reason, CFD models excel at modeling small project models, not long linear infrastructure. There are many inputs and factors that can impact dispersion distances, which is why Summit and Allied Solutions utilized extremely conservative inputs for the CANARY model, such that small scale CFD models would only result in less conservative distances. Summit is required to identify all locations where the pipeline could affect a HCA and include those segments within the Integrity Management Plan as defined under 49 CFR 195.452. In doing so, Summit has elected to utilize a very conservative CANARY air dispersion model.</p>	Thank you for your comment.	20242-203374-05
Summit Carbon Solutions	Lange, Alexander	2024-02-13	<p>Q. The DEIS states that FLO2D software “is not intended to be used for aerial dispersion analyses.” <i>(9) Why did Summit Carbon use this tool?</i></p> <p>A. The DEIS generally misrepresents the applicability of FLO2D utilized by Summit. The DEIS often describes that carbon dioxide is heavier than air and can settle in low-lying areas. Summit recognizes this risk and utilized FLO2D to help identify critical valleys located in close proximity to HCAs to determine how terrain could affect the gravity-assisted transportation of carbon dioxide vapor as well as the pooling effects in low-lying areas. As was discussed in the DEIS, elevation does not greatly impact the dispersion distance. What was not discussed, however, was how to address low-lying areas where carbon dioxide may be more resistant to dispersion through ambient weather conditions. FLO2D allowed Summit to use Digital Elevation Maps across the entire footprint and highlight these low-</p>	Thank you for your comment.	20242-203374-05

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			lying areas for use in our Emergency Management Plan procedures. Although the results from FLO2D did not impact our dispersion distances, it provides valuable insight for Emergency Responders. <i>(9) DEIS App. G at Aerial and Thermal Dispersion Analysis at 9.</i>		
Summit Carbon Solutions	Lange, Alexander	2024-02-13	Q. Do you have any concerns regarding the CFD modeling results presented in the DEIS? A. No. The independent CFD modeling completed by Allied Solutions appears to be reasonable, and the information regarding the mitigating effects of windbreaks in the area provides useful information to the public. It is also helpful for the public to understand that, based on this independent analysis, “regardless of the scenario, the time it takes for the 30,000-ppm concentration CO ₂ release to dissipate is very short—less than 4 minutes. In fact, the total time of the entire event would be less than 7 minutes in a worst-case scenario.” <i>(10)</i> <i>(10) DEIS App. G at CFD Analysis at 9.</i>	Thank you for your comment.	20242-203374-05
Summit Carbon Solutions	Lange, Alexander	2024-02-13	Q. EERA staff recommends a special permit condition requiring Summit it identify locations of fracture arrestors and any locations of thicker-walled pipe on the Plan and Profile filed with the Commission. <i>(11)</i> What are fracture arrestors and how do they impact pipeline integrity? A. Summit will not install fracture arrestors on the 4-inch pipeline. The standard method of ensuring arrest of a running fracture in a pipeline is to ensure that the fracture velocity in the pipeline wall is less than the decompression velocity of the product in the pipeline (CO ₂). The decompression response is a function of the product composition and the pipeline operating conditions. The velocity of a running fracture in a pipeline is dependent on the size of the pipe, the pressure, and the material toughness. As the material toughness increases, the speed of the running fracture decreases. Based on the size of the pipe, pressure, and specified material toughness (above the values prescribed by API-5L), the 4-inch pipeline has been designed to be self-arresting. Q. Will Summit Carbon provide the location of fracture arrestors and thicker-walled pipe for the Project? A. Yes. Summit can provide this information. The Project will be constructed of 4-inch nominal diameter pipeline. The 4-inch pipe is all 0.189 inches thick and is self- arresting. This gives the entire pipeline a design factor of 0.5. The only difference along the pipeline route will be the coating, depending on installation method. Bores and horizontal directional drills will have an additional Abrasion Resistant Overcoat, which has no bearing on the fracture arresting properties of the pipeline. <i>(11) DEIS at 8-26.</i>	Thank you for your comment.	20242-203374-05
Summit Carbon Solutions	Lange, Alexander	2024-03-14	Q. Have you reviewed CURE witness Dr. Gorman’s direct testimony? A. Yes. Q. Dr. Gorman suggests that it is impossible to know if “the results from the CANARY software (or any other model) have any basis in reality” without performing and presenting results related to verification and validation activities.” (Gorman Direct, at 5:9-16.) When selecting the CANARY software for its dispersion modeling, did Summit consider whether the model was subject to verification and validation? A. Yes. The CANARY model has been validated against data obtained from large scale outdoor experiments. These outdoor experiments provide a more accurate validation method than lab-based wind tunnel validation, which is often used to validate other available dispersion modeling. As stated in Appendix G of the Draft Environmental Impact Statement (DEIS), “CANARY has a long and vetted history in the pipeline industry—so much so that some major pipeline operators have it written into their standards that they will use only CANARY when modeling aerial dispersions.” <i>(1)</i> The CANARY model is widely accepted by the Pipeline and Hazardous Material Safety Administration (PHMSA) as well. Q. Dr. Gorman states that it is not clear from the report that the conditions of the CO ₂ within the pipe are fully known (Gorman Direct, at 6:21-22). Do you agree? A. No. Although the report does not explicitly state what phase the CO ₂ was modeled in, the phase can be determined based on the content in the report, which includes composition, pressure, and temperature. <i>(1) DEIS, Appendix G – Aerial and Thermal Dispersion Analysis: Otter Tail to Wilkin CO₂ Pipeline Project, p. 19 of 19.</i>	Thank you for your comment.	20243-204356-04
Summit Carbon Solutions	Lange, Alexander	2024-03-14	Q. Dr. Gorman also points out a presumed difference in the assumed flow rate at the time of rupture (Gorman Direct, at 7:16-20). Do you agree that the report should be clarified regarding what assumed flow rate was used in the modeling? A. No. The dispersion analyses completed both by Summit and Allied use a mass flow rate of 13.34 lbs/sec of CO ₂ . The CO ₂ Pipeline	Modeling was done to confirm Aerial Dispersion analysis, inform emergency response, and provide public awareness. Modeling was not used to determine if one pipeline route is safer than another route.	20243-204356-04

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			<p>Sensitivity Analysis Report appears to be a “sensitivity analysis on a representative pipeline,” (2) not necessarily Summit’s Project. The sensitivity analysis provides information on how different operating and ambient conditions can impact dispersion modeling.</p> <p>Q. Dr. Gorman testifies that information in Appendix G of the DEIS does not demonstrate which route alternative poses fewer risks to humans and animals or which is safer considering the possible impacts of a CO₂ release. Do you agree?</p> <p>A. Conceptually, I agree. Dispersion modeling is not intended to be used as a pipeline routing tool. It is intended to inform the emergency response planning for pipeline facilities as well as Integrity Management Plan prescribed under 49 CFR Part 195.452. Modeling must be performed for whatever route is selected and will be used to inform and update a pipeline operator’s emergency response, public awareness, and similar measures.</p> <p>(2) DEIS, Appendix G - CO₂ Pipeline Sensitivity Analysis Report, p. 5 of 9.</p>		
Summit Carbon Solutions	Lumpkin, Michael	2024-02-13	<p>Q. What is the purpose of your Direct Testimony?</p> <p>A. The purpose of my testimony is to respond to select issues in the Draft Environmental Impact Statement (DEIS) published by the Minnesota Department of Commerce, Energy Environmental Review and Analysis Unit (EERA) on January 23, 2024. (1) My testimony also provides information regarding the toxicological effects of acute (meaning short-term) CO₂ exposures at varying concentrations higher than typically found in ambient air.</p> <p>Q. What schedules are attached to your Direct Testimony?</p> <p>A. The following schedule is provided with my Direct Testimony:</p> <ul style="list-style-type: none">• Schedule 1 – Statement of Qualifications <p>(1) DEIS (Jan. 23, 2024) (eDocket No. 20241-202524-01) (DEIS).</p>	Thank you for your comment.	20242-203374-06
Summit Carbon Solutions	Lumpkin, Michael	2024-02-13	<p>Q. In your opinion, what are the important takeaways from the information presented in that Chapter?</p> <p>A. In my professional opinion as a toxicologist and human health risk assessor, I conclude that the information presented in Chapter 8 of the DEIS demonstrates that the risk of actual toxicological harm or a reduced capacity to escape in the event of an accidental release even under worst-case discharge conditions is small.</p> <p>Q. What is the basis for that conclusion?</p> <p>A. Primarily, even using what in my view are overly conservative measures of CO concentrations and exposure times, which I will discuss further below, the concentrations and exposure time presented in the DEIS are not high and long enough to present an undue risk of adverse effects to human health.</p> <p>Specifically, the DEIS findings that the total impact distance at which CO₂ concentrations would reach 40,000 ppm is 617 feet, (2) and that the total time for release and dispersion was less than 7 minutes, compels a conclusion that human health effects from exposure in even the worst-case scenario presented in the DEIS are minimal. Further, while CO₂ levels would be expected to be higher and at distances closer than 617 feet of the release, the likelihood of an individual being in this area (e.g., the risk of experiencing an exposure higher than 40,000 ppm for 7 minutes) is less than the likelihood of a person being beyond 617 feet of the release.</p> <p>(2) DEIS at 8-14.</p>	Thank you for your comment.	20242-203374-06
Summit Carbon Solutions	Lumpkin, Michael	2024-02-13	<p>Q. Chapter 8 of the DEIS discusses adverse health effects related to potential exposure to CO₂. Can you provide some context for how CO₂, a gas we all exhale every day, has the potential for adverse health effects?</p> <p>A. While normal inhalation and exhalation of CO₂ is part of regular bodily function, at very high levels, CO₂ can be toxic to humans. Toxicity is the ability of a chemical to cause harm to biological tissues, organ systems, or individual organisms. It is widely accepted by toxicologists that there exists some dose or exposure level at which a substance changes from harmless to harmful to an organism. This harm may range from relatively mild and reversible to lethal. This is true for substances ranging from water (a requisite for all living organisms) to botulinum toxin (one of the most potent known neurotoxins).</p> <p>Q. How does the human body respond to inhalation of a gas such as oxygen or CO₂?</p> <p>A. Changes in the human body’s physiological or biochemical conditions due to inhalation of oxygen, CO₂, or other gases include a well-ordered sequence of biochemical adjustments. These adjustments are intended to establish or re- establish optimum use of energy sources so that bodily functions required for survival are maintained. In the case of normal CO₂ production within the body or inhalation of increasing CO₂ concentrations from ambient air, the body responds with neurological messaging that prompts shifts in breathing rates, blood pressure, and proportional blood flow to critical organ systems in an attempt to re-balance the delivery of oxygen and the removal of waste CO₂ from cells. This re-balancing process, called physiological compensation, occurs for many processes in the body in addition to oxygen and CO₂ transport and use. However, there are limitations to the body’s ability to</p>	Thank you for your comment.	20242-203374-06

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			compensate, after which further perturbations of oxygen or CO ₂ inhalation and CO ₂ elimination create conditions in blood and tissues that may not be conducive to normal function.		
Summit Carbon Solutions	Lumpkin, Michael	2024-02-13	<p>Q. Are there published scientific studies regarding the potential health effects of high concentration acute CO₂ exposure?</p> <p>A. Yes, numerous case reports and studies of volunteers and lab animals contain data on the effect of high concentration acute (up to a few hours) CO₂ exposures. Many of these published studies were conducted in the early to mid-1900's. Several of these studies are limited by details regarding the actual CO₂ and oxygen composition of the test atmospheres (in the case of experimental studies) or presence of other unmeasured toxic gases (in the case of occupational case reports of injuries and fatalities). Further, these studies reported rather inconsistent results, with some studies suggesting loss of coordination, dizziness and headaches following exposures of 5,000 to 10,000 ppm while others reported no ill effects from acute and longer duration exposures up to 30,000 ppm. Similarly, some reported exposures at or more than 100,000 ppm indicated lethargy and transient loss of consciousness, while others reported death at these same concentrations.</p> <p>While some study authors have suggested that possible blood acidosis may have led to disruption of electrolyte balance (particularly potassium levels in blood), the details in reporting are lacking to verify this impact. Many authors have opined that the observed effects described in their respective studies are due to "CO₂ toxicity;" however, it is difficult to determine if the observed effects were a result of oxygen deficiency, actual overwhelming of the subjects' blood buffering capabilities, or neurological stimulation of cardiopulmonary changes resulting in secondary effects on mental acuity, coordination, or headaches.</p> <p>These older studies inform the current National Institute for Occupational Safety and Health (NIOSH) Immediately Dangerous to Life and Health (IDLH) limit of 40,000 ppm for healthy people. A NIOSH IDLH limit is an air concentration at or below which healthy workers may be exposed for 30 minutes without risk of permanent harm to health or ability to escape. The DEIS utilizes this 40,000 ppm IDLH limit as an identified level of concern in its analysis. (3) I disagree with the DEIS Appendix G characterization of 15,000, 30,000, or 40,000 ppm CO₂ as a "Toxic Level of Concern" as the weight of evidence from the available scientific literature on human effects do not show exposure to these levels to cause toxic effects.</p> <p>(3) DEIS at 8-12; DEIS App. G at Aerial and Thermal Dispersion Analysis at 5 (Sept. 23, 2024) (eDocket No. 20241-202530-04).</p>	<p>Minnesota Rule 4410.2300(H) indicates that an EIS shall include "a thorough but succinct discussion of potentially significant adverse or beneficial effects generated" by the proposed project and each major alternative with "[l]ess important material ... summarized, consolidated, or simply referenced." Factors to be considered include "the impact and the relevance of the information to a reasoned choice among alternatives" and "the relationship between the cost of data and analyses and the relevance and importance of the information." A review of the science concerning CO₂ toxicity levels is not necessary for a reasoned choice among alternatives. The EIS continues to use CO₂ concentration levels defined by federal agencies in its discussion.</p>	20242-203374-06
Summit Carbon Solutions	Lumpkin, Michael	2024-02-13	<p>Q. Are there more recent studies of the potential health effects of high concentration acute CO₂ exposure?</p> <p>A. Yes. The most detailed and recent study on the subject is by van der Schrier, et al. (2022) (van der Schrier Study). The study authors reported CO₂ exposures from 60,000 to 120,000 ppm (or 6% to 12% CO₂ atmosphere) to healthy male volunteers. The volunteers were exposed for up to one hour. The inspired oxygen levels ranged from 19.7% down to 18.4% as CO₂ exposure levels increased. In the same study publication, rats were exposed from 100,000 to 500,000 ppm CO₂ for up to one hour. At the conclusion of the rat exposures or at the time of death, 3 rats were necropsied for examination of organs, including the lungs. The blood pH values from the human and rat data were used together to develop a mathematical model that could translate (or predict) human and rat blood pH changes over time given various CO₂ inhalation exposures. This is the first time such an intraspecies model of CO₂-induced blood pH changes has been reported.</p> <p>The human and rat data were complimentary, moving from sub-100,000 ppm exposures to up to 500,000 ppm exposures. The human subjects showed high tolerability of 60-minute exposures to up to 75,000 ppm and 10-minutes at 90,000 ppm. Blood pH levels decreased over time at all exposure levels but reached an equilibrium of no less than 7.2 at exposure levels up to 90,000 ppm (blood pH has a typical neutral value of 7.4). Transient changes to cardiac parameters and mental acuity were reported, indicating physiological compensation to increase blood elimination of CO₂. Exposures to 100,000 and 120,000 ppm were stopped early due to subject irritability, anxiety, or loss of consciousness. However, all subjects completely recovered in all aspects within minutes of exposure cessation.</p> <p>Q. Does the DEIS reference the van der Schrier Study?</p> <p>A. Yes, Section 8.3.4 of the DEIS cites the van der Schrier Study as it related to potential impacts on the natural environment, but the cited material focuses only on the impacts on rats at concentrations of 30 percent or higher. The DEIS does not mention the conclusions of the study as it relates to human exposures.</p> <p>Q. What conclusions do you draw from the van der Schrier Study as it relates to the potential human health effects of CO₂ exposure?</p> <p>A. Prior to the publication of the van der Schrier Study, it was difficult to use data from the earlier studies and case reports in humans to distinguish the effects caused by non-toxic physiological compensation to blood CO₂ burdens or actual toxic harm.</p> <p>The detailed effects reported for humans in the van der Schrier Study indicate a lack of toxic effect and the ability to make escape-</p>	<p>A review of the science concerning CO₂ toxicity levels is not necessary for a reasoned choice among alternatives. The EIS continues to use CO₂ concentration levels defined by federal agencies in its discussion. The Executive Summary, Chapter 8, and Appendix G have been revised to remove references to "Toxic Level of Concern" or "toxic impact distances."</p>	20242-203374-06

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			<p>related decisions for exposures between 75,000 and 90,000 ppm in typical, healthy individuals.</p> <p>The database of studies for inhaled CO₂ effects at levels from 2,000 ppm to less than 100,000 ppm are often missing sufficient detail to tease out toxic versus compensatory effects in humans. However, the van der Schrier Study provides the latest details into acute CO₂ tolerability and toxicity. The van der Schrier Study is a solid study on which to base the classification of acutely inhaled CO₂ exposures of less than 100,000 ppm as non-toxic and suggests revisiting the present NIOSH limit of 40,000 ppm for healthy people.</p> <p>Q. Do your comments about the van der Schrier Study change your view of how potential human health effects are addressed in Chapter 8 of the DEIS?</p> <p>A. I think that the van der Schrier Study and information in it will, or at least should, drive a review of the current CO₂ exposure limits. I also think that such an effort would lead to less conservative levels than those used in the DEIS, meaning that the likelihood of effects would be even lower. That said, using those different levels I would not make a material difference in my ultimate conclusion, which is that the DEIS demonstrates there is not an undue risk of adverse human health effects from CO₂ exposures in the event of the worst-case scenario presented in the DEIS.</p>		
Summit Carbon Solutions	Lumpkin, Michael	2024-02-13	<p>Q. Do you have any other comments regarding the DEIS?</p> <p>A. Yes. In Section 8.5.3 of the DEIS, EERA recommends that Summit provide indoor CO₂ detectors to all residences within 1,000 feet of the project. I disagree that provision and installation of indoor CO₂ detectors in these homes will provide meaningful mitigation of health risks in the event of a pipeline failure. Indoor residential CO₂ concentrations are typically above ambient background levels due to a variety of factors, including increasing CO₂ from residents’ exhaled breath, the unventilated portion of combustion gases from use of fireplaces or other wood-burning or gas appliances, tobacco use, or other indoor sources. In homes with relatively low rates of mixing of indoor and outdoor air (particularly in cold weather seasons), typical indoor CO₂ levels may be in the thousands of ppm with no adverse health impact to occupants. Addition of CO₂ detectors with alarm thresholds set close to these levels may likely result in frequent alarms sounding completely independent of the existence of the CO₂ pipeline within 1,000 feet. Conversely, the appearance of an outdoor CO₂ plume due to a pipeline failure in proximity to a residence will not be immediately detected by an indoor detector because of relatively low air changes rates of homes with doors and windows closed. Thus, the addition of indoor CO₂ detectors for the purpose of exposure mitigation from a pipeline failure may result in false alarms and subsequent discontinuation of detector use by the occupants as well as lack of timely alerting of home occupants to a change in outdoor CO₂ levels.</p>	<p>Thank you for your comments. EERA staff continue to believe that applicant-provided indoor CO₂ detectors for residences within 1,000 feet of the project is a reasonable mitigation measure. In addition, EERA staff believes that applicant-provided outdoor CO₂ detectors for residences within 1,000 feet of the project is a reasonable mitigation measure. This distance was chosen based on the area that could reach a concentration of 15,000 ppm CO₂, as described in Appendix G. Section 8.5.3 has been updated to include the recommendation for outdoor CO₂ detectors.</p>	20242-203374-06
Summit Carbon Solutions	Lumpkin, Michael	2024-03-28	<p>Q. Have you reviewed Dr. McKinney’s Rebuttal Testimony?</p> <p>A. Yes.</p> <p>Q. Does anything in Dr. McKinney’s Rebuttal Testimony contradict your conclusion that “the risk of actual toxicological harm or reduced capacity to escape in the event of an accidental release even under worst-case discharge conditions is small”?</p> <p>A. No. Dr. McKinney’s Rebuttal Testimony addresses 1 CO₂ health hazards (the innate potential of CO₂ to produce effects that may damage human tissues or impair escape) but does not address CO₂ health risks (the chance that an adverse effect will occur) associated with hypothetical releases scenarios. The Draft Environmental Impact Statement (DEIS) reports air dispersion modeling predictions of greater than 40,000 ppm CO₂ going no further than 617.5 feet from the release point. Further modeling reported in the DEIS predicted a total CO₂ of greater than 30,000 ppm to exist for less than 7 minutes, extending no further than 711 feet from the release site. These predictions indicate that a worst-case release event would impact a very small distance from the pipeline beyond which CO₂ levels in air would rapidly dissipate to levels that have never been shown to cause tissue damage or impair the ability of a person to egress.</p>	<p>Thank you for your comment.</p>	20243-204748-04
Summit Carbon Solutions	Lumpkin, Michael	2024-03-28	<p>Q. Dr. McKinney’s Rebuttal Testimony claims you assert “that it is reasonable to classify inhaled CO₂ exposures of less than 100,000 parts per million (ppm) as non-toxic. Is that your testimony?</p> <p>A. Yes, I testified that the van der Schrier et al. (2020) study of CO₂ exposures provides a robust data set indicating lack of tissue or physiological system damage resulting from exposures to less than 100,000 ppm (specifically, 90,000 ppm as reported by van der Schrier et al). Dr. McKinney conflates short-lived episodes of physical or mental discomfort reported by van der Schrier and others with toxicity and the inability to make decisions of egress. Indeed, his quotation from the van der Schrier study that “The translational model predicts that at inhaled CO₂ concentrations greater than 9%, pH will rapidly decrease to values that further hamper the capacity to function adequately” ignores data presented in the van der Schrier study that human blood pH from 90,000 ppm CO₂ exposure did not fall below or approach 7.2, which is not an acidotic blood condition and would not be expected to affect the ability to make decisions to escape.</p>	<p>Minnesota Rule 4410.2300(H) indicates that an EIS shall include “a thorough but succinct discussion of potentially significant adverse or beneficial effects generated” by the proposed project and each major alternative with “[l]ess important material ... summarized, consolidated, or simply referenced.” Factors to be considered include “the impact and the relevance of the information to a reasoned choice among alternatives” and “the relationship between the cost of data and analyses and the relevance and importance of the information.” A review of the science concerning CO₂ toxicity levels is not necessary for a reasoned choice among alternatives. The EIS continues to use CO₂ concentration levels defined by federal agencies in its discussion.</p>	20243-204748-04

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Summit Carbon Solutions	Lumpkin, Michael	2024-03-28	<p>Q. Are you advocating for revisions to, or a departure from, NIOSH in this proceeding?</p> <p>A. No. As alluded to on page 9 of my Direct Testimony, the van der Schrier Study demonstrates the CO₂ exposure limits currently prescribed by NIOSH are conservative. The van der Schrier Study provides data showing healthy individuals are capable of withstanding much higher CO₂ exposure levels. Neither Summit nor I are advocating that NIOSH values should be revised or disregarded in this proceeding. NIOSH values should, however, be placed in context with other relevant materials such as the van der Schrier Study.</p> <p>Q. Does the debate between NIOSH, the van der Schrier Study, and overall ppm values change your ultimate conclusion in this proceeding?</p> <p>A. No. Though I reference the potential for less conservative tolerances, as I stated in my Direct Testimony “using those different levels would not make a material different in my ultimate conclusion, which is that the DEIS demonstrates that there is not an undue risk of adverse human health effects from CO₂ exposures in the event of the worst-case scenario presented in the DEIS.”</p> <p>Q. Please explain.</p> <p>A. The NIOSH CO₂ IDLH value of 40,000 ppm is not a bright line exposure limit at which toxicity is expected, but is a conservative level based on a range of exposures (30,000 ppm to greater than 100,000 ppm) from older data that do not benefit from more recent and more detailed studies such as van der Schrier et al. (2020). Nevertheless, both the OSHA Short Term Exposure Limit (STEL) of 30,000 ppm and NIOSH IDLH of 40,000 ppm were used as decision points in the air modeling described in the DEIS. This modeling, as I explained previously, predicts that worst-case CO₂ levels greater than 30,000 ppm may only feasibly occur over very short distances for just minutes.</p>	<p>Minnesota Rule 4410.2300(H) indicates that an EIS shall include “a thorough but succinct discussion of potentially significant adverse or beneficial effects generated” by the proposed project and each major alternative with “[l]ess important material ... summarized, consolidated, or simply referenced.” Factors to be considered include “the impact and the relevance of the information to a reasoned choice among alternatives” and “the relationship between the cost of data and analyses and the relevance and importance of the information.” A review of the science concerning CO₂ toxicity levels is not necessary for a reasoned choice among alternatives. The EIS continues to use CO₂ concentration levels defined by federal agencies in its discussion.</p>	20243-204748-04
Summit Carbon Solutions	O'Konek, Scott	2024-02-13	<p>Q. What areas would potentially be impacted by construction of the Project?</p> <p>A. Summit plans to utilize temporary construction workspace that typically varies from 25 to 100 feet wide, plus additional temporary workspace, to facilitate construction. Summit would use temporary roads to access the construction workspace.</p> <p>In addition, several above-ground facilities will also be constructed as part of the Project. These associated facilities are described in Section 3.2 of the Application and Section 2.3 of the DEIS.</p> <p>Following construction, land would be restored to pre-construction conditions and would remain suitable for farming, pasturing, and other activities. Structures and trees over the permanent right-of-way (ROW) would be restricted. Summit would retain a 25 to 50-foot-wide permanent ROW centered over the pipeline for inspection and maintenance access during operations. Permanent roads would also be established to access aboveground mainline valve (MLV) sites.</p>	<p>Thank you for your comment.</p>	20242-203374-03
Summit Carbon Solutions	O'Konek, Scott	2024-02-13	<p>Q. How has Summit incorporated input from landowners, agencies, tribes, and local government officials when developing its Preferred Route?</p> <p>A. Summit has engaged with landowners in the route refinement process to obtain survey permission and to learn more about specific impacts important to area landowners. Summit also held a number of open houses to solicit broader public input on the route. To date, Summit has surveyed over 98 percent of its Preferred Route and is committed to continue to work with landowners along the route to further minimize potential impacts. Summit has been successful in the acquisition of approximately 83 percent of the pipeline route through voluntary easements with nearly 55 landowners.</p> <p>As part of its larger Midwest Carbon Express Project, Summit also contacted sixty-two Native American tribes and offered the opportunity to participate in field surveys, provide review and input and contribute to knowledge of the resources in the area. The following Tribes have participated in archeological surveys for the Project to date: Mille Lacs Ojibwe; the Rosebud Sioux; the Yankton Sioux; and Sisseton, Wahpeton, Oyate of the Lake Traverse Reservation Tribes. Tribes did not identify features or areas of concern during surveys. Summit witness Mr. Jason Zoller provides additional discussion regarding Summit’s tribal engagement efforts.</p> <p>Summit also shared the initial project design with regulatory agencies including the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, Minnesota Board of Water and Soil Resources, and Otter Tail and Wilkin counties. Summit has continued to meet with and exchange information with federal, state, and local agencies to address potential impacts from the Project. Based on feedback from these agencies and local units of government, some route variations were proposed, and some route alignments were confirmed.</p> <p>Summit’s evaluation and coordination resulted in a Preferred Route that begins at the Green Plains Ethanol Plant capture facility near Fergus Falls and travels approximately 28.1 miles to the Bois de Sioux River before crossing into North Dakota. The Preferred Route is collocated with existing powerlines, pipelines, and 16 roads for approximately 53 percent of its length. The Preferred Route reflects</p>	<p>A summary of Tribal engagement for the EIS is included in Appendix J.</p>	20242-203374-03

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			Summit’s review of sensitive routing resources, coordination with agencies regarding routing concerns, as well as coordination with affected landowners to cross their private properties to best reflect their preferences.		
Summit Carbon Solutions	O'Konek, Scott	2024-02-13	<p>Q. Has Summit received landowner or agency feedback regarding either of these route alternatives?</p> <p>A. Summit has had limited interaction with landowners and agencies regarding their input on RA-North and RA-Hybrid. However, there would be differences. For example, based upon Summit’s desktop analysis, there are more residences along RA-North versus RA-South within 300 feet (10 vs. 2) and within 500 feet (19 vs. 5) that may experience temporary impacts during construction. Further, based upon where RA-North would cross the Minnesota/North Dakota border, it is likely that the route would continue in between developed areas in and around Wahpeton, North Dakota, which could affect likely infill development in a way that RA-South would not.</p> <p>Q. Have there been any route modifications in North Dakota that would impact any of the route alternatives studied in the DEIS?</p> <p>A. No. Summit’s route in North Dakota begins at the Minnesota/North Dakota border where RA-South and RA-Hybrid end in Minnesota. That is the location of the pipeline route in North Dakota that is currently being evaluated within the North Dakota Public Service Commission’s permitting process. RA-North has no connection point to the rest of Summit’s pipeline system in North Dakota.</p>	Thank you for your comment.	20242-203374-03
Summit Carbon Solutions	O'Konek, Scott	2024-02-13	<p>Q. Based on Summit’s analysis, do any of the Route Alternatives better minimize potential human or environmental impacts as compared to the RA-South, the Applicant’s Preferred Route?</p> <p>A. No. The DEIS demonstrates that RA-North and RA-Hybrid do not avoid or minimize potential impacts related to project construction, they simply shift potential impacts to another location. Importantly, Summit has worked with the landowners on RA-South to address potential impacts on land crossed by the Project and has also surveyed over 98 percent of RA-South for environmental and cultural features, providing strong evidence that potential impacts along RA-South will be avoided or minimized to the extent practicable.</p>	Thank you for your comment.	20242-203374-03
Summit Carbon Solutions	O'Konek, Scott	2024-02-13	<p>Q. Have you reviewed the DEIS?</p> <p>A. Yes.</p> <p>Q. Do you have any comments on the DEIS?</p> <p>A. Summit appreciates EERA’s thoughtful and comprehensive approach to the analysis of potential benefits, impacts, and mitigation related to construction and operation of the Project. Summit appreciates EERA’s thoughtful and comprehensive approach to the analysis of potential benefits, impacts, and mitigation related to construction and operation of the Project. Summit completed a detailed review of the DEIS and is offering written comments on a number of issues that could be added, corrected, or clarified in the final EIS to ensure a complete and accurate record. Summit’s DEIS comments are included as Schedule 2 to my Direct Testimony and were also efiled under separate cover to EERA.</p> <p>Q. Do you have any comments on the recommendations EERA included in the DEIS?</p> <p>A. Yes. I will respond to several of EERA’s recommendations related to construction mitigation.</p>	Thank you for your comment.	20242-203374-03
Summit Carbon Solutions	O'Konek, Scott	2024-02-13	<p>Q. EERA staff recommends that if a route permit for RA-South is granted, Summit should provide documentation of coordination with the Fergus Falls Fish & Game Club. (1) What is your response?</p> <p>A. Summit agrees with this recommendation. As discussed in the Application, Summit is coordinating closely with the Fergus Falls Fish & Game Club to minimize impacts to its land and associated recreational economies during construction and operation of the Project. (2) Summit will continue to coordinate with the Fish & Game Club and, if RA-South is approved, will provide documentation of such coordination prior to construction.</p> <p>(1) DEIS at 5-56, 11-13 (Jan. 23, 2024) (eDocket No. 20241-202524-01).</p> <p>(2) Route Permit Application at 40-41 (Sept. 12, 2022) (eDocket No. 20229-189023-02).</p>	Section 5.4.10.3 has been updated to indicate that the applicant would adopt the EERA-recommended mitigation if issued a route permit for the project.	20242-203374-03
Summit Carbon Solutions	O'Konek, Scott	2024-02-13	<p>Q. EERA staff included in the DEIS a recommendation by the Minnesota Pollution Control Agency (MPCA) that “details be provided in the ECP for preventing excessive crowning or subsidence above the restored centerline, and for addressing excessive crowning or subsidence if it is discovered during post-construction monitoring.” (3) What is your response?</p> <p>A. Summit will include details in the Minnesota Environmental Construction Plan (ECP) for preventing excessive crowning or subsidence above the restored centerline. Summit will restore the construction workspace to as close to the original pre-construction contours as practicable. If uneven settling occurs or surface drainage problems develop as a result of pipeline construction, Summit will provide additional land leveling services after receiving a landowner's written notice, weather and soil conditions permitting.</p>	Section 5.7.9.3 has been updated to indicate that the applicant would adopt the EERA-recommended mitigation if issued a route permit for the project.	20242-203374-03

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			(3) DEIS at 5-145.		
Summit Carbon Solutions	O'Konek, Scott	2024-02-13	<p>Q. EERA staff included in the DEIS a recommendation by the Minnesota Department of Natural Resources (MDNR) that “[e]xploratory borings should be conducted to characterize the shallow subsurface anywhere sheet piling would be used and submitted to DNR groundwater staff for evaluation Exploratory borings should be conducted to at least the maximum depth of any construction impacts.” (4) What is your response?</p> <p>A. Summit agrees with this recommendation and will conduct exploratory borings in coordination with the MDNR anywhere sheet piling would be used, subject to obtaining landowner permission.</p> <p>(4) DEIS at 5-139.</p>	Section 5.7.8.2 has been revised to indicate that the applicant would conduct geotechnical investigations prior to construction anywhere sheet pile would be used.	20242-203374-03
Summit Carbon Solutions	O'Konek, Scott	2024-02-13	<p>Q. EERA staff included in the DEIS a recommendation by MDNR that “[a]t a minimum, Pennsylvania standards for trench breaker placement should be used, and knowledge gained from additional subsurface site characterization may provide further guidance on where to place trench breakers most effectively. Trench breakers should be used at the entrance and exit of every waterbody regardless of slope (except for HDD crossings).” (5) What is your response?</p> <p>A. Permanent trench breaker placement is discussed in Section 2.9.1 of the Minnesota ECP. (6) As committed to the MDNR in Enclosure of its September 1, 2022 Project introduction letter (see Application, Appendix 8), Summit is presently proposing to install trench breakers at the entry and exit from every public water crossing, except for at HDD crossings. In addition, as outlined in Section 5.5 of the Minnesota ECP, trench breakers will be installed at wetland boundaries where the pipeline trench may cause a wetland to drain, or the trench bottom will be sealed to maintain wetland hydrology. (7)</p> <p>Summit plans to select the location of additional trench breakers across the Project based on field conditions at the time of construction and will consider the degree and length of slope, presence of down-slope sensitive resource areas such as wetlands and waterbodies, and proximity to other features such as roads and/or railroads. Generally, slopes are higher in the eastern portion of the Project, while the majority of the Project, and particularly the western portion of the Project, is located in areas where slope is not a concern (0.001-6.71 degree slope; see 18 Figure 11-3 of the Scoping EAW).</p> <p>Summit’s trench breaker plans account for the substantial body of knowledge that its construction staff has regarding the placement of trench breakers. In Summit’s view, those plans are consistent with the intent of the Pennsylvania standards, while also accounting for local, site-specific knowledge to use trench breakers most effectively. Use of this field condition review will ensure that Summit will not install trench breakers where they would not provide the intended benefit (i.e., on steep slopes where trench line erosion has the risk of occurring and at slopes adjacent to wetlands and waterbodies). In other words, while Summit does not intend to specifically implement the Pennsylvania standards, Summit’s plans will achieve the same or greater levels of protection, which is consistent with the Pennsylvania standards regarding the use of alternate best management practices.</p> <p>(5) DEIS at 5-139.; (6) DEIS App. D at Minnesota Environmental Construction Plan at 7 (Jan. 23, 2024) (eDocket No. 20241- 202530-02) (Minnesota ECP).; (7) DEIS App. D at Minnesota ECP at 17.</p>	Text regarding the applicant's proposed use of trench breakers has been added to Section 5.7.8.2.	20242-203374-03
Summit Carbon Solutions	O'Konek, Scott	2024-02-13	<p>Q. EERA staff included in the DEIS a recommendation by MDNR that the “pipeline should be installed deep enough to prevent pipe exposure over time. The DNR’s Area Hydrologists may have specific data on depth of cover for river and stream crossings and should be consulted.” (8) What is your response?</p> <p>A. Summit agrees with this recommendation relative to public waters and will consult with the MDNR when public water crossing designs are prepared for the License to Cross Public Waters application.</p> <p>Q. EERA staff included in the DEIS a recommendation by MDNR that Summit “should continue to consult with DNR on groundwater investigations for the potential routes and on construction methods in relation to groundwater.” (9) What is your response?</p> <p>A. Summit currently has an ongoing groundwater investigation underway relative to the Preferred Route/RA-South and will continue to consult with the MDNR.</p> <p>Q. EERA staff included in the DEIS a recommendation to select a crossing technique that is most appropriate for each waterbody, after consultation with MDNR. (10) What is your response?</p> <p>A. Summit agrees with this recommendation relative to public waters and will consult with the MDNR when designing and selecting public water waterbody crossing techniques as part of the License to Cross Public Waters application.</p> <p>Q. The DEIS states that “[g]eotechnical investigations prior to construction in beach ridge areas would identify areas where sheet pile use should be avoided.” (11) EERA staff also recommended certain procedures prior to sheet piling in beach ridge areas. (12) What is your response?</p>	Text in Section 5.7.8 either already reflected this information or has been revised where needed.	20242-203374-03

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			<p>A. Summit has committed to not using sheet piling in the beach ridge areas. Accordingly, the recommended procedures will not be applicable.</p> <p>(8) DEIS at 5-139.</p> <p>(9) DEIS at 5-139.</p> <p>(10) DEIS at 5-150.</p> <p>(11) DEIS at 5-137.</p> <p>(12) DEIS at 5-139 – 5-140.</p>		
Summit Carbon Solutions	O'Konek, Scott	2024-03-28	<p>Q. Do you agree with Dr. Christy Dolph’s opinion that because all routes have not been equally assessed, it is impossible to evaluate and compare the potential impacts of all the routes?</p> <p>A. No. The Draft Environmental Impact Statement (DEIS) demonstrates that RA-North and RA-Hybrid do not avoid or minimize potential impacts related to project construction, they simply shift potential impacts to another location.</p> <p>Q. Dr. Dolph raises concerns with how construction will be completed in the beach ridge area without use of sheet piling. How will Summit construct the pipeline in beach ridge areas?</p> <p>A. Trench excavation will be limited to a maximum depth of 60 inches. To minimize the likelihood that construction activities will impact this area, Summit has committed to not using sheet piling within the beach ridge area. On RA-South, the beach ridge area is located between mileposts 4 and 9. Should trench wall stability be a concern, Summit will use trench boxes to stabilize the trench walls, which will not result in any additional excavation. If the horizontal direction drill (HDD) method is used outside the beach ridge area, pipe will be installed to a depth of six to ten feet. A shallow bore installed to a depth of six to ten feet will minimize the likelihood of intersecting groundwater. Continued groundwater studies will further inform construction practices in this area, and Summit will continue to consult with the Minnesota Department of Natural Resources.</p>	<p>Text in Section 5.7.8.2 has been revised to reflect that sheet piling would not be used in beach ridge system areas and to describe the use of trench boxes to stabilize trench walls, if needed.</p> <p>As confirmed by the applicant in response to Supplemental Information Inquiry 13, Question 7, the sentence "If the horizontal direction drill (HDD) method is used outside the beach ridge system area, pipe will be installed to a depth of six to ten feet" has an error. "[O]utside the beach ridge system area" should be "inside the beach ridge system area."</p>	20243-204748-02
Summit Carbon Solutions	Piggott, Brad	2024-03-14	<p>Q. Have you reviewed the CURE DEIS Comments and MCEA DEIS Comments?</p> <p>A. Yes.</p> <p>Q. The CURE DEIS Comments state, “[t]he DEIS assumes...the proposed project is capable of and will capture 100% of the CO₂ emitted by the Green Plains ethanol plant.” Similarly, the MCEA DEIS Comments state, “the Applicant estimates a 100 percent capture rate at its facility.” (4) Do you agree with these statements?</p> <p>A. No. It would be more accurate to state that the proposed Project is capable of capturing 100% of the CO₂ emitted by the Green Plains ethanol plant’s CO₂ scrubber stack while the capture facility is online. Other CO₂ emissions from the Green Plains ethanol plant, such as fired heater emissions and yeast growth emissions, are not intended or designed to be captured by the Project.</p>	<p>Section 2.3.1 of Chapter 2 has been revised to include this additional information on the design of the CO₂ capture facility. Section 2.1 has been revised to clarify that the amount of CO₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios for 100 percent, 70 percent, 40 percent, and 10 percent.</p>	20243-204356-07
Summit Carbon Solutions	Piggott, Brad	2024-03-14	<p>Q. The CURE DEIS Comments and the MCEA DEIS Comments discuss the Archer Daniels Midland (ADM) CO₂ capture facility (the Illinois Basin – Decatur Project (IBDP)) in Decatur, IL. Do you agree that it is appropriate to compare the capture rate at the IBDP with the Project?</p> <p>A. No. There are a number of important technical differences between the ADM facility and the Green Plains Ethanol Plant that make this, at best, an apples to oranges comparison.</p> <p>First, ADM processes up to 600,000 bushels of corn per day through the Decatur facility. (5) The Green Plains Ethanol Plant makes 55 million gallons per year of ethanol from corn fermentation, (6) and a modern ethanol plant can convert one bushel of corn into 2.7 gallons of ethanol. (7) Thus, the Green Plains facility, when operating, processes 55,809 bushels of corn per day, or less than 10% of the amount of corn that the ADM Decatur facility can process. Second, the ADM facility in Decatur also contains a coal-fired power plant and soy processing facilities. (8) This ADM facility makes several products in addition to ethanol, such as citric acid, lactic acid, xanthan gum, and corn syrup, (9) none of which are made at the Green Plains Ethanol Plant to the best of my knowledge. All of these additional unit operations at the ADM facility have related energy consumption and resultant CO₂ emissions associated with them that will not be present at the Green Plains Ethanol Plant. Accordingly, comparing the ADM Decatur facility’s emissions to the potential emissions at the Green Plains Ethanol Plant is not a reasonable comparison.</p> <p>Third, while the ADM Decatur CO₂ capture facility captures CO₂ from the ethanol plant’s CO₂ scrubber in a manner similar to that of the Project at the Green Plains ethanol plant, I cannot comment on what fraction of the ADM ethanol plant’s CO₂ emissions were actually captured since the large sequestration operation in Decatur began operations in 2017. This is because the capture facilities operate as auxiliary facilities to the ethanol plant. There are numerous reasons why the ADM ethanol plant may not be running at the</p>	<p>Thank you for your comment.</p>	20243-204356-07

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			<p>full design rate; and when the ethanol plant is not running at full design rates, the CO₂ capture unit is also running below the full design rate. Corn shortages, low profit margins, maintenance issues in the ethanol plant, etc. may all contribute to lower sequestration volumes than design that are not due to problems with the CO₂ capture unit.</p> <p>(5) <i>The Center for Land Use Interpretation, "Archer Daniels Midland Decatur Plant, Illinois," [Online]. Available: https://clui.org/ludb/site/archer-daniels-midland-decatur-plant.</i></p> <p>(6) <i>Green Plains Inc., "Otter Tail," [Online]. Available: https://gpreinc.com/location/otter-tail/. [Last accessed Mar. 8, 2024].</i></p> <p>(7) <i>N. S. Mosier and K. Ileleji, "How Fuel Ethanol Is Made from Corn," Purdue University, 2006.</i></p> <p>(8) <i>The Center for Land Use Interpretation, "Archer Daniels Midland Decatur Plant, Illinois," [Online]. Available: https://clui.org/ludb/site/archer-daniels-midland-decatur-plant; Global Energy Monitor, "Archer Daniels Midland Decatur Power Plant," [Online]. Available: https://www.gem.wiki/Archer_Daniels_Midland_Decatur_Power_Plant. [Last Accessed Mar. 8, 2024].</i></p> <p>(9) <i>The Center for Land Use Interpretation, "Archer Daniels Midland Decatur Plant, Illinois," [Online].</i></p>		
Summit Carbon Solutions	Piggott, Brad	2024-03-14	<p>Q. Is there any other information from the IBDP that is more helpful in analyzing the technical capability of the capture facility technology to fully capture CO₂ produced at the ethanol plant?</p> <p>A. Yes. The initial three-year pilot project at the IBDP offers some useful information. Originally, the IBDP was a one million tonne CO₂ storage demonstration project that operated from November of 2011 – 2014. This capture facility was installed in the ADM Decatur plant with the goal of capturing, purifying, and injecting 1,000 tonnes of CO₂ per day to achieve a total injection volume of one million tonnes of CO₂ in a three-year period. This injection goal was achieved within the original timeline of that project. The equipment in the demonstration project is very similar to the equipment designed for the Summit Project. During the three-year operation period, CO₂ was injected for more than 90% of the time. (10) This included equipment downtime in the CO₂ capture unit and equipment downtime in the ethanol facility. The ADM ethanol plant was offline for 37 days during the three-year operation period. (11)</p> <p>I agree with CURE’s comment that “it is not realistic to assume that the project will operate without any breakdown or updates for the entire lifetime of the ethanol plant.” Operating equipment will have unscheduled maintenance needs that are difficult to predict either in terms of when they will occur or for how long the equipment will be offline. However, the above-mentioned operating experience would suggest that when the ethanol plant is operating, it is reasonable to expect that the CO₂ capture facility will be able to capture CO₂ nearly all of the time.</p> <p>(10) <i>R. McKaskle, R. Jones, A. Vance, B. Piggott, K. Fisher and S. Greenberg, "Illinois Basin - Decatur Project: Process Design and Operation of Carbon Dioxide Surface Facilities," Illinois State Geological Survey, Champaign, 2019.</i></p> <p>(11) <i>Id.</i></p>	Thank you for your comment.	20243-204356-07
Summit Carbon Solutions	Piggott, Brad	2024-03-14	<p>Q. CURE’s DEIS Comments also include a paragraph discussing the Petra Nova plant in Texas. Does the Petra Nova facility provide a useful comparison of CO₂ capture rates as compared to the Project?</p> <p>A. No. The Petra Nova facility is a CO₂ capture plant that captures CO₂ from post-combustion emissions from a coal-fired power plant. The CO₂ emitted by the coal-fired power plant is dilute and must be enriched to higher concentrations using a chemical solvent circulation process before the CO₂ can be compressed, dehydrated, and sent to the oil field for injection in an Enhanced Oil Recovery (EOR) operation. The operating history of the Petra Nova plant is unlikely to be a representative comparison to the Summit capture project at the Green Plains ethanol plant for the following reasons:</p> <p>1. The chemical solvent CO₂ capture and enrichment process is a much more operationally complex process than the Summit CO₂ capture process and will be much more likely to experience maintenance issues that are not applicable to the Summit CO₂ capture process. Not all of the CO₂ present in the post-combustion emissions is captured in the chemical solvent; some of the CO₂ in the stream flows out with the rest of the emissions to the atmosphere. The Petra Nova facility, by design, captures 90% of the CO₂ present in the post-combustion emissions. In contrast, the CO₂ emissions captured by Summit do not need to be enriched and no CO₂ flows out of the CO₂ scrubber when Summit’s plant is operating. Summit’s facility, by design, captures >99% of the CO₂ present in the CO₂ scrubber emissions.</p> <p>2.The source gas is coal combustion flue gas and has a very high impurity load associated with it that can be detrimental to operational reliability and uptime for the solvent circulation process. There is no analogous issue in the Summit CO₂ capture process.</p> <p>3.The CO₂ captured at Petra Nova is utilized for EOR, which is subject to different market forces than the Summit Project. The Rebuttal Testimony of Mr. James Powell further addresses the intended use of the CO₂ that will be captured from the Green Plains Ethanol Plant.</p>	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios for 100 percent, 70 percent, 40 percent, and 10 percent.	20243-204356-07

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Summit Carbon Solutions	Powell, James	2024-02-13	Q. What is the anticipated schedule for construction and operation of the Project? A. Summit plans to commence construction of the Project in the third quarter of 2025 and complete construction in the fourth quarter of 2026. Summit plans to place the Project into service in late 2026. However, construction timing is contingent on receipt of required permits and authorizations.	Section 2.9 and the Executive Summary have been updated to include the provided information.	20242-203374-02
Summit Carbon Solutions	Powell, James	2024-02-13	Q. What is the status of regulatory approvals for the Midwest Carbon Express Project in other states? A. The Midwest Carbon Express Project is in the permitting phase across the 5-state footprint. In Iowa, hearings before the Iowa Utilities Board are now complete, and a final decision is expected in Q1 2024. In South Dakota, Summit plans to submit a permit application to the South Dakota Public Utilities Commission in Q2 2024. South Dakota’s permitting process is anticipated to take up to one year to complete. In North Dakota, Summit has submitted supplemental information and anticipates a final hearing will be scheduled in Q2 2024 as part of the reconsideration process before the North Dakota Public Service Commission. In Nebraska, permitting is underway and occurs at the county level. Summit anticipates having permits in hand to facilitate a start of construction for portions of the project by Q1 2025 and plans to be operational by late 2026. Q. Have there been any other significant changes to the Midwest Carbon Express Project since Summit filed its Route Permit Application in Minnesota? A. Yes. On January 29, 2024, Summit announced a strategic partnership with POET to add 17 of POET’s biorefining facilities in Iowa and South Dakota to Summit’s pipeline network. The addition of these facilities in neighboring states has no impact on Summit’s proposed facilities in Minnesota which are the subject of this Route Permit Application.	Section 2.1 has been updated to include the provided information.	20242-203374-02
Summit Carbon Solutions	Powell, James	2024-02-13	Q. Please summarize the Project’s benefits. A. The Project provides an important benefit to Minnesota as it moves forward with its clean energy and carbon reduction efforts. Each year, during normal operations, the Project will capture and permanently store approximately 0.19 million metric tons per annum of CO ₂ from the existing Green Plains Ethanol Plant (Plant) that would otherwise be released into the atmosphere under the Plant’s existing air permits. CO ₂ is a leading contributor to climate change. The World Health Organization states that “[c]limate change is the single biggest health threat facing humanity, and health professionals worldwide are already responding to health harms caused by this unfolding crisis” (World Health Organization, 2023). The Centers for Disease Control has identified the following health-related impacts of climate change in the Midwest, including in Minnesota: temperature-related death and illness, air quality impacts, extreme events, vector-borne diseases, water-related illness, and high risks for certain populations of concern (Centers for Disease Control and Prevention, 2021). The Project would contribute in a concrete and meaningful way to reducing CO ₂ in the atmosphere, and, coupled with other CO ₂ capture and clean energy projects and initiatives, is an important tool for slowing or reversing the human health and safety impacts related to climate change. The Project will also provide significant economic benefits to Minnesota, local governments and communities, and landowners, including the following:	Thank you for your comment.	20242-203374-02
Summit Carbon Solutions	Powell, James	2024-02-13	<ul style="list-style-type: none"> Provides additional income to landowners whose land will be crossed by the Project in the form of easement payments. Landowners will be compensated for use of the temporary construction workspace on their land, as well as for Summit’s permanent right of way (ROW) necessary to install and operate the Project. Creates up to approximately 200 construction-related jobs during the construction period, resulting in approximately \$37,411,000 in employment expenditures during the construction phase. Creates two new full-time equivalent (FTE) pipeline technicians and one new FTE capture facility operator once the Project is operational, resulting in approximately \$450,000 per year in employment expenditures. These full-time staff are expected to live in the vicinity of the Project. Construction of the Project would provide temporary increases in revenue through increased demand for lodging, food services, fuel, transportation, and general supplies. Generates personal income by circulation and recirculation of dollars paid out by the Project as business expenditures and state and local taxes, as well as associated increases to the local tax base. Diversifies economic development in Wilkin and Otter Tail counties, while complementing existing economic activities. See Sections 2 and 6.2.1.2 of the Application for further details on the benefits of the Project. 	Section 5.4.11 has been updated to include the provided information.	20242-203374-02
Summit Carbon Solutions	Powell, James	2024-02-13	Q. Has the Project been designed to minimize potential impacts to agricultural production and uses? A. Yes. The Project has been designed to minimize potential impacts to agricultural production and uses. The Project is sited primarily on agricultural land. Following construction, lands impacted by construction will be restored to pre-construction conditions and	Text has been added to section 5.5.1 stating that the pipeline depth is below what would impact normal agricultural operations.	20242-203374-02

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			<p>existing agricultural activities will resume, except at permanent aboveground facility sites (mainline valve (MLV) sites and access roads). Landowners will be compensated by Summit for losses to crop production during construction. Permanent impacts to agricultural land (including cropland, pasture/hay/range lands) are only anticipated at aboveground facility locations that will be fenced and removed from current use (approximately 0.7 acres).</p> <p>Further, the pipeline will be buried to provide a minimum of 54 inches depth of cover and will not interfere with normal agricultural operations. Landowners will be compensated for use of the temporary construction workspace on their land, as well as for Summit’s permanent right-of-way to operate the Project. Measures within the Minnesota Environmental Construction Plan (DEIS Appendix D) and Minnesota Agricultural Protection Plan (DEIS Appendix E) will be implemented to minimize potential impacts to agricultural lands.</p>		
Summit Carbon Solutions	Powell, James	2024-02-13	<p>Q. Will the Project have a significant impact on community facilities and services?</p> <p>A. No. Summit will ensure medical services are available in the field during construction. Accordingly, existing social and health services should be adequate to support the workforce during construction. The Project is not likely to increase the need for public services, including police and fire protection, due to the short-term duration of the construction activities. Summit will work with local emergency management offices to develop procedures for response to emergencies. No significant increase in the permanent population of local communities would be expected from construction and operation of the Project, and the construction workforce would not create any measurable impact to the local government, utilities, or community services.</p>	Thank you for your comment.	20242-203374-02
Summit Carbon Solutions	Powell, James	2024-02-13	<p>Q. Do you have any comments on the recommendations EERA included in the DEIS?</p> <p>A. Yes. The DEIS discusses a number of mitigation measures recommended by EERA that Summit agrees with. For example:</p> <ul style="list-style-type: none"> • EERA staff recommends requiring Summit to provide indoor CO₂ detectors for residences within 1,000 feet of the Project. (1)While Summit agrees with Dr. Michael Lumpkin’s testimony, Summit is willing to supply CO₂ detectors to residents within 1,000 feet of Project centerline prior to the start of pipeline operations, if required by the Commission. • EERA staff recommends including a special permit condition requiring Summit to file with the Commission its Emergency Response Plan that is filed with Pipeline and Hazardous Materials Safety Administration (PHMSA). (2) <p>As discussed in the Application, Summit has prepared a draft Emergency Response Plan (provided as Application Appendix 6) and will maintain and update its Emergency Response Plan in accordance with PHMSA requirements which will be provided to PHMSA. Summit has no objection to inclusion of a special permit condition requiring Summit to file with the Commission the Emergency Response Plan that is provided to PHMSA prior to the start of operations.</p> <p>(1) DEIS at 8-26, 11-13 (Jan. 23, 2024) (eDocket No. 20241-202524-01).</p> <p>(2) DEIS at 8-26, 11-13.</p>	Thank you for your comment.	20242-203374-02
Summit Carbon Solutions	Powell, James	2024-02-13	<ul style="list-style-type: none"> • EERA staff recommends including a special permit condition requiring Summit to provide its public education plan for Commission review 30 days prior to submittal of the Plan and Profile. EERA staff notes that the public education plan could include specific safety information for neighboring landowners, including what to do in case of a rupture. (3) <p>Summit has no objection to a special permit condition requiring it to provide its public education plan for Commission review 30 days prior to submittal of the Plan and Profile. As discussed in the Application, Summit will implement comprehensive public awareness and education outreach programs, including damage prevention programs, that meet or exceed industry standards and regulatory requirements concerning public awareness of pipelines and pipeline operations. (4) The public awareness programs are intended to inform members of the public in the vicinity of the pipeline and facilities to protect the public from injury, prevent or mitigate effects on the environment, protect the pipeline and facility assets from damage by the public, and provide ongoing public awareness.</p> <p>(3) DEIS at 8-26, 11-13.</p> <p>(4) Route Permit Application at 26 (Sept. 12, 2022) (eDocket No. 20229-189023-02).</p>	EERA staff has revised Section 8.5.3 and removed the reference to “accidental release plan” and to list information to be filed as compliance filings 60 days prior to the Plan and Profile submittal.	20242-203374-02
Summit Carbon Solutions	Powell, James	2024-02-13	<p>Q. EERA staff recommends including a special permit condition requiring the applicant to provide an “accidental release plan,” developed in coordination with local emergency responders, for Commission review 30 days prior to submittal of the Plan and Profile. (5) What is your response?</p> <p>A. As discussed in the Application and noted above, Summit has prepared a draft Emergency Response Plan and will develop and maintain its Emergency Response Plan in accordance with PHMSA requirements. As noted above, Summit does not object to EERA’s other recommended special permit condition requiring Summit to file with the Commission the Emergency Response Plan that is provided to PHMSA prior to the start of operations. The Emergency Response Plan will include the information required by PHMSA,</p>	EERA staff has revised Section 8.5.3 to remove reference to “accidental release plan” and to list information to be filed as compliance filings 60 days prior to the Plan and Profile submittal.	20242-203374-02

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			<p>and any additional/other information required by the Commission would be addressed separately. As I discuss further below, Summit does not object to filing additional information, as recommended by EERA, in a compliance filing, but I do not recommend calling it an “accidental release plan,” as naming it as such creates the potential for confusion and/or conflict with PHMSA’s emergency response plan requirements.</p> <p><i>(5) DEIS at 8-26, 11-13.</i></p> <p>Q. EERA staff also lists potential information that could be included in such an “accidental release plan.”⁶ What is your response?</p> <p>A. As noted above, the Emergency Response Plan will include the information required by PHMSA, and any additional/other information required by the Commission would be addressed in a separate document. I do not recommend requiring creation of a separate “accidental release plan,” but Summit does not object to providing a compliance filing addressing the following information recommended by EERA:</p> <ul style="list-style-type: none"> • “include the specific equipment, training, and reimbursement that could be provided to emergency managers.” <i>(7)</i> Summit will file a compliance filing describing its coordination with county emergency managers, including information about equipment, training, and reimbursement provided to emergency managers. • “list the names of the emergency responders and a provision to update contact information as needed.” <i>(8)</i> Summit’s Emergency Response Plan will include contact information for Summit’s qualified and trained response personnel as well as contact information of the county emergency managers. • “discuss the feasibility of a ‘reverse 911’ notice that goes out to landowners’ telephones in the event of an emergency shutdown or rupture.” <i>(9)</i> In accordance with PHMSA regulations, in the event of an emergency condition on the pipeline, Summit’s control center will immediately notify the public safety answering point (PSAP) for each county. Depending on the incident type and severity, additional regulatory notifications, including notifying the public will occur. <p>Summit does not object to filing a compliance filing evaluating the feasibility of also using an electronic notification system, such as Send Word Now.</p> <ul style="list-style-type: none"> • “identify how the applicant would pay for costs of any repair to public infrastructure or private property (including crops and livestock) that might occur during an accidental release.” <i>(10)</i> <p>Summit does not object to filing a compliance filing identifying how the applicant would pay for costs of any repair to public infrastructure or private property (including crops and livestock) that might occur during an accidental release.</p> <p><i>(6) DEIS at 8-26, 11-13.; (7) DEIS at 8-26, 11-13.; (8) DEIS at 8-26, 11-13.; (9) DEIS at 8-26, 11-13.; (10) DEIS at 8-26, 11-13.</i></p>		
Summit Carbon Solutions	Powell, James	2024-03-14	<p>Q. CURE witness Ms. Secchi asserts that the economic benefits of the Project are overstated in the DEIS, and that “job numbers, job characteristics and duration, purchases of materials and other project-specific information” provided by applicants should be independently verified. (Secchi Direct at 4-6.) Was Summit the sole source of the job creation and economic benefits stated in Summit’s Application and your direct testimony?</p> <p>A. No. Summit engaged Ernst & Young LLP (EY) to complete an economic impact analysis of the Project. Summit provided key assumptions to EY to facilitate its analysis, but those assumptions were informed by third party bid proposals. As I stated in my direct testimony, since filing our Application, Summit has contracted with Precision Pipeline LLC to construct the Project. Through this contracting process, Summit has been able to verify its initial assumptions regarding job numbers, duration, materials, and other key components of the economic analysis. Importantly, by hiring a local, union contractor, the economic benefits are anticipated to increase over initial estimates, as the union is expected to source from local union halls for at least 50 percent of the construction workforce. Summit is pleased to partner with this skilled, local workforce to construct the Project.</p>	Thank you for your comment.	20243-204356-02
Summit Carbon Solutions	Powell, James	2024-03-14	<p>Q. CURE witnesses Dr. Emily Grubert and Ms. Silvia Secchi include discussion regarding the potential to use CO₂ transported on the Project for enhanced oil recovery (EOR) (Grubert Direct at 7:8-11 and Secchi Direct at 7-10). Does Summit intend to ship CO₂ on the Project for EOR?</p> <p>A. No. As stated in the Application, the intention is to capture and permanently sequester 100% of the CO₂ captured from the Green Plains Ethanol Plant in Fergus Falls. Green Plains has no plans to use the CO₂ for EOR, and to do so would lessen the Project’s impact on reducing the carbon intensity (CI) score of the ethanol produced at the Green Plains Plant. Accordingly, there are both environmental and economic disincentives to use the CO₂ transported on the Project for EOR. Moreover, the sequestration facilities in North Dakota are geographically distant from any oil producing wells in the state, making use of the CO₂ for EOR physically impossible with the planned facilities.</p>	Information regarding the possibility of using the captured CO ₂ for EOR has been added to Section 5.7.2.3.	20243-204356-02

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			For clarity, Summit’s pipeline is a common carrier system and, as such, Summit’s shippers ultimately determine the purpose and end use for CO ₂ transported on their behalf. If a shipper chooses to transport CO ₂ for EOR, the shipper must have the means to physically receive the CO ₂ from Summit’s termination area in Oliver and Morton Counties, North Dakota, and transport it independently to an alternative destination. Most of the capacity of the Project is subscribed through a contract with Green Plains, and Summit is unaware of any other shippers with an interest in shipping CO ₂ for EOR via the Project.		
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. What environmental surveys have been conducted for the Project?</p> <p>A. Summit has conducted the following environmental surveys for the Applicant’s Preferred Route (RA-South):</p> <ul style="list-style-type: none"> • Wetland and waterbody delineation surveys • Phase I cultural survey (included participation by Tribal Cultural Specialists) • Aerial raptor nest survey • Threatened and endangered species surveys • Groundwater monitoring <p>Q. What percentage of the Applicant’s Preferred Route (RA-South) has been surveyed?</p> <p>A. Summit has completed biological surveys for 98.4% of RA-South and cultural surveys for 99.8% of RA-South.</p> <p>Q. Do you have any additional survey reports summarizing the findings of Summit’s environmental survey efforts?</p> <p>A. Yes, we do have additional survey reports. They are as follows:</p> <ul style="list-style-type: none"> • Draft Minnesota Conventional Archaeological Resources Survey (Phase 1) Volume 4: Fieldwork Report Addendum (MNL-305 and MNL-321) For Work Completed Between July 2, 2022, and November 14, 2022 on MNL-321 in Otter Tail County and MNL-305 in Martin County, and Since December 3, 2021, for the Eliminated Segment of MNL-305 in Faribault County [dated March 31, 2023] • Wetland and Waterbody Delineation Report – Minnesota [dated October 3, 2022] • Wetland and Waterbody Delineation Supplemental Report for MNL-305 and MNL-321 (2022) – Minnesota [dated March 31, 2023] • Results of 2022 Field Surveys for Listed Butterfly and Plant Species in Minnesota [dated February 8, 2023] • Results of 2022-2023 Field Surveys for Listed Butterfly and Plant Species in Minnesota [dated January 18, 2024] <p>Each of these reports has been provided to the appropriate resource agency for review.</p> <p>Q. Will Summit complete environmental survey efforts prior to the start of construction?</p> <p>A. Yes. Summit will complete all identified environmental surveys before beginning construction.</p>	Thank you for your comment.	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. Has Summit continued to coordinate with tribes on the development of this Project?</p> <p>A. Yes. Summit is committed to building relationships with Tribes, Tribal Communities, and Native American-Owned businesses as the Project is planned, constructed, and operated. Summit has reached out to 62 Tribes with current and historic ties to the Midwest Carbon Express (MCE) Project area, including the eleven federally recognized Minnesota Tribes. Initial outreach occurred at the very start of the MCE Project in August 2021 with Project information and an invitation to participate in field studies. Annual informational webinars hosted by Summit are put on every year to inform the Tribes of MCE Project activities.</p> <p>In December of 2021, each Tribe was invited to conduct Traditional Cultural Property (TCP) studies in the Project area. Summit offered to compensate Tribes for conducting studies that seek to identify possible TCP/historic properties that could be located within the Project corridor.</p> <p>Summit has elected to target 100 percent inventory or cultural survey of the Project route, not just high probability areas and federal jurisdictional areas. Where Summit has been granted permissions to access a property, the Tribes have been afforded the opportunity to accompany archaeological crews along the entire route, or to conduct their own studies if permitted by the landowner. In Minnesota, specifically, the following Tribes have participated in the cultural resource surveys: Rosebud Sioux, Mille Lacs Ojibwe, Sisseton Wahpeton Oyate, and Yankton Sioux. All resources identified by the Tribal Cultural Specialists have been avoided.</p>	Thank you for your comment.	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>The following are some additional examples how Summit has engaged Tribes, Tribal Communities, and Native American-Owned businesses in the Minnesota and across the larger MCE Project:</p> <ul style="list-style-type: none"> • In February of 2022, Summit Carbon and EXP reached out to Tribally-owned and operated enterprises and Native American-owned businesses to explore job opportunities. This outreach includes working with Tribal Employment Rights Offices (TERO) to maximize potential job opportunities related to the Project. • In May 2022, Summit sponsored a week-long Tribal Cultural Specialist training for the Mille Lacs Band of Ojibwe. • Summit has sponsored and presented at a number of Tribal Coalition meetings including the Coalition of Large Tribes (COLT), the 	Thank you for your comment.	20242-203374-04

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			Midwest Alliance of Sovereign Tribes, the Great Plains Tribal Chairmans Association, the Northern Plains TERO Coalition, the Great Lakes TERO Association, and the National TERO Conference. <ul style="list-style-type: none"> Summit is committed to workforce development in Indian Country and partnered with Five Skies Training and Consulting to host a Career Readiness Enhancement Training for Native Communities in May 2023 in Sioux City, Iowa. In October 2023, Summit sponsored and helped develop a law enforcement training hosted by COLT in Billings, Montana focused on the Missing and Murdered Indigenous Persons (MMIP) crisis. A number of Tribes from across the nation were represented, law enforcement from Tribal nations, and law enforcement from “border towns” or those towns who border reservations. 		
Summit Carbon Solutions	Zoller, Jason	2024-02-13	Summit recognizes that violence against Indigenous peoples is a crisis that has been underfunded in communities throughout Indian Country and that murders and missing persons cases go unsolved and unaddressed. Summit is fully committed to partnering with Tribes and Tribal communities to achieve justice and healing for families around the Project by investing in programs and services that: foster awareness of the issues related to MMIW/MMIWG; address issues of human trafficking; domestic violence; honor Indigenous cultural values; educate on the prevention of sexual violence; support community self-defense training; and invest in the empowerment of Native women and girls. Furthermore, Summit supports the programs and services of agencies responsible for investigating and resolving these cases. Safe communities are Summit’s priority and violence against Native people has no place in the communities in which Summit serves and operates. Summit will require that all of its employees and contractors complete a Human Trafficking Prevention Training prior to construction work.	Section 5.4.8.3 has been updated to note that the applicant would require that all its employees and contractors complete a Human Trafficking Prevention Training prior to construction work.	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	Q. Have you reviewed the DEIS? A. Yes. Q. Do you have any comments on the DEIS? A. Yes. The DEIS provides a comprehensive evaluation of potential human and environmental impacts associated with construction and operation of the Project. Summit has provided separate DEIS comments recommending several additions, corrections, or clarifications. (O’Konek Direct, Schedule 2.) I assisted with preparation of those comments. In my Direct Testimony, I focus on several issues raised during the DEIS comments and respond to recommendations made by EERA related to environmental impacts and mitigation.	Thank you for your comment.	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	Q. During the DEIS meetings, several members of the public asked how much water will be used during construction and operation of the Project. How much water will the Project use during construction and operation, and how will water use be regulated? A. During construction, execution of horizontal directional drills (HDDs), hydrostatic testing, and dust control may involve appropriations from surface water or groundwater sources if permitted by the Minnesota Department of Natural Resources (MDNR). The use of water for HDDs and hydrostatic testing would be single-event appropriations, while dust control appropriations would be variable as needed based on conditions. As stated in DEIS on page 5-137, Summit is currently anticipating the need to use approximately 125,000 gallons of water for the execution of HDDs, hydrostatic testing, and dust control for the Project, of which 110,000 gallons would be used for pipeline hydrostatic testing. Summit is currently exploring options for appropriation of water, including duration of use, volume, and appropriation location(s). These could be private, municipal, or surface water sources. Once proposed/preferred and contingency sources and volumes are finalized, these details would be reviewed by the MDNR. Summit would obtain coverage under individual or general MDNR water appropriation permit(s) for any surface or groundwater appropriated for these activities. These permits would contain BMPs for water withdrawals. Water appropriation permits from the MDNR would inform the locations used, any seasonal restrictions to account for low-flow conditions, volume and measurement requirements, and BMPs to be used during appropriation activities.	Thank you for your comment.	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	Minnesota law sets standards for non-depletion, reasonable use, and non-degradation of water resources in striving to prevent negative impacts. (1) The MDNR, through its water appropriation permitting process, would ensure that water appropriations would not deplete or degrade the water source (e.g., the permit would specify maximum surface water withdrawal rates to protect aquatic life and allow for downstream uses). Summit would include a contingency plan as part of the appropriation permit application because it is challenging to predict how changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons would impact proposed water resources. The contingency plan would include identification of potential alternate water supply sources and/or a statement that Summit agrees in advance to a suspension of withdrawals following MDNR request, when necessary.	Text has been added to Section 5.7.8.2 to include this commitment by the applicant to provide a contingency plan and apply for water appropriation permits for trench dewatering.	20242-203374-04

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			<p>Trench dewatering is also considered an appropriations activity regulated by MDNR and would be conducted according to permit requirements. Summit is evaluating the need to appropriate water for dewatering, dust control, and hydrostatic testing during construction of the capture facility. A specific water source has not been determined at this time; however, Summit plans to obtain water from either a local surface water source or groundwater well directly, or indirectly, from the Green Plains Ethanol Plant or the City of Fergus Falls.</p> <p>(1) <i>Managing Water Sustainability: Report of the EQB Water Availability Project</i>, available at: https://www.eqb.state.mn.us/sites/eqb/files/documents/Managing_for_Water_Sustainability_12-08.pdf.</p>		
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>During operations, the CO₂ capture facility would have estimated water supply needs ranging from 8.2 gallons per minute (gpm) in winter months and 40.9 gpm in summer months, for an average water usage of approximately 13 million gallons per year. The “13 million gallon” total was calculated by using the estimate of 8.2 15 gpm for 182.5 days and the estimate of 40.9 gpm for 182.5 days (for a total of 365 days of use). The water is expected to be obtained from the Green Plains Otter Tail Ethanol Plant’s onsite wells. Water use at the capture facility may also be subject to permitting by the MDNR.</p> <p>The MDNR reported over 23.3 billion gallons of permitted water use in Otter Tail and Wilkin counties in 2022. (2) Due to the volume of current permitted appropriations in the counties crossed by the Project, the relatively small volume likely needed by the Project in comparison, and the measures and conditions outlined above, environmental effects from the Project’s water appropriation activities are expected to be minimal.</p> <p>(2) <i>Minnesota Water Use Data. Permit Index Report: Water Use Data – 1988 to 2022</i>, available at: https://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/wateruse.html.</p>	<p>Section 5.7.8.2 was revised to clarify the applicant's calculation of approximately 13 million gallons per year. Section 5.7.8.2 was also revised to provide context of the project's water use compared to water use in Otter Tail and Wilkin Counties. Section 5.7.8.2 was also revised to include updated permitted groundwater usage.</p>	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. Do you have any additional information regarding the eligibility status of cultural resources identified with the Project’s environmental survey area during field surveys?</p> <p>A. The DEIS on page 5-78 says, “One of the six resources has not been evaluated (21WL0005)” ; however, the October 2022 MN Cultural Report Volume 2 (Minnesota Conventional Archaeological Resources Survey (Phase 1) Volume 2: Fieldwork Report Addendum (MNL-305 and MNL-321) For work completed between December 3, 2021, and July 2, 2022) recommends site 21WL0005 be deemed not eligible, and the December 5, 2022 Minnesota State Historic Preservation Office (SHPO) letter concurred with that recommendation. Therefore, the characterization of 21WL0005 as “not evaluated” is incorrect, and it should be characterized as “not eligible.” In response to the statement in the DEIS that “Construction of the project would result in negligible impacts on these resources”, (3) under federal regulation (36 CFR 800, the implementing regulations for Section 106), effects can only happen to sites listed or eligible for listing under the National Historic Preservation Act (NHPA), and not to “not eligible” properties. As such, there would be no impact on the resources identified by Summit’s surveys and no further work at the sites are needed.</p> <p>(3) <i>DEIS at 5-78 (Jan. 23, 2024) (eDocket No. 20241-202524-01)</i>.</p>	<p>References to site 21WL0005 within Tables 5-25 and 5-27 and within the text of Section 5.6 of the final EIS has been updated to reflect its NRHP status is Not Eligible instead of Not Evaluated, per the December 5, 2022, SHPO letter. Sites 21OT0229, 21WL0107, and 21WL0108 have also been updated to Not Eligible in all applicable tables, per SHPO's agreement with the surveyor's recommendations.</p>	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. Do you have any comments on the recommendations EERA staff included in the DEIS?</p> <p>A. Yes.</p> <p>Q. EERA staff recommended that “appropriate surveys for archaeological resources should occur regardless of which route alternative is selected. If archaeological resources are found, treatment plans should be prepared in consultation with Tribes and SHPO, as appropriate.” (4) What is your response?</p> <p>A. Summit will complete archeological surveys regardless of the route selected and is committed to avoiding impacts to any identified eligible cultural resources and Tribal areas of interest through route modifications or construction methodology. If identified resources cannot be avoided, then treatment plans would be developed with Tribes and SHPO, as appropriate. To date, Summit has surveyed 99.8% of RA-South, and the construction of the Project will not impact any cultural resources listed or eligible for listing under the NHPA or Tribal areas of interest.</p> <p>(4) <i>DEIS at 5-80, 11-13</i>.</p>	<p>Summit's commitment to avoid archaeological resources through route modifications or otherwise, or to develop treatment plans if resources cannot be avoided, is already documented in Sections 5.6.1.3 and 5.6.2.3 of the draft EIS.</p>	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. The DEIS states that “[p]otential impacts to ground-nesting birds during construction would be lessened or avoided by conducting surveys for these species and their nests, per USFWS standards, at appropriate timing ahead of construction.” (5) What is your response?</p> <p>A. Summit intends to follow U.S. Fish and Wildlife Service (USFWS) guidance regarding compliance with the Migratory Bird Treaty Act (MBTA) and will continue to consult with the USFWS regarding MBTA. Additionally, a MBTA plan is under development for company use with the contractors during construction and during operations. Summit has also received the MDNR’s August 23, 2023 Natural</p>	<p>Mitigation proposed in the draft EIS does not conflict with standard USFWS guidance; nevertheless, text in the Mitigation discussion in Section 5.7.5 has been amended to reference adherence to USFWS and DNR guidance.</p>	20242-203374-04

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			<p>Heritage Information review letter for the Project, and the MDNR did not recommend bird surveys. To avoid duplicative, and potentially conflicting requirements, Summit recommends any special condition related to this issue reference adherence to USFWS and MDNR recommendations, if needed, rather than including the specific language suggested on DEIS page 5-114.</p> <p>Q. EERA staff included in the DEIS a recommendation by DNR that “[o]ne additional mitigation for nesting birds in areas of grass/shrub vegetation to be cleared for construction would be to mow/cut these areas during non-nesting season prior to actual construction so suitable nesting habitat is not present prior to final clearing and construction.” (6) What is your response?</p> <p>A. Summit intends to follow USFWS guidance regarding compliance with MBTA and will continue to consult with the USFWS regarding MBTA. Additionally, Summit is developing a MBTA plan for use by the contractors during construction and during operations. As I note above, I recommend that the Commission not establish separate conditions on this issue but rather defer to USFWS and MDNR to identify appropriate measures to minimize potential impacts to nesting birds, if needed.</p> <p>(5) DEIS at 5-114. (6) DEIS at 5-151; see also DEIS at 5-115.</p>		
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. EERA staff included in the DEIS a recommendation by CURE that “[p]rior to construction, field surveys should be conducted for state-listed species. Surveys for state-listed plants should follow the MnDNR protocol described in the April 2022 ‘Guidance for Documenting and Collecting Rare Plants.’” (7) What is your response?</p> <p>A. Summit has conducted surveys for state-listed species and has coordinated with the MDNR on survey efforts. Prior to all survey efforts, the MDNR reviews Summit’s survey protocol. Surveys are then conducted under the MDNR-approved protocol. To date, surveys have not identified concerns for impacts to state-listed species. Pages 75-76 of the Scoping EAW contain additional discussion of this issue.</p> <p>(7) DEIS at 5-115.</p>	Thank you for your comment.	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. EERA staff included in the DEIS a recommendation by CURE that “[p]roper restoration of native vegetation communities would benefit rare and unique species. The proposed performance standard of 70 percent vegetation density relative to background native vegetation cover is too low and should be higher...” (8) What is your response?</p> <p>A. There is no regulatory requirement that mandates a performance standard greater than 70 percent; and therefore, Summit does not agree with this recommendation. The proposed 70 percent revegetation standard is in accordance with the revegetation standards contained within Condition 13.2 of the Minnesota Pollution Control Agency’s (MPCA) Construction Stormwater General Permit. (9) The condition is as follows:</p> <p>Permittees must complete all construction activity and must install permanent cover over all areas prior to submitting the NOT. Vegetative cover must consist of a uniform perennial vegetation with a density of 70 percent of its expected final growth. Vegetation is not required where the function of a specific area dictates no vegetation, such as impervious surfaces or the base of a sand filter. [Minn. R. 7090].</p> <p>(8) DEIS at 5-115. (9)MPCA Construction Storm Water General Permit (issued Aug. 1, 2023), available at: https://www.pca.state.mn.us/sites/default/files/wq-strm2-81a.pdf.</p>	Thank you for your comment.	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. EERA staff included in the DEIS a recommendation by MDNR that “[i]f the selected route alignment is near the Foxhome Prairie High Biodiversity [Minnesota Biological Survey] MBS site, the alignment should follow the south side of the road in the area and avoid crossing the MBS site.” (11) What is your response?</p> <p>A. The Applicant’s Preferred Route (RA-South) does not cross this MBS site, so there would be no impacts to the site. If the RA-North route was to be selected, Summit would evaluate resources along the route and coordinate with MDNR to avoid impacts to the Foxhome Prairie High Biodiversity MBS site.</p> <p>(11) DEIS at 5-116, 5-151.</p>	Text has been added to section 5.7.5.3 stating that the applicant would evaluate resources and coordinate with DNR if RA-North was selected.	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. EERA staff recommended that “[t]he applicant should use only ‘bio-netting’ or ‘natural netting’ types and mulch products without synthetic (plastic) fiber additives.” (12) EERA staff also included in the DEIS a recommendation by Minnesota Department of Transportation (MnDOT) that “[t]o reduce potential construction impacts on state-listed species,” applicant should use “erosion control techniques that avoid entrapping or entangling small wildlife.” (13) What is your response?</p> <p>A. Summit has already committed to use wildlife-friendly erosion and sediment control BMPs that contain biodegradable netting</p>	Sections 5.7.5.3 and 5.7.10.3 of the EIS note the applicant's stated intent to use erosion controls with natural fibers and not plastic netting. These sections also reference the applicant's intent to draft and implement a Vegetation Management Plan. Sections 5.7.5.3 and 5.7.10.3 have been revised to remove EERA's recommended mitigation regarding plastic netting and mulch since it is stated in the applicant-proposed mitigation.	20242-203374-04

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			<p>(Category 3N or 4N natural fibers) and to avoid the use of plastic mesh. Both BMPs help to minimize wildlife mortality resulting from the use of erosion and sediment control materials. <i>(14)</i></p> <p>Q. EERA staff included in the DEIS a recommendation by MDNR that the Applicant “[f]ollow MnDOT’s 2020 Standard Specifications for Construction for rolled erosion control materials that specify only natural fibers with no 20 plastic mesh be used.” <i>(15)</i> What is your response?</p> <p>A. During construction, Summit will follow MnDOT’s 2020 Standard Specifications for Construction for rolled erosion control materials that specify only natural fibers with no plastic mesh be used.</p> <p><i>(12) DEIS at 5-116, 5-151.</i></p> <p><i>(13) DEIS at 5-115.</i></p> <p><i>(14) See DEIS App. D at Minnesota Environmental Construction Plan at 7 (Jan. 23, 2024) (eDocket No. 20241-202530-02) (Minnesota ECP).</i></p> <p><i>(15) DEIS at 5-151.</i></p>		
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. EERA staff included in the DEIS a recommendation that “[n]o temporary workspace areas shall be placed within or adjacent to wetlands or water resources, as practicable.” <i>(16)</i> What is your response?</p> <p>A. This is not practicable, as the pipeline crosses some wetlands. When this occurs, temporary workspace will be required to install the pipe. Summit is reducing the width of temporary workspace required for the crossing of wetlands from 50 feet to 25 feet to minimize the temporary impacts to the wetland. Additionally, additional temporary workspace (ATWS) will be sited outside of wetlands to the extent practicable. <i>(17)</i></p> <p><i>(16) DEIS at 5-138.</i></p> <p><i>(17) See DEIS App. D at Minnesota ECP.</i></p>	EERA did not make this recommendation. Rather it is a standard condition of the pipeline routing permit issued by the Commission.	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. EERA staff included in the DEIS recommendations that “[s]oil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area.” <i>(18)</i> What is your response?</p> <p>A. Summit will restore water resource areas disturbed by construction activities to pre-construction conditions in accordance with the requirements of applicable state and federal permits or laws and landowner agreements.</p> <p>The requirement to not replace wetland or riparian soil would be in conflict of Condition F.14 of the USACE’s U.S. Army Corps of Engineer’s (USACE)’s Utility Regional General Permit, <i>(19)</i> which Summit anticipates obtaining for the Project. The condition is as follows [bolded for emphasis]:</p> <p>Restoration of Temporary Impacts: All temporary impacts in waters of the US, including discharges resulting from side casting material excavated from trenching, that occur as a result of the regulated activity must be fully contained with appropriate erosion control or containment methods, be restored to pre-construction contours and elevations, and, as appropriate, revegetated with native, non-invasive vegetation, unless otherwise conditioned in a Corps RGP verification. All temporary access roads constructed in waters of the US must be properly bridged or culverted to maintain surface flows. In temporarily excavated wetlands, the top 6 to 12 inches of the excavation should normally be backfilled with topsoil originating from the wetland. No temporary excavation area, including, but not limited to trenches, may be constructed or backfilled in such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a French drain effect).</p> <p><i>(18) DEIS at 5-138.</i></p> <p><i>(19) https://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RGP/Utility.pdf?ver=9pcj7dVPna3FU6CTYjnCVA%3D%3D</i></p>	"Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area" means that, during construction, the contractor may not store trench soils in wetlands—trench soil must be stored in uplands. When necessary in the construction process, these soils are taken from the upland and used to restore the trench. Text in Section 5.7.8.3 and Section 5.7.9.3 has been revised: "Soil excavated from wetlands and riparian areas shall be contained in uplands and not placed back into the wetland or riparian area until necessary to restore the excavated trench."	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. EERA staff included in the DEIS a recommendation by MDNR that “[i]solated dry trench crossing methods should be used on all stream crossings instead of the proposed open trench method. This method reduces silt and sediment suspension and transport to downstream waterbodies. This would reduce potential impacts from local and downstream transport of disturbed sediments on state-listed mussel species.” <i>(20)</i> What is your response?</p> <p>A. Summit will implement the isolated dry trench crossing method on delineated waterbodies with perceivable water flow during construction. If a delineated waterbody is dry and has no perceivable water flow, then Summit intends to use the proposed open trench method.</p> <p>Q. EERA staff included in the DEIS a recommendation by MDNR that “[u]nintentional release evaluations should be conducted for water crossings proposed to be installed via HDD to ensure the soils are amenable to HDD. This would further reduce potential impacts from local and downstream transport of disturbed sediments on state-listed mussel species. (As described in Section 5.7.3.4,</p>	<p>Sections 5.7.8.2 and 5.7.10.2 have been revised to reflect the applicant's clarification that it would use the isolated dry-trench crossing method on delineated waterbodies with perceivable water flow during construction. The flowing open-cut crossing method would not be used for the project.</p> <p>Text regarding the HDD contingency plan in Section 5.7.8.2 has been revised to include the stipulation that the containment, response, and clean-up equipment would be available "at both sides of an HDD crossing."</p>	20242-203374-04

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			<p>the applicant would develop a contingency plan to address the unintended release of drilling mud to the environment during the execution of each HDD.)” (21) What is your response?</p> <p>A. Unintentional release evaluations will be conducted to ensure soils are amenable for each HDD crossing. Summit’s contractor will develop an HDD contingency plan to address unintended return or release of drilling fluids. Containment, response, and clean-up equipment would be available at both sides of an HDD crossing location and one side of a bore prior to commencement to assure a timely response in the event of an inadvertent release of drilling fluid.</p> <p>(20) DEIS at 5-115.</p> <p>(21) DEIS at 5-115.</p>		
Summit Carbon Solutions	Zoller, Jason	2024-02-13	<p>Q. EERA staff recommends, and the Minnesota Department of Health concurs, requiring Summit to “provide documentation of coordination with residents located within 1,320 feet of HDD entries. The submittal should document locations of sound dampening barrier walls and include a plan for monitoring noise levels at these locations during HDD operations. The information should be provided 30 days prior to submittal of the Plan and Profile.” (22) What is your response?</p> <p>A. The equipment needed to construct the HDD would have a temporary and short-term impact on noise levels in the vicinity of the Project, which would decrease from the levels presented in the response to Summit’s Supplemental Information Inquiry Number 4, Question 8 based on distance, topography, and weather conditions. Summit will coordinate with nearby landowners along the Project prior to execution of HDDs. Summit’s contractor will determine the need for noise mitigation and noise monitoring based on feedback received from landowners during construction.</p> <p>(22) DEIS at 5-37, 11-12.</p>	Thank you for your comment. EERA continues to recommend this mitigation as worded in the draft EIS.	20242-203374-04
Summit Carbon Solutions	Zoller, Jason	2024-03-28	<p>Q. Do you agree with SHPO’s suggestion that section 5.6.1.1 of the DEIS provides a detailed assessment of whether the Permittee’s surveys conducted to date were completed to the guidelines and standards outlined in the SHPO’s “Guidelines for Archaeological Projects in Minnesota” and the Secretary of the Interior’s Standards for the Identification of Historic Properties?</p> <p>A. Yes. Summit would also propose adding the following language to section 5.6.1.1 of the DEIS:</p> <p>“All work was conducted in accordance with Minnesota State Historic Preservation Office (SHPO) and the Office the State Archaeologist (OSA) standards and the SHPO Manual for Archeological Projects in Minnesota (Anfinson 2005) and the State Archaeologist’s Manual for Archaeological Projects in Minnesota (Anfinson 2011) and the Secretary of the Interior’s Standards for the Identification of Historic Properties (48 CFR 44716).”</p> <p>These guidelines are cited and referenced not only in Summit’s protocols, but also in Volume 1, Section 1.4; Volume 2, Section 1.5; Volume 3, Section 1.5; and Volume 4, Section 1.5.</p>	Section 5.6 of the final EIS now indicates that the surveyor's survey method protocol was designed to follow state guidelines as outlined in the Minnesota State Historic Preservation Office Manual for Archaeological Projects in Minnesota (Anfinson 2005) and the State Archaeologist's Manual for Archaeological Projects in Minnesota (Anfinson 2011) and national guidelines as outlined in the Secretary of the Interior's Guidelines for Archaeology and Historic Preservation (48 CFR 44716). It also references that the survey reports follow the SHPO-reviewed and approved survey method protocol.	20243-204748-03
Summit Carbon Solutions	Zoller, Jason	2024-03-14	<p>Q. Has Summit evaluated the potential construction-related impacts to groundwater along the Applicant’s Preferred Route, RA-South?</p> <p>A. Yes. Summit does not expect that ground disturbance or excavation associated with installation of a 4-inch diameter pipeline will significantly affect groundwater resources. Ground disturbance associated with construction will be primarily limited to the upper 5-6 feet, which is above the water table of most regional aquifers. The primary pipeline construction activities that can affect groundwater include the clearing of vegetation (affecting groundwater recharge rates); soil mixing and compaction; trench excavation, the use of sheet piling to create a safe, stable open work area; dewatering of the trench; and hazardous material handling. However, Summit does not anticipate that extensive sheet piling use would be needed to construct the Project because of the small, 4-inch diameter pipe and the resulting narrow trench width. If needed, Summit’s contractor would drive sheets to depths of 10 to 15 feet below the ground surface. This depth is above any confined groundwater aquifers in the area. Additionally, Summit will not use sheet piling in the beach ridge areas and would conduct exploratory borings anywhere sheet piling would be used.</p> <p>Q. Is it likely that similar risks to artesian aquifers are present along RA-North 5 and RA-Hybrid?</p> <p>A. Yes. As noted in the DEIS, “MDH reports that, based on well records in its County Well Index, artesian conditions are present in shallow confined aquifers within 1 mile of each route alternative.”</p> <p>Q. Will Summit continue to coordinate with the Minnesota Department of Natural Resources regarding potential impacts to groundwater resources?</p> <p>A. Yes.</p>	Section 5.7.8.2 describes that geotechnical investigations would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	20243-204356-03
Summit Carbon Solutions	Zoller, Jason	2024-03-14	<p>Q. Has Summit evaluated the potential construction-related impacts to surface water along RA-South?</p> <p>A. Yes.</p>	Thank you for your comment.	20243-204356-03

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			<p>Q. Given the potential risks of inadvertent returns, why is Summit proposing crossing certain waterbodies using the horizontal directional drill (HDD) method?</p> <p>A. First, it is important to understand that HDDs are the best method to reduce overall risks to certain waterbodies, when compared to open cut crossing methods. Advantages of installation by HDD include:</p> <ul style="list-style-type: none"> • Avoids direct impacts to the waterbody, the aquatic flora and fauna within the waterbody, and adjacent habitat located between the entry and exit of the HDD; • Faster installation, with less soil and ground disturbance; • Avoids the introduction of sediment into the waterbody, does not result in impacts to turbidity; • Reduces the potential of contamination of groundwater; • Installation of the pipeline is less influenced by the weather conditions of the site; and • Increased burial depth of the pipeline underneath the waterbody. <p>Second, Summit's HDD contractor will prepare a detailed plan for each HDD crossing. This plan takes into account information about the crossing, such as geotechnical information, and identifies specific risk factors and mitigation methods that can be used to further reduce the risks of inadvertent returns.</p> <p>Third, prior to construction Summit's HDD contractor will develop an HDD Contingency Plan for each HDD crossing that will evaluate the potential for an inadvertent return or release of drilling fluid within wetlands, waterbodies, and areas immediately adjacent to wetlands and waterbodies, such as stream banks or steep slopes, where drilling fluid releases can quickly reach surface waters. The HDD Contingency Plan will contain protocol and best management practices for the containment, response, and clean-up in the event of an inadvertent release of drilling fluid.</p>		
Summit Carbon Solutions	Zoller, Jason	2024-03-14	<p>Q. Would the HDD crossing method be utilized for RA-North and RA-Hybrid?</p> <p>A. Yes, both RA-North and RA-Hybrid have crossings of certain waterbodies and roads that would be accomplished by the HDD crossing method. See DEIS Tables 5-46 and 5-47.</p> <p>Q. Why is Summit proposing to use open cut methods to cross certain waterbodies?</p> <p>A. If a delineated waterbody is dry and has no perceivable water flow, then Summit intends to use open cut methods. Additional detail regarding this method is in the Minnesota Environmental Construction Plan (Minnesota ECP). Open cut methods are employed in areas where no perceivable water flow is present or anticipated to be present from initial disturbance and final stabilization as an industry standard method for installation of pipe across dry waterbodies, and this method will comply with applicable permit regulations and conditions.</p> <p>Q. Would open cut crossings be utilized on RA-North and RA-Hybrid?</p> <p>A. Yes.</p>	Sections 5.7.8.2 and 5.7.10.2 have been revised to indicate that the applicant would use the isolated dry-trench crossing method on delineated waterbodies with perceivable water flow during construction. The flowing open-cut crossing method would not be used for the project.	20243-204356-03
Summit Carbon Solutions	Zoller, Jason	2024-03-14	<p>Q. Has Summit evaluated the potential construction-related impacts to wetlands?</p> <p>A. Yes. Summit will permit all impacts to wetlands as a result of construction with the USACE St. Paul District. Summit is seeking to permit wetland impacts with the St. Paul District under Section 404 of the Clean Water Act (CWA) through the use of the Utility Regional General Permit (RGP). Summit will comply with all permit requirements and conditions associated with the Utility RGP.</p> <p>Q. Would RA-South have significantly higher wetland impacts than the other alternatives?</p> <p>A. No. As stated in Summit's DEIS comments, the data in the DEIS overstates the expected impacts to wetlands crossed by RA-South. Table 5-3 in Section 5.4.4.18 notes that RA-South crosses 81.1 acres of Emergent Herbaceous Wetlands compared to 15.6 and 15.1 acres crossed by RA-North and RA-Hybrid, respectively. This data is based on USGS National Landcover Dataset, which is a very coarse data set for providing spatial reference and descriptive data for characteristics of the land surface such as thematic class (e.g., urban, agriculture, and forest), percent impervious surface, and percent tree canopy cover. This data is known not to be an accurate representative of the occurrence of wetlands within a landscape. Additionally, the acreage provided in Table 5-3 is for the entire route width, not just the project right-of-way. The total 81.1 acres of Emergent Herbaceous Wetlands is highly influenced by the high density of wetland pixels located within the portion of the RA-South corridor that has been increased in width near milepost 6.6 for future routing flexibility intended to avoid potential impacts. The majority of the wetland pixels in this specific area do not overlap the proposed Project right-of-way and would not be impacted by construction. The route widths analyzed by EERA for RA-North and RA-Hybrid do not include similar widened route width areas. When considering the actual width of the right-of-way expected for construction, RA-South would not have demonstrably greater wetland impacts than the other alternatives.</p>	Section 5.4.10.3 has been updated to indicate that Summit proposes to adopt the EERA-recommended mitigation.	20243-204356-03

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Summit Carbon Solutions	Zoller, Jason	2024-03-14	<p>Q. Dr. Dolph suggests that the No-Build or RA-North present the best alternatives for minimizing impacts to groundwater, surface water, wetlands, and soils (Dolph Direct). Do you agree?</p> <p>A. No. As stated in the DEIS, construction of the Project will have minimal, temporary impacts to these resources, and Summit will implement best management practices to further minimize potential impacts to these resources.</p> <p>As between the No-Build Alternative and RA-South, it will always be true that not building a linear project, like a pipeline, will have fewer construction-related impacts than building a project. However, in order to meet the urgent need to address climate change and reduce greenhouse gas emissions, investment in new infrastructure, with its related impacts, is necessary. As the DEIS notes, the Project will have a positive environmental benefit in reducing greenhouse gas emissions from the Green Plains Ethanol Plant.</p> <p>As between RA-South and RA-North or RA-Hybrid, the DEIS demonstrates that potential impacts are simply shifted to these locations. The potential impacts Dr. Dolph discusses are not unique to RA-South, and they are well-understood impacts that are regularly managed through permits issued by regulatory agencies and application of best management practices in construction activities throughout the state and region.</p>	Thank you for your comment.	20243-204356-03
Summit Carbon Solutions	Zoller, Jason	2024-03-28	<p>Q. Do you agree with Dr. Christy Dolph’s opinion that Summit will cross water bodies with horizontal direction drills (HDD) in places where the soils are not amenable to HDD and rely only a contingency plan inadvertent drilling mud returns?</p> <p>A. No. Based on the geotechnical work completed to date, soils in the area are suitable for HDDs. The geotechnical studies provide necessary information for Summit to design the drills and fine tune the operation of the drills in order to minimize the potential for inadvertent release. Based on the results of the studies, the contractor will be able to fine tune the speed and pressure of the drill and also the depth at which it is designed. Additionally, the installation of a 4-inch diameter pipeline allows for a considerable amount of flexibility in the arc of the drill. Summit will complete a geotechnical evaluation of each HDD along the Project prior to the start of construction.</p>	Thank you for your comment.	20243-204748-03
Summit Carbon Solutions	Zoller, Jason	2024-03-28	<p>Q. Do you agree with Dr. Dolph’s statement that once drilling fluid is spilled to subsurface environments or waterways, it is impossible to remove, and may have negative impacts on surface or subsurface water quality?</p> <p>A. No. Summit does not agree that spilled drilling fluid is impossible to remove. While it is true that temporary impacts could occur as a result of an inadvertent return, cleanup can be successful, and cleanup will minimize impacts to affected resources. The effectiveness of the cleanup really depends on the size of the release, the duration of the release, when the release is detected, and the location of the release (i.e., if the release is in a waterbody, then the flow or size of the waterbody can impact the cleanup). Summit’s inadvertent return plan will help ensure that Summit and its contractors are prepared for a variety of potential scenarios and that they are able to act quickly to clean up the site if an inadvertent return should occur.</p>	Section 5.7.8.2 addresses potential impacts on surface waters in the event of an inadvertent return, factors that can influence the effectiveness of a cleanup, and the applicant's contingency plan for the unintended release of drilling mud.	20243-204748-03
Summit Carbon Solutions	Zoller, Jason	2024-03-28	<p>Q. Do you agree with SHPO’s comment that a full evaluation of either alternative’s potential to impact archaeological resources cannot be determined until the archaeological surveys of RA-North and RA-Hybrid route widths have been completed?</p> <p>A. Yes. However, Summit would like to note it is not typical to complete surveys on all route alternatives other than those proposed by Summit, since landowner permission is necessary to carry out these surveys. Summit plans to complete surveys on all parcels prior to construction on the parcel. Summit would also clarify that that surveys should be completed such that a “good faith effort to carry out appropriate identification efforts” can be agreed upon per 36 CFR 800.4.</p> <p>Q. Do you agree with SHPO’s comment that it would be useful in the final EIS to have complete evaluations for all the archaeological sites within the route width for the three route alternatives evaluated?</p> <p>A. No. Again, it is not typical to complete evaluations of archeological sites on all proposed alternatives at the environmental review stage.</p>	Thank you for your comment.	20243-204748-03
Summit Carbon Solutions		2024-02-13	<p>Summit Carbon Solutions, LLC (Summit) appreciates this opportunity to provide comments on the Draft Environmental Impact Statement: Otter Tail to Wilkin Carbon Dioxide (CO₂) Pipeline Project (DEIS) published by the Minnesota Department of Commerce Energy Environmental Review and Analysis (EERA) staff on January 23, 2024.</p> <p>Overall, the DEIS provides a comprehensive evaluation and discussion of the potential benefits, impacts, and mitigation measures for the Otter Tail to Wilkin CO₂ Pipeline Project (Project) and alternatives being considered by the Minnesota Public Utilities Commission (Commission or MPUC). Importantly, the DEIS confirms the Project “would reduce [greenhouse gas emissions] in the atmosphere and contribute to reducing the effects of climate change”¹ and that the potential impacts of construction and operation of the Project are generally anticipated to be minimal.²</p>	Thank you for your comment.	20242-203374-03

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			<p>These comments are focused on (1) Summit’s assessment of whether the DEIS fully addresses the issues identified in the October 5, 2023 Final Scoping Decision (FSD), as well as the content required under Minn. R. 4410.2300; and (2) corrections, clarifications, and additions that EERA should consider in preparing the final EIS (FEIS) to ensure that the FEIS is complete and accurate and responsive to issues raised during the DEIS comment period. Various sections of the DEIS (e.g., Chapter 5, Section 8.5.3, and Chapter 11) contain recommendations from EERA staff, other agencies, and members of the public regarding mitigation measures the Commission may consider as part of a route permit for the Project. Summit will respond to those recommendations in its pre-filed direct testimony; the recommendations are not addressed in these comments.</p> <p>Summit has organized these DEIS comments first to identify information that should be added to the FEIS based on the FSD and then by chapter and appendix for ease in tracking the comments.</p>		
Summit Carbon Solutions		2024-02-13	<p>I. INFORMATION REQUIRED BY FINAL SCOPING DECISION</p> <p>The FSD states that the EIS should discuss potential impacts to vegetation, including oak trees.³ Summit was unable to locate this discussion in the DEIS. While the DEIS notes that very few trees would be impacted by construction of the Project,⁴ Summit was unable to identify a discussion of impacts to oak trees and recommends this content be added to the FEIS as specified in the FSD.</p>	Section 5.2 and Section 5.7 have been revised to note that the percent cover of oak trees is very low for all route alternatives.	20242-203374-03
Summit Carbon Solutions		2024-02-13	<p>Section 2.1 of the DEIS states that the larger Midwest Carbon Express Project will capture and transport CO₂ from 32 ethanol plants across 5 states to permitted underground sequestration facilities in North Dakota.⁵ Summit recently announced a strategic partnership with POET, LLC that will add 17 of POET’s biorefining facilities in Iowa and South Dakota to Summit’s planned pipeline network.⁶ While the addition of these facilities to the Midwest Carbon Express Project do not impact the analysis in the DEIS, EERA could consider mentioning the updated information in the FEIS.</p>	This information on the expansion of the Midwest Carbon Express project has been added to Section 2.1 of the EIS.	20242-203374-03
Summit Carbon Solutions		2024-02-13	<p>Valve Closure Time: Section 4.5 includes the following statement: “Therefore, in the time it would take for the valves to close in case of an emergency (25 minutes according to the applicant), the throughput volume would be equal to about 5 percent of the volume already in the 13.9-mile-long pipeline segment.”⁷ The stated valve closure time is incorrect. A valve can be closed in as little as 17 seconds. As Summit stated in response to EERA Inquiry No. 5-34, for modeling purposes, the valve closure time for the Project was conservatively modeled as 10 minutes, which is generally the time measured from the beginning of the loss of containment to the time the valve fully closes and typically includes the time it takes to: detect the leak, decide to close the valve (human or logic), travel time to valve (human or signal), and close the valve. The modeled valve closure time is correctly listed as 10 minutes in Table 7 (page 12) of the Aerial and Thermal Dispersion Analysis, included as DEIS Appendix G. Summit requests that EERA correct the valve closure time reference in Section 4.5 in the FEIS.</p>	Text in Section 4.5 on valve closure time has been corrected from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20242-203374-03
Summit Carbon Solutions		2024-02-13	<p>Summit identified several clarifications and minor corrections to the content in DEIS Chapter 5, including:</p> <ul style="list-style-type: none"> Table 5-3 in Section 5.4.4.18 notes that RA-South crosses 81.1 acres of Emergent Herbaceous Wetlands compared to 15.6 and 15.1 acres crossed by RA-North and RA-Hybrid, respectively. The table and surrounding text should clarify that the data is based on USGS National Landcover Dataset, which is a very coarse data set for providing spatial reference and descriptive data for characteristics of the land surface such as thematic class (e.g., urban, agriculture, and forest), percent impervious surface, and percent tree canopy cover. This data is known not to be an accurate representative of the occurrence of wetlands within a landscape. Additionally, the acreage provided in Table 5-3 is for the entire route width, not just the project right- of-way.⁹ The total 81.1 acres of Emergent Herbaceous Wetlands is highly influenced by the high density of wetland pixels located within the portion of the RA-South corridor that has been increased in width near milepost 6.6 for future routing flexibility. The majority of the wetland pixels in this specific area do not overlap the proposed Project right-of-way and would not be impacted by construction. The route widths analyzed by EERA for RA-North and RA-Hybrid do not include similar widened route width areas. 	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9, Table 5-53, and Table 5-54. In addition, footnotes were added to Table 5-3 and Table 5-53 noting that the route width for RA-South is greater than for RA-North and RA-Hybrid.	20242-203374-03

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Summit Carbon Solutions		2024-02-13	<ul style="list-style-type: none"> Sections 5.4.2.210 and 5.6.1.211 should clarify that tribal cultural resource surveys have been completed on 99.8 percent of RA-South.¹² No sites of tribal significance were identified. Summit has prepared an Unanticipated Discoveries Plan (UDP)¹³ and will provide training on the UDP to all construction personnel.¹⁴ 	Text in Sections 5.4.2.2 and 5.6.1.2 has been revised to indicate that Tribal cultural resource surveys were completed for these portions of each alternative.	20242-203374-03
Summit Carbon Solutions		2024-02-13	<ul style="list-style-type: none"> Section 5.7.1.2 includes several incorrect footnotes in Table 5-36.¹⁵ Footnote (b) should be corrected to read “CO₂e emission rates based on a conversion factor of 6.2901 pounds (lbs) of CO₂ per gallon of ethanol produced and assume a maximum production rate of 65 million gallons of ethanol per year. [CO₂e (lbs/gallon ethanol) = 3,785.41 cubic centimeters/gallon ethanol x 0.789 grams ethanol/cubic centimeter / (46.07 grams ethanol/44.01 grams CO₂) x 0.0022046 lbs CO₂/gram CO₂].” 	Thank you for your comment. The footnote to Table 5-36 has been corrected.	20242-203374-03
Summit Carbon Solutions		2024-02-13	At the DEIS public meetings on February 6-8, 2024, commenters asked several questions regarding the Project’s expected water use. As stated in the DEIS, Summit anticipates using approximately 125,000 gallons of water for the execution of horizontal direction drills (HDDs), hydrostatic testing, and dust control for the Project, of which 110,000 gallons would be used for pipeline hydrostatic testing. ¹⁶ Summit is currently exploring options for appropriation of water, including duration of use, volume, and appropriation location(s). These could be private, municipal, or surface water sources. Once proposed/preferred and contingency sources and volumes are finalized, these details would be reviewed by the Minnesota Department of Natural Resources (MDNR). Summit would obtain coverage under an individual or general MDNR water appropriation permit(s) for any surface or groundwater appropriated for these activities. These permits would contain best management practices (BMPs) for water withdrawals. Water appropriation permits from the MDNR would inform the locations used, any seasonal restrictions to account for low-flow conditions, volume and measurement requirements, and BMPs to be used during appropriation activities.	Thank you for your comment.	20242-203374-03
Summit Carbon Solutions		2024-02-13	<p>Minnesota law sets standards for non-depletion, reasonable use, and non-degradation of water resources in striving to prevent negative impacts.¹⁷ The MDNR, through its water appropriation permitting process, would ensure that water appropriations would not deplete or degrade the water source (e.g., the permit would specify maximum surface water withdrawal rates to protect aquatic life and allow for downstream uses). Summit would include a contingency plan as part of the appropriation permit application because it is challenging to predict how changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons would impact proposed water resources. The contingency plan would include identification of potential alternate water supply sources and/or a statement that Summit agrees in advance to a suspension of withdrawals following DNR request, when necessary.</p> <p>Trench dewatering is also considered an appropriations activity regulated by MDNR and would be conducted according to permit requirements.</p>	Information on contingency plan and appropriations for trench dewatering has been added to Section 5.7.8.2.	20242-203374-03
Summit Carbon Solutions		2024-02-13	Summit is evaluating the need to appropriate water for dewatering, dust control, and hydrostatic testing during construction of the capture facility. A specific water source has not been determined at this time; however, Summit plans to obtain water from either a local surface water source or groundwater well directly, or indirectly, from the Green Plains Ethanol Plant or the City of Fergus Falls.	This information has been added to Section 5.7.8.2.	20242-203374-03
Summit Carbon Solutions		2024-02-13	During operations, the CO ₂ capture facility would have estimated water supply needs ranging from 8.2 gallons per minute (gpm) in winter months and 40.9 gpm in summer months, for an average water usage of approximately 13 million gallons per year. The “13 million gallon” total was calculated by using the estimate of 8.2 gpm for 182.5 days and the estimate of 40.9 gpm for 182.5 days (for a total of 365 days of use). The water is expected to be obtained from the Green Plains Otter Tail Ethanol Plant’s onsite wells. Summit will coordinate water use permitting at the capture facility with the MDNR.	This information is provided in Section 5.7.8.2.	20242-203374-03
Summit Carbon Solutions		2024-02-13	Any water appropriation permit issued by MDNR would require annual water use reporting. The MDNR reported over 23.3 billion gallons of permitted water use in Otter Tail and Wilkin counties in 2022. ¹⁸ Due to the volume of current permitted appropriations in the counties crossed by the Project, the relatively small volume likely needed by the Project in comparison, and the measures and conditions outlined above, environmental effects from the Project’s water appropriation activities are expected to be minimal. Given the comments regarding water use at the DEIS meetings, Summit suggests including this additional information, which was also discussed in the Scoping Environmental Assessment Worksheet (Scoping EAW), ¹⁹ in the FEIS.	Additional information has been added to Section 5.7.8.2 to address the volume of water that would be used by the project relative to available resources.	20242-203374-03
Summit Carbon Solutions		2024-02-13	Section 5.4.9.3 restates the Minnesota Department of Transportation (MnDOT) recommended mitigation measures at MnDOT right-of-way (ROW) crossings, including depth and casing requirements, restrictions on boring pit locations, avoiding intersecting other roads with MnDOT ROW, and setbacks for existing utilities and structures. ²⁰ Summit is committed to working with MnDOT for all MnDOT road crossings. However, Summit disagrees that casing is an appropriate mitigation measure and requests that the FEIS	The HDD and bore crossing methods are discussed in Section 2.4.8. Additional information has been added describing these two crossing methods. EERA notes that crossing methods at MnDOT ROW would be determined by MnDOT through a road crossing permit.	20242-203374-03

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			<p>include a discussion of potential impacts related to requiring cased crossings. As Summit stated in response to EERA Inquiry No. 5-28, Summit is currently proposing to cross Minnesota TH 210 and US Highway 75 via horizontal directional drill (HDD).</p> <p>Summit does not recommend requiring the use of cased crossings at Minnesota TH 210 and US Highway 75. Requiring cased crossings at these locations will result in greater impacts to privately-owned land during and after construction, increased installation times, increased risk to pipeline integrity, and actually less depth of cover over the pipeline with the road ROWs.</p> <p>For example, in order to install the casing pipe with a minimum depth of cover of 10 feet below the lowest point within the road ROWs as recommended by MnDOT, bell holes approximately 15-20 feet deep by 10-20 feet wide by 20-40 feet long will need to be excavated on both sides of the roadways, on privately owned agricultural land. The bell holes are required to accommodate the equipment and installation of the casing pipe. The large volume of excavated soils will have to be stored onsite during construction. In addition to the bell hole excavations, tail ditches will have to be excavated on both sides to gradually slope the pipeline up from the casing depth to the normal pipeline depth of 4.5 feet. Due to MnDOT’s recommendation to require the casing maintain a minimum of 10 feet of cover under the lowest point within the road ROW, the casings will be 12-16 feet deep at the edges of the road ROW. Larger construction workspace may be needed to accommodate excavation spoils and equipment during installation.</p> <p>In addition to the physical impacts, casing increases installation times. The steps described above will require longer installation time, increasing the impacts to private landowners.</p> <p>Casing pipe also increases risks to pipeline integrity. Casing pipe shields carrier pipe from the induced current cathodic protection system by eliminating contact between the carrier pipe and the electrolyte (soil). This means that the pipeline’s cathodic protection system will not protect the pipe within the casing. Metallic shorts between the casing pipe and the carrier pipe are also common, especially within longer casings. This occurs when the casing pipe comes into contact with the carrier piping and can be caused by earth movement or settlement over time. This situation can lead to additional corrosion and stress on the carrier pipe. Due to railroad ROW abutting the road ROW for both Minnesota TH 210 and US Highway 75, the cased crossings will be approximately 250-270 feet long each.</p> <p>There would also be increased maintenance requirements associated with casings over the life of the pipeline in order to ensure integrity. Vent pipes, end seals, and centralizers may require maintenance (excavation required) to ensure integrity of the casing and carrier pipe throughout the life of the pipeline system.</p>		
Summit Carbon Solutions		2024-02-13	<p>Encasement of pipelines is an outdated technique that was utilized prior to the introduction of trenchless technologies. Modern pipeline design and corrosion guidelines such as ASME B 31.4 – Pipeline Transportation Systems for Liquids and Slurries and NACE RP0200 – Steel- Cased Pipeline Practices recommend avoiding pipeline casings.</p> <p>Finally, casing results in less depth of cover over the pipeline within the road ROWs. MnDOT is recommending requiring 10 feet of cover for the casing, which far exceeds the minimum requirements in the MnDOT Utility Accommodation and Coordination Manual (requires 5 feet of cover below the pavement and 3 feet of cover below the ditch).²¹</p> <p>In summary, Summit’s preliminary HDD designs for these crossings have been designed to provide a minimum depth of cover of 20 feet below the lowest points within the road ROWs, would result in less impact to private landowners, and would allow for the protection afforded by the cathodic protection system. Per the MnDOT Utility Accommodation and Coordination Manual Section VIII(D)(3)(c)(ii), pipelines placed by trenchless technologies may be approved on a case- by-case basis if certain criteria are met.²² Summit’s preliminary HDD designs meet and exceed all the criteria laid out in the MnDOT Utility Accommodation and Coordination Manual. Summit intends to continue to work with MnDOT regarding the crossing methodology at these locations; however, Summit requests that the FEIS consider the increased impacts associated with MnDOT’s requested casing mitigation measure.</p>	The HDD and bore crossing methods are discussed in Section 2.4.8. Additional information has been added describing these two crossing methods. EERA notes that crossing methods at MnDOT ROW would be determined by MnDOT through a road crossing permit.	20242-203374-03
Summit Carbon Solutions		2024-02-13	<p>The discussion of accidental releases found in Chapter 8 and Appendix G of the DEIS provides a conservative and thorough discussion of the potential impacts of an accidental release of CO₂ from the Project and addresses many of the questions that have been raised in public comments. Importantly, the independent evaluation of Summit’s air dispersion model confirmed Summit’s “methodology and results are valid,”²³ and the independent modeling completed by Allied Solutions, while more conservative in some respects than Summit’s analysis, was not materially different than Summit’s modeling for the Project.²⁴</p> <p>Summit offers several suggestions to address what may be perceived as internal inconsistencies in the DEIS and provides additional context related to the potential impacts associated with an accidental CO₂ release.</p>	Thank you for your comment.	20242-203374-03

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Summit Carbon Solutions		2024-02-13	<p>Short Modeled Release Duration</p> <p>The independent air dispersion and computational fluid dynamics (CFD) modeling completed by Allied Solutions concluded that “regardless of the scenario, the time it takes for the 30,000-ppm concentration CO₂ release to dissipate is very short—less than 4 minutes. In fact, the total time of the entire event would be less than 7 minutes in a worst-case scenario.”²⁵ Summit agrees with the DEIS conclusion that even a reasonable worst-case release event would have a very short duration. However, several other discussions of the potential impacts of a CO₂ release suggest a longer duration and should be revised in the FEIS. For example:</p> <ul style="list-style-type: none"> • DEIS at 8-15 states: “However, CO₂ in gas form dissipates within hours, so [road] closures resulting from nearby ruptures that do not damage infrastructure would be short-term, likely hours rather than days.” (emphasis added). • DEIS at 8-19 states: “As a result, some individuals from amphibian species might eventually be overcome by a large, persistent CO₂ plume and would likely die or experience respiratory trauma and disorientation.” (emphasis added). <p>These statements should be revised to reflect the finding that the total expected duration of a reasonable worst-case release from the Project would be minutes, not hours or days.</p>	Section 8.3.1.4 has been modified to state that dangerous concentrations of CO ₂ would dissipate within minutes. Section 8.3.4 has been revised to remove the word "persistent."	20242-203374-03
Summit Carbon Solutions		2024-02-13	<p>Effects of CO₂ on Humans</p> <p>Given the public interest in obtaining additional information regarding the potential impacts of a CO₂ release on human health, Summit believes the FEIS should provide several corrections and clarifications on the human health discussion currently included in the DEIS.</p> <p>First, the FEIS should correct the bold statement under the Section 8.2 heading on page 8-3 that states “[a] 2020 pipeline rupture in Mississippi caused 45 people to be hospitalized...” This statement is inaccurate. As correctly stated under Section 8.2.1.2, the Pipeline Hazardous Materials Safety Administration’s (PHMSA) 2022 Failure Investigation Report found that “[n]o fatalities occurred, but 200 people were evacuated and 45 people sought medical treatment at local hospitals...”²⁶ This statement accurately reflects PHMSA’s findings, and the earlier statement regarding hospitalization should be revised.</p>	The PHMSA 2022 Failure Investigation Report states numerous times that 45 people were "taken to the hospital," including in its "Key Points" on Page 2 of the report. The text in Section 8.2 and the Executive Summary has been revised to use that phrasing.	20242-203374-03
Summit Carbon Solutions		2024-02-13	<p>Second, the DEIS anchors its discussion on potential human health effects of a CO₂ release on the National Institute for Occupational Safety and Health (NIOSH) Immediately Dangerous to Life and Health (IDLH) limit of 40,000 ppm for healthy people. Specifically, the DEIS utilizes this 40,000 ppm IDLH limit as an identified level of concern in its analysis.²⁷ The DEIS Appendix G also characterizes 15,000, 30,000, or 40,000 ppm CO₂ as a “Toxic Level of Concern.”²⁸ While Summit, too, utilizes 15,000 and 40,000 ppm of CO₂ as levels evaluated in its modeling, the FEIS should include additional discussion regarding the conservative nature of these levels.</p> <p>A NIOSH IDLH limit is an air concentration at or below which healthy workers may be exposed for 30 minutes without risk of permanent harm to health or ability to escape. Accordingly, levels of 40,000 ppm or less are not “Toxic Level[s] of Concern.” The weight of evidence from the available scientific literature on human effects do not show that CO₂ exposure at these levels causes toxic effects. For example, the DEIS cites a 2022 study conducted by van der Schrier, et al. (van der Schrier Study) in Section 8.3.4 where the DEIS discusses the potential impacts of CO₂ exposure on the natural environment.²⁹ The FEIS should also include a discussion of the van der Schrier Study findings related to potential human health impacts. In this detailed and recent study, the study authors reported CO₂ exposures from 60,000 to 120,000 ppm (or 6% to 12% CO₂ atmosphere) to healthy male volunteers. The volunteers were exposed for up to one hour. Exposures to 100,000 and 120,000 ppm were stopped early due to subject irritability, anxiety, or loss of consciousness. However, all subjects completely recovered in all aspects within minutes of exposure cessation.</p> <p>The detailed effects reported for humans in the van der Schrier Study indicate a lack of toxic effect and the presence or continued ability to make escape-related decisions for exposures between 75,000 and 90,000 ppm in typical, healthy individuals. The FEIS should include a discussion of the van der Schrier Study in the human health effects section to provide a more robust discussion of the recent science supporting that inhaled CO₂ exposures of less than 100,000 ppm have been demonstrated to be non-toxic, further demonstrating that use of the NIOSH limit of 40,000 ppm for healthy people is extremely conservative. Based on the best available science, the term “toxic impact distance” used to indicate the distance at which CO₂ concentrations could reach 40,000 or 30,000 ppm should be revisited throughout the DEIS Chapter 8 and Appendix G.</p>	<p>By "toxic levels of concern," the EIS refers to levels of concern (LOC) from the toxic analysis that was performed for this project. The toxic analysis that CANARY provides is the analysis that determines given CO₂ concentrations and their associated impact distances. 30,000 ppm is the concentration that was selected as a LOC for the conservative reasons explained in Appendix G.</p> <p>A review of the science concerning CO₂ toxicity levels is outside the scope of the EIS, and the EIS continues to use CO₂ concentration levels defined by federal agencies in its discussion. The Executive Summary, Chapter 8, and Appendix G have been revised to remove references to "Toxic Level of Concern" or "toxic impact distances."</p>	20242-203374-03
Summit Carbon Solutions		2024-02-13	<p>Other Clarifications or Corrections</p> <p>The FEIS should correct the statement in the DEIS that there is an airport “within the toxic impact distance.”³⁰ The closest edge of the Fergus Falls Airport runway is approximately 1,750 feet from the Project and the primary buildings are nearly 3,200 feet away, well outside the distance identified as the furthest distance that CO₂ concentrations above 40,000 ppm may reach according to Allied Solutions’ modeling. The DEIS later states a potential release would cause “no or minimal damage to the airport”.³¹ Summit suggests</p>	Thank you for your comment. Section 8.3.1.4 of the EIS has been revised to clarify the results of modeling concerning the proposed route near the Fergus Falls Municipal Airport-Einar Mickelson Field.	20242-203374-03

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			that the statement on page 8-14 be revised simply to state that potential impacts on the airport were evaluated, but not suggest that the airport is “within the toxic impact distance.”		
Summit Carbon Solutions		2024-02-13	<p>Assumed Soil and Product Temperature</p> <p>Summit also suggests that the FEIS provide further discussion and clarification regarding Allied Solutions’ assumed product temperature of -20 degrees Fahrenheit.³² Summit assumed 30 degrees for the same factor in its modeling.³³ The DEIS justifies the -20 degrees temperature assumption stating, “[d]ue to a measured soil temperature at burial depth being subzero and the existence of aboveground valve sets, this temperature should be nearly the same as the air temperature.”³⁴ It cites “NOAA. Soil Temperature Maps by Depth: History data in CSV” as the source for this justification.³⁵ Summit was unable to confirm a -20 degrees soil temperature assumption in the cited source. To the contrary, according to the 10-year data from four USDA Natural Resources Conservation Service soil temperature probes in the region (Mandan #1, Glacial Ridge, Crescent Lake, and Eros Data Center), the minimum annual temperature at 40-inch depth ranged between 30-35 degrees Fahrenheit. With Summit’s pipeline proposed depth of cover at 54- inches, it is expected that actual soil temperatures around the pipeline would be slightly above these levels. Once the product enters the pipeline, no additional energy is added and thus the product will begin cooling and ultimately equalizing with surrounding soil temperature. As discussed in the DEIS, colder ambient conditions result in a more conservative dispersion model, which is why both Summit as well as Allied Solutions utilized winter conditions. However, based on the discussion above, Summit believes a soil temperature and, in turn, product temperature of 30 degrees Fahrenheit is a better estimate of a “reasonable worst-case temperature.”</p>	<p>Sections 8.3.1 and 8.3.4 have been revised to discuss the potential impacts of ice covering waters or wetlands at the point of a rupture. In general, if CO₂ released from the pipeline was trapped by ice, then the CO₂ would release more slowly into the atmosphere as it traveled laterally under the ice until it escaped through cracks or gaps in the ice, thereby decreasing the impact distance (the distance the CO₂ would travel through the air). The EIS modeled the worst-case scenario where the CO₂ is not trapped by ice. In the event of a pipeline rupture that caused CO₂ to be trapped by ice covering a waterbody, CO₂ could remain in contact with the water for more time, and the concentration of carbonic acid could increase. In other words, the water and aquatic species could experience a greater impact from the CO₂, but the atmosphere would experience less CO₂, and the risk to humans and other terrestrial species would be lower.</p> <p>As noted in Section 5.7.3.4 and Section 8.1, the applicant has committed to conducting a Phase I Geohazard Assessment to identify areas surrounding the pipeline that may be prone to large earth movement, as recommended by PHMSA in its June 2022 Advisory Bulletin, and EERA staff recommends that the results of the Phase I assessment, and any subsequent assessments, should be provided to the Commission.</p>	20242-203374-03
Summit Carbon Solutions		2024-02-13	<p>Given the stated objective of the independent modeling was to provide a more conservative worst-case representation of potential release impacts,³⁶ Summit does not suggest revising the modeling presented in the FEIS to correct this temperature assumption, but rather the FEIS should discuss the source of this assumption and disclose the overly conservative nature of the assumption given historical soil temperatures in Minnesota, as documented by the USDA. In Summit’s view, revising this assumption would not materially change the outcome of Allied Solutions’ conservative modeling analysis.</p> <p>It is, however, important that the FEIS clarify and further explain use of this assumption so as not to cause confusion for individuals who have asked about the potential risk to the pipeline related to frost heave. Frost heave is not a significant risk to pipeline integrity because the pipe will be buried at a depth of at least 54 inches for this Project,³⁷ well below the frost line.³⁸ Without further clarification of the modeling temperature assumption in the FEIS, individuals concerned about the risk of frost heave may misinterpret this modeling assumption to suggest that, in fact, soil temperatures at the depth of the pipe could be subzero.</p>	<p>Sections 8.3.1 and 8.3.4 have been revised to discuss the potential impacts of ice covering waters or wetlands at the point of a rupture. In general, if CO₂ released from the pipeline was trapped by ice, then the CO₂ would release more slowly into the atmosphere as it traveled laterally under the ice until it escaped through cracks or gaps in the ice, thereby decreasing the impact distance (the distance the CO₂ would travel through the air). The EIS modeled the worst-case scenario where the CO₂ is not trapped by ice. In the event of a pipeline rupture that caused CO₂ to be trapped by ice covering a waterbody, CO₂ could remain in contact with the water for more time, and the concentration of carbonic acid could increase. In other words, the water and aquatic species could experience a greater impact from the CO₂, but the atmosphere would experience less CO₂, and the risk to humans and other terrestrial species would be lower.</p> <p>As noted in Section 5.7.3.4 and Section 8.1, the applicant has committed to conducting a Phase I Geohazard Assessment to identify areas surrounding the pipeline that may be prone to large earth movement, as recommended by PHMSA in its June 2022 Advisory Bulletin, and EERA staff recommends that the results of the Phase I assessment, and any subsequent assessments, should be provided to the Commission.</p>	20242-203374-03
Summit Carbon Solutions		2024-02-13	<p>Response to Public Comment on Modeling</p> <p>At the afternoon DEIS meeting in Fergus Falls, Minnesota, Craig Winters, a member of the public, asked whether the DEIS’ air dispersion modeling evaluated what would occur if a CO₂ release happened while it was raining. Rain is not anticipated to have a major impact on CO₂ dispersion. Precipitation has the potential to strip CO₂ from the air through dissolution, although likely in very small quantities. The rain would only have tens of meters or hundreds of meters of CO₂ to fall through, with only seconds of interaction. Dissolution into raindrops would likely be limited. Puddles that form on the ground may initially have a slightly lower pH,</p>	Thank you for your comment.	20242-203374-03

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			but would offgas to atmosphere, interact with the soils or organic matter on the surface, and dilute with additional rain, returning the pH rather quickly to typical levels. To respond to Mr. Winters’ question, the FEIS could add this additional explanation regarding how CO ₂ would likely disperse if it were raining at the time of a release.		
Summit Carbon Solutions		2024-02-13	Summit requests that EERA consider and incorporate these suggestions in the FEIS to ensure it (1) addresses all issues identified in the FDS; (2) is complete and accurate; and (3) responds to substantive comments raised during the DEIS comment period.	Thank you for your comment.	20242-203374-03
Union of Concerned Scientists	Moura, Maria	2024-02-23	Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) on Otter Tail to Wilkin Carbon Dioxide Pipeline Project. On behalf of the Union of Concerned Scientists and our more than 5000 members and supporters in Minnesota we request that in order to protect the health and safety of adjacent communities, the approval process for the proposed pipeline and any other carbon dioxide (CO ₂) pipeline should not move forward until the federal Pipeline and Hazardous Materials Safety Administration finalizes new rules governing carbon dioxide pipelines.	Thank you for your comment.	20243-204403-01
Union of Concerned Scientists	Moura, Maria	2024-02-23	Incentivized by the federal 45Q tax credit, pipeline companies have started proposing the rapid buildout of CO ₂ pipelines. The Bipartisan Budget Act passed in 2018 extended and significantly increased the tax credit for CO ₂ use and storage under Section 45Q of the Internal Revenue Code. Our main concern is that according to a 2022 study commissioned by the Pipeline Safety Trust, CO ₂ pipelines pose significant safety and public health hazards which are not adequately addressed by current regulations.	Thank you for your comment. The draft EIS discusses PHMSA rules and regulations, and the pending rulemaking process it is undertaking for CO ₂ pipelines, and acknowledges pending PHMSA changes to such regulations (see draft EIS, Chapter 3, Chapter 8, and Appendix G). PHMSA regulations (that is, their appropriateness) and related standards for CO ₂ pipelines are outside the scope of the EIS (Appendix A).	20243-204403-01
Union of Concerned Scientists	Moura, Maria	2024-02-23	CO ₂ pipelines are susceptible to ductile fractures, which can run along a significant length of the pipe, releasing large amounts of CO ₂ , and projecting segments of pipe and shrapnel. The likelihood of ruptures is aggravated by the fact that water, which is difficult to eliminate from CO ₂ pipelines, contributes to the formation of corrosive carbonic acid.	Ductile fractures are addressed in Section 8.1.2. Measures to prevent fractures are detailed in Section 8.5.1.1.	20243-204403-01
Union of Concerned Scientists	Moura, Maria	2024-02-23	CO ₂ is an asphyxiant that is heavier than air and accumulates close to the ground, where people can be exposed to it. It causes dizziness, severe muscle twitching and unconsciousness within a few minutes and even death at higher concentrations and longer exposure times. Because it is a colorless, odorless, nonreactive and inert gas, victims and first responders have no way of knowing they are exposed until it happens, which is often too late. Impacts happen too quickly so warning detectors are not necessarily effective. As an example, after the rupture in Satartia, Mississippi, on February 22, 2020, first responders were not able to understand why people were lying on the ground, shaking and unable to breathe, and more than 200 people were evacuated and at least 45 people were hospitalized.	Effects of inhaling CO ₂ are described in Section 8.3.1.4. Section 8.2.1.2 discusses the Satartia accident in detail, including a table summarizing significant differences between the proposed project and the pipeline involved in the Satartia incident. As discussed in Section 8.2.1.2, the operator of the Delhi pipeline did not inform local first responders or citizens of the unique safety risks posed by the CO ₂ pipeline. The applicant for this project has committed to educating and training both first responders and the public, as well as paying for equipment needed to safely and effectively respond to CO ₂ ruptures, thereby removing many issues that resulted in hospitalizations during the Satartia rupture (Sections 8.5.1.3, 8.5.1.4, and 8.5.1.5). In addition, EERA staff recommended special permit conditions to avoid impacts of a potential CO ₂ release, as described in Section 8.5.3, including information on the applicant's public information plan.	20243-204403-01
Union of Concerned Scientists	Moura, Maria	2024-02-23	Regulations for CO ₂ pipelines exist at both the federal and state levels in the United States. At the federal level, CO ₂ pipelines are regulated by the Pipeline and Hazardous Materials Safety Administration (PHMSA) under the Department of Transportation (DOT). However, these outdated regulations are unclear and do not sufficiently address the hazards associated with ruptures and other problems associated with CO ₂ pipelines which affect communities and ecosystems, such as dangers to water bodies and aquifers, land degradation, and geologic hazards, to name just a few. In particular, the DEIS accepts Summit’s assurances that it will “comply with federal emergency response requirements”, but given how outdated and inadequate current federal regulations are, the DEIS should not accept these assurances.	Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements.	20243-204403-01
Union of Concerned Scientists	Moura, Maria	2024-02-23	There now about 5,300 miles of CO ₂ pipelines in the U.S., and in the next few decades, that number could grow to more than 65,000 miles, according to an analysis prepared by researchers at Princeton University. Several states are moving forward with carbon sequestration projects. It should be noted that Summit’s project extends well beyond the 28-mile pipeline being considered: Summit	Thank you for your comment. The draft EIS discusses PHMSA rules and regulations, and the pending rulemaking process it is undertaking for CO ₂ pipelines, and acknowledges pending PHMSA changes to such	20243-204403-01

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			has public plans for a larger buildout in Minnesota and will be applying for permits for additional parts of the network. In addition, Summit should not be allowed to proceed on a segment of the network before a thorough cumulative impact review of the entire network is conducted, and granting a permit for one segment of the network will impede a thorough review of such impacts. It is key to wait for the Pipeline and Hazardous Materials Safety Administration to finalize new rules that are clear and effective and protect communities from the dangers of pipelines before any more CO ₂ pipeline projects are approved.	regulations (see draft EIS, Chapter 3, Chapter 8, and Appendix G). PHMSA regulations (that is, their appropriateness) and related standards for CO ₂ pipelines are outside the scope of the EIS (Appendix A). Section 3.2.2 has been updated to address the comment concerning cumulative impact review of the entire Midwest Carbon Express project.	
Upper Sioux Community	Jensvold, Kevin	2024-02-24	Appendix G provides some information about what the potential impact radius of a rupture might be, but overall the DEIS does not adequately address how the applicant will be able to guarantee the safety of those living along or near the project. The Pipeline and Hazardous Material Safety administration (PHMSA) has issued public statements that their regulations are not adequate to address the safety risks associated with CO ₂ pipelines. CO ₂ pipelines need special considerations because when a pipeline leaks or a rupture occurs it will release an asphyxiant that can suffocate people and prevent combustion-type vehicles from working. The equipment and training needs for Emergency response personnel to response to a pipeline incident needs to be thoroughly addressed and placed into practice prior to pipeline construction. All responders will need additional training and equipment to safely respond. This includes replacing all the gasoline/diesel vehicles with Electric Vehicles. In many rural areas the first responders/emergency response are often volunteers. Communities near the route of the pipeline should not have to bear the expense of specialized equipment needed for response to a new hazard brought to the area by a commercial entity.	Section 3.6 acknowledges that PHMSA is currently conducting rulemaking proceedings on proposed amendments to its pipeline safety rules, and the Commission states it would be prudent for EERA staff and the applicant to take that information into account, even if the updates have not been finalized. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including that the applicant indicates it will train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes that the applicant indicates it will educate the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-02
Upper Sioux Community	Jensvold, Kevin	2024-02-24	The Summit project aims to significantly impact our state's ethanol production industry. It would be impossible to clearly evaluate those potential impacts without looking at Summit's full Minnesota footprint and all the ethanol facilities contracted to connect to the pipeline. This type of project has the potential to induce further proliferation of carbon capture facilities across the state, as well as impact land use. And, ultimately, this DEIS is precedent-setting. It would be unwise to examine a 28.1-mile segment out of the context of the planned 240-mile Minnesota footprint. We strongly urge that the Commission re-evaluate and research further into the environmental impact of this new type of project by considering the impacts of the entire MN footprint of the Midwest Carbon Express pipeline including impacts to cultural and natural resources along the proposed route. Upper Sioux Community thanks the Commission for the opportunity to comment and for its consideration of our concerns.	Thank you for your comment. The Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	The Summit CO ₂ pipeline project's proposed route is within Dakota Homelands. Upper Sioux Community is directly associated to many areas of cultural importance and/or religious significance identified within the project area. The proposed route is located within an archaeologically dense area with a high volume of known cultural resources and/or significant sites. These resources and sites had, and continue to have, a significant cultural and spiritual role in the identity of Dakota practices and lifeways, we request that meaningful and diligent evaluation of project needs be carefully considered. Such sites and resources are irreplaceable.	Thank you for your comment.	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	The Dakota Peoples have a strong spiritual connection to the lands and waters within the ancestral territories of the Dakota. Protection of natural and cultural resources is critically important not only now but for several generations. Therefore, projects that impact the Waters, Air, Lands, wildlife and plant life need a thorough assessment as not to contaminate or destroy the natural environment. Further projects involving relatively new technology are particularly concerning and should be thoroughly researched to avoid issues or consequences.	Thank you for your comment.	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	The purpose of DEIS is to provide an overview of affected resources and discuss potential human and environmental impact and mitigation measures. We have concerns that the proper review hasn't been accomplished and have identified gaps in the impacts and mitigation measures. The following are the concerns regarding the impact to Cultural resources, waters, safety, land, climate change and greenhouse gas emissions, and cumulative impacts.	Thank you for your comment.	20243-204403-02

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Upper Sioux Community	Kevin Jensvold	2024-02-24	Tribes are tasked with evaluating impacts to known cultural resources and cultural sites without relevant case studies, scientific analysis, and precedent to guide informed determinations on CO ₂ pipeline impacts. To consider for example subsurface artifacts, human remains or any organic material and how exposure and interaction to CO ₂ would affect them, yet such studies are not available and even more detrimental are not being required in the EIS. The purpose of an EIS is to provide such studies and information. The Summit Carbon Solution pipeline route is a large-scale project, with many complex variables to consider when evaluating cultural resource impact, it is unreasonable for THPO s to review such considerations when key information is absent. The DEIS fails to address cumulative landscape impacts as well as exposure and interaction studies (as cited above).	Thank you for your comment. A study focused on the interaction of CO ₂ and subsurface artifacts, human remains, or any organic material is outside the scope of the EIS (Appendix A). Potential impacts on cultural resources are discussed in Section 5.4.2. Cumulative potential effects are discussed in Chapter 10.	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	<p>The proposed project and the identified right-of-way will impact numerous streams, rivers, wetlands, aquifers and other waterbodies. This includes the Pelican River, the Otter Tail River, and the Bois de Sioux River, and up to 44.6 acres of wetlands.</p> <p>We are concerned that the DEIS did not take an in-depth look at how the proposed project will impact the health and abundance of these water resources. The DEIS describes the potential impact of construction activity within or near these waterbodies as being short-term and minimal. But we know from past experiences with other pipelines, like Line 3, that the pipeline construction can have long-term and widespread impacts on both surface water and groundwater resources. Additional questions that were mentioned in our comments on the scoping (attachment) included the need to identify the amount of water usage that is needed, what will be added to the water, and where will the water be discharged?</p>	<p>Section 5.7.8 and Section 5.7.9 describe the impacts of the project on water resources and wetlands.</p> <p>Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.</p>	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	<p>Additional questions that were mentioned in our comments on the scoping (attachment) included the need to identify the amount of water usage that is needed, what will be added to the water, and where will the water be discharged? Further, how will this project impact the medicinal and cultural plants, fish, macroinvertebrates, mammals, macrophytes, human health, surface water quality, wetlands/connected waterbodies, groundwater, etc.? What is the cumulative impact of the project over the course of the route? These are vital questions about this proposed project that have not been sufficiently investigated. In the past, Upper Sioux staff have reviewed the EIS documents of pipeline and renewal energy projects that addressed these types of questions with specific research and studies. It is not evident in the DEIS that these questions were addressed. Merely stating the project will have minimal impact is not adequate for the NEPA EIS process.</p>	<p>Section 2.4 discusses water discharge locations and processes, Section 3.7 discusses water use and discharge permits that would be acquired, Sections 5.4.4 and 5.7.8 discuss impacts on water and water usage, Section 5.7.7 addresses impacts on vegetation, Section 5.7.10 addresses impacts on wildlife and habitats, Section 5.7.9 addresses impacts on wetlands, Section 5.4 addresses impacts on human settlement, and section 5.4.8 specifically addresses health and safety. Native Minnesota plants and wildlife of significance to Tribes are discussed in Section 5.4.2. The project would temporarily impact the habitats of plants and wildlife of Tribal significance during construction until restoration of disturbed areas is complete. Additional studies on these topics are outside the scope of the EIS. Chapter 8 addresses effects on humans, health, wildlife, and the environment from an accidental release of CO₂. Chapter 10 describes the cumulative impacts of the project.</p>	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	<p>The technology used to capture carbon can also require significant amounts of water. The DEIS states that the average annual water usage for the capture equipment will be 13 million gallons, and that much water will come from on-site wells at the ethanol facility. There is no information in the DEIS about how the additional water use from the ethanol plant will impact surrounding wells or other water resources. Also, the DEIS does not consider the water usage in context of the nearby Communities and the impacts from this new water demand on the current, existing water demands of the aquifers that serve as the source water for these Communities. This is particularly a concern as we have seen recent drought conditions the past few years</p>	<p>Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.</p>	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	<p>Consideration must also be given to the impact on surface and groundwater in the event of a pipeline leak or rupture. It is necessary to state what will be the response to minimize and remediate after such an event.</p>	<p>Potential impacts on water resources and wetlands and mitigation measures associated with a CO₂ release are described in Section 8.3.4.1 of the EIS.</p>	20243-204403-02

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Upper Sioux Community	Kevin Jensvold	2024-02-24	We remain concerned about the potential risks to human and environmental health in the event of a leak or a rupture. High concentrations of CO ₂ are hazardous and can sicken and asphyxiate humans and animals. The DEIS has also confirmed that vegetation and soil near a leak or rupture could be significantly impacted, from slowing plant growth to freezing soils and killing off vegetation, soil microbes, mycorrhizae, and soil animals.	Thank you for your comment.	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	The impact of the proposed project to the land is not fully addressed and needs additional research. Studies on the long-term impacts of Line 3 pipeline on the land have shown that the environment does not always recover as promised after construction and other major disturbances, despite assurances from companies that impacts will be short-lived. The degradation and loss of habitats is noted as one of the main reasons native plants are lost. The sensitivity of native and medicinal plants to disruption that will occur during construction is a concern that needs to be studied further before the project occurs. Also the impact of a leak or rupture of the pipeline on sensitive plants needs to be defined and mitigation measures need to be proposed if this type of event happens.	The project's potential impacts on natural resources, including vegetation, wildlife, rare and unique species, surface waters, and groundwater, are discussed in various sections of Chapter 5. Potential impacts on Minnesota plants of significance to Tribes are discussed in Section 5.4.2. In Section 5.7, which discusses mitigation, the EIS states that the applicant will prepare a Vegetation Management Plan for post-construction revegetation and management. Potential impacts due to CO ₂ releases on vegetation, wildlife, rare and unique species, surface waters, and groundwater are discussed in Chapter 8.	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	Climate Change and Greenhouse Gas Emissions In the DEIS, it is assumed that the applicant will be able to capture and permanently sequester 100% of the CO ₂ from the ethanol facility, but there is no evidence to support that assumption. Without the evidence to support 100% sequestration, it is not possible to know what the actual GHG emission reductions (if any) might be.	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	Further, it is not stated length of the life of this project. If a project is for 25 years or perhaps 50 years, does this simply move the issue of greenhouse gases down the road for the future generations to deal with? The purpose is to make ethanol a green fuel to sell more of it and make it a viable energy source.	Section 2.7 describes project decommissioning. If the ethanol plant continues to operate beyond the life of the proposed project, its CO ₂ emissions would not be captured.	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	Summit Carbon Solutions' full proposal is an extensive project with a 239.64-mile footprint in Minnesota, connecting multiple ethanol plants. It aims to impact the State's agricultural and ethanol industry. It is critical that the environmental concerns be addressed now as there may be more permit applications and environmental reviews of this type in the future. The DEIS does not consider the potential environmental and human impacts of the entire Minnesota portion of the applicant's CO ₂ pipeline project. Because of this, we do not know the true cumulative impacts of this entire project on the water, soil, air, health, vegetation, and animals. The DEIS should look at all 240+ miles of pipeline the applicant has publicly proposed. The cumulative impacts of the carbon pipeline are more than listed in the DEIS. For example, the fresh gallons of drinking water currently used for ethanol production is around 3-3.5 billion gallons in the more efficient ethanol plants. In the year 2021 15 billion gallons of ethanol were reportedly produced. Multiply that number by 3 to get a total of 45 billion gallons of fresh drinking water used to produce the ethanol. Additionally, it is necessary to factor in the amount of natural gas used to manufacture ethanol. The current most efficient ethanol plant is using 37 883 btu's of natural gas to manufacture one gallon of ethanol about the equivalent to one cubic meter of natural gas now multiply those times 15 billion. This is an unlikely source of green energy with all the inputs of natural resources and safety concerns with ethanol carbon capture technology. This should also be for the whole "Midwest Carbon Express" pipeline project as the project described in the current DEIS is merely a pipeline to the North Dakota border with no known end connection point.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-02
Upper Sioux Community	Kevin Jensvold	2024-02-24	Based on the broad-reaching implications of this project, we respectfully request that the Commission appropriately broaden the scope of the DEIS to the Minnesota footprint of the "Midwest Carbon Express" project rather than studying the northern and southern portions of the pipeline in separate reviews. The "Midwest Carbon Express" is Summit's full proposed project- a pipeline across five states, connecting 30 ethanol plants to an underground storage location in North Dakota. In Minnesota, Summit plans to construct approximately 240 miles of pipeline; approximately 212 miles of that pipeline will connect six ethanol plants in southern Minnesota ("Southern Branch"). The project in the DEIS is only the smaller 28.1-mile branch in Otter Tail and Wilkin Counties, that will connect one ethanol plant to the pipeline network ("Northern Branch"). This proposal meets the Minnesota Environmental Policy Act's ("MEPA") definition of a "phased action," and the rules allow the Commission to include the entire Minnesota footprint. By reviewing the entire Midwest carbon express project in one environmental review would allow the Commission to fully understand and evaluate the impact the Carbon pipeline could have on land use conversion, the ethanol industry, environmental impacts, emergency response needs, and climate change.	Thank you for your comment. The Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-02

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	Ahlstrand, Heidi	2024-02-22	no pipeline	Thank you for your comment.	20243-204403-01
	Allie, Ginny (Kramer)	2024-02-21	Thank you for hosting three Public Meetings on the Otter Tail – Wilkin CO ₂ Pipeline DEIS. As noted when I spoke at the Thursday Feb. 8, 2024 Online Meeting Webinar, I own land where the Midwest Carbon Express pipeline by Summit Carbon Solutions (SCS) is being proposed. This land is at Redwood County Secs. 27 and 34, Vesta Township. I have concerns that the Draft Environmental Impact Statement (DEIS) for this proposed pipeline does not fully address the magnitude of the impact to Minnesota’s water supplies, electrical resources, farmers land damages, and the safety of Minnesota citizens.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Allie, Ginny (Kramer)	2024-02-21	The DEIS identified water usage needs per plant using the carbon capture pipeline in Ottertail County. ¹ With six plants currently identified by Summit for this proposed pipeline, the DEIS listing of water usage for one plant is misleading and needs to consider the impact of multiplying this water usage by at least 6 sites that are currently planned for this pipeline proposed through 13 counties in Minnesota. ² The capture facility would require 8.2 gallons per minute in winter months and 40.9 gallons per minute in summer months, for an average water usage of about 13 million gallons per year (DEIS pg. 5-137). Total = 13 million gallons per year X 6 With Minnesota’s continued drought conditions ³ and some farmers/townships already getting water from Non Minnesota resources, the DEIS needs to consider the drainage on Minnesota water resources and impact to water supply when considering Minnesota’s drought conditions. The applicant states that the anticipated lifetime of this project is 25 years. With a 25 year timeline, the DEIS needs to consider the loss of water supply over 25 years. ¹	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS. Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Allie, Ginny (Kramer)	2024-02-21	CO ₂ is a hazardous material in high concentrations · Although DEIS indicates CO ₂ levels of immediate dangerous to life or health is 617 feet and expands to 910 for lower concentrations, the DEIS does not provide meaningful safety measures for a rupture but suggests “reasonable” measures as supplying residences within 1000 feet with indoor CO ₂ detectors. However, as indicated in Appendix G, a full rupture would happen too quickly for early warning device such as an oxygen detector to be effective. Yet during Feb. 8 webinar discussion, the response to inquiries about warning systems was that it could be seen and heard implying that this would allow individuals time to get to safety with also no warning solution for persona who are deaf or blind. ⁶ · The DEIS does not address the risks to health for both first responders and victims in the event of a rupture. Nor does the DEIS address the impact on small communities who are staffed by volunteers to available personnel and special equipment, including non-internal combustion engines, to respond to a CO ₂ . ⁶	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-01
	Allie, Ginny (Kramer)	2024-02-21	· Although the DEIS indicates Summit will “comply with federal emergency response requirements”, the Pipeline Hazardous Material Safety Administration (PHMSA) has stated that the current emergency response requirements are dangerously outdated. ⁴ · The DEIS indicates that the PUC cannot set safety standards for the pipeline. Yet PHMSA notes in public letter to CO ₂ pipeline companies including Summit, that local authorities can exercise their powers to regulate land use, including setback distances and that “nothing in the federal pipeline safety law impinges on these traditional prerogatives of local—or state—government.” ⁴	Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements.	20243-204403-01
	Allie, Ginny (Kramer)	2024-02-21	The DEIS sates project would use 38,501,733 kilowatt hours per year that would not require addition of power but fails to state how much electricity the ethanol refinery is currently using. The DEIS needs to provide explanation on how doubling of electrical usage will impact the Lake Region Electric Cooperative and the potential financial impact to the coops member-owners.	Section 5.4.9.1 has been updated with the electricity currently being used by the ethanol plant. Section 5.4.9.2 contains relevant information regarding how LREC would support the project. This section has been updated to indicate that the applicant is solely responsible for necessary	20243-204403-01

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				infrastructure upgrades (see Appendix I, Supplemental Information Inquiry 13 response and email from LREC).	
	Allie, Ginny (Kramer)	2024-02-21	<p>The DEIS does not fully address the farmers financial impact from indefinite loss of crop yields and landowner liability with pipeline damage while farming land during and after the construction process.</p> <ul style="list-style-type: none"> · Dan Henrikson, a neighbor to land I own in Redwood County, has documentation of continued loss of crop yields after 9 years in area where the soil was compacted during installation of high powerlines with no indication that this will change in the future and this does not factor in the additional crop yield risks that might be caused during removal of top soil needed for the pipeline installation. · During a 1/23/2023 presentation by Dan Henrikson, he also shared farmer liability risks with easements offered by with liability risk on the farmer and not on SCS.9 · “Based on the experience with Dakota Access, the fertility of cropland can be adversely impacted for several (or perhaps many) years.” 2 During a 1/23/2023 presentation by Renville County farmer Bob Reubel (Olivia farmer), he shared how area of his land with pipeline decades later continues to have a decrease in crop yield between 30-35% yet SCS is only proposing to compensate farmers with Midwest Carbon Express pipeline easement for 3 years crop loss.8, 9 <p>Thanks you for considering my concerns and request for additional ipact information as noted above.</p>	<p>As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term.</p> <p>Landowner easements are outside the scope of the EIS.</p>	20243-204403-01
	Anderson, Janet	2024-02-22	<p>In case of a rupture of a CO₂ pipeline, persons within a 617' radius are subject to conditions “immediately dangerous to life or health”. This is euphemistic. Persons nearby lose consciousness within a minute. Persons within 910' will experience dizziness, drowsiness, severe muscle twitching, and unconsciousness within a few minutes. Emergencylive.com tells us Death from suffocation (asphyxia) proceeds in four stages:</p> <p>1) Irritative or ‘respiratory dyspnoea’ stage: lasts from 30 to 60 seconds and is characterized by: tachypnoea (increased respiratory rate); tachycardia; arterial hypotension (‘low blood pressure’); cyanosis (bluish skin); miosis (narrowing of the pupil diameter of the eye).</p> <p>2) Convulsive or ‘expiratory dyspnoea’ stage: lasts about 1 minute and is characterized by: hypercapnia (too much CO₂ in the blood); severe dyspnoea (marked expiratory difficulty); arterial hypertension; high release of adrenaline into the circulation; tachycardia; obnubilation of consciousness; cerebral hypoxia; convulsions; reduced motor reflexes; sensory alteration; sphincter release (faeces and/or urine may be involuntarily released).</p> <p>3) Apnoic or ‘apparent death’ stage: lasts about 1 minute and is characterized by: progressive bradypnoea (progressive reduction in the frequency of respiratory acts); miosis (pupil constriction); muscle relaxation; severe bradycardia (slow and weak heartbeat); deep coma.</p> <p>4) Terminal or ‘gasping’ stage: lasts approximately 1 to 3 minutes and is characterized by: continued loss of consciousness; slow and irregular respiratory movements; severe cardiac arrhythmia; cardiac arrest; cessation of breathing; death. This means that people in the vicinity of a rupture may be dead in 3-1/2 to 6 minutes.</p>	<p>Thank you for your comment. Section 8.3.1.2 describes the risks associated with the inhalation of CO₂.</p>	20243-204403-01
	Anderson, Janet	2024-02-22	<p>Summit indicates that it will take 25 minutes for the system to shut off the relevant valves in the event of “abnormal operation,” the DEIS does not mention any meaningful safety measures for a rupture.</p> <p>Appendix G's rupture report says, “a full rupture results in impact distances too quickly for an early warning device, such as an oxygen detector, to be effective.”</p>	<p>Text in Section 4.5 on valve closure time has been corrected from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.</p>	20243-204403-01

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	Anderson, Janet	2024-02-22	As CO ₂ is colorless and odorless, both victims and first responders have no way of knowing what is causing the problems. In addition, first responders need special equipment, including vehicles that do not rely on combustion and special breathing equipment, to respond to a CO ₂ disaster. The DEIS does not consider how EMS and health providers should prepare for a pipeline rupture or the burden of acquiring and maintaining the necessary special equipment and training with it.	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended that a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-01
	Anderson, Janet	2024-02-22	Though the plan talks of multiple company personnel as playing roles in an emergency response, it ignores the fact that the applicant plans on having only one full-time employee at the capture facility. This pipeline should not be approved without a clear understanding of the risks to human health.	Thank you for your comment.	20243-204403-01
	Anderson, Jon	2024-02-22	My name is Jon Anderson, I am a 3rd generation retired farmer and reside on a 125 year old family farm in Martin Co. Mn. I have seen no proof of any reduction to CO ₂ in the atmosphere which has been occurring for decades.	Thank you for your comment	20243-204403-01
	Anderson, Jon	2024-02-22	Rural residents and their small surrounding communities should not be asked to be subjected to these hazardous CO ₂ pipelines and sequestration sites. CO ₂ from ethanol plant production can be captured at point of production and utilized at the ethanol production facility there is no reason to endanger residents, communities, volunteer responders, livestock and water resources. This proposed pipeline with it's easements offer no beneficial advantage to the land owner, his neighbors, or local community but these rural residents will be left to live with the consequences.	Thank you for your comment.	20243-204403-01
	Anderson, Jon	2024-02-22	It's presence devalues the property and surrounding area value and adds risk to surrounding area. It will consume huge amounts of water from local sources all the while benefiting a fossil fuel industry that will continue to emit.	Impacts on property values are discussed in Section 5.4.7.2, and water use impacts are described in Section 5.7.8.2. Effects on water use in the event of a rupture is described in Section 8.3.4.1. Other impacts in the event of a rupture are described in Section 8.3.	20243-204403-01
	Anderson, Jon	2024-02-22	Carbon credit money would be better spent on new technology. Who will benefit from this proposed boondoggle? Not the rural resident, not the environment, then who? Huge amounts of spending and resources consumed all the while endangering rural communities and nothing to show for it.... very sad ...we can do much better than this. Thank you for listening.	Thank you for your comment. As stated in the final scoping decision, the appropriateness of federal and state policies regarding carbon capture and ethanol, including tax credits and other incentives, is outside the scope of the EIS.	20243-204403-01
	Andresen, Deborah	2024-02-23	We would all like to dream of something that could separate carbon from the air; but that would leave the CO ₂ in high concentrations resulting in hazardous material. A rupture of a CO ₂ pipeline leaves the victims drowsy to the point of unconscious with severe muscle twitching. Being an odorless, colorless gas, first responders are in danger and would need expensive special equipment to be safe.	Section 8.3 describes the effects on humans and the environment from an accidental release of CO ₂ . Section 8.4 describes the actions that would be taken in the event of an accidental release.	20243-204403-01
	Andresen, Deborah	2024-02-23	Pipeline construction can affect water crossings, wetlands, aquifers, and sensitive water bodies that support all kinds of wildlife: fish, reptiles, waterfowl, insects. This is precious.	Potential impacts of pipeline construction on water resources, wetlands, wildlife, and rare and unique resources are described in Sections 5.7.8, 5.7.9, 5.7.10, and 5.7.5.	20243-204403-01
	Andresen, Deborah	2024-02-23	MN has drought problems and the carbon capture process can double the water requirements of a facility and increase toxic wastewater discharge.	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals	20243-204403-01

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				following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	
	Appel, Dylan	2024-04-23	<p>Hello, my name is Dylan Appel. Resident and homeowner in Wabasso, MN located in the heart of Redwood County. I first learned of the CO₂ pipeline because of yard signs I saw while driving. Through reading, watching videos, talking with community members and being on zoom calls discussing the topic, I learned why the pipeline is being proposed, who's paying for it, how it functions, where it will run and the impacts and risks involved.</p> <p>The proposed pipeline route goes directly through Redwood County. My first and biggest concern is that of public safety. In February of 2020 near Satartia, Mississippi, there was a CO₂ pipeline rupture. The result was vehicles stalled out on highways, people having seizures, and a huge delay in emergency response all due to oxygen deprivation. Fortunately, there were no casualties, but there was over 45 people hospitalized.</p>	Risks of a potential CO ₂ release and potential impacts are described in Chapter 8 of the EIS. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Appel, Dylan	2024-04-23	A well-known problem in our small rural communities is the shortage of EMT's and fire fighters - to the degree that Minnesota launched a task force to help with this problem. We simply do not have the resources, training, or manpower to handle a pipeline rupture. Although Summit Carbon Solutions may have safety failsafe built in, everything manmade fails - and when it does, how many will be hospitalized? Will there be casualties?	Section 8.5.1.5 has been revised to address EMS staffing shortage problems.	20243-204403-01
	Appel, Dylan	2024-04-23	Summit "anticipates" they will consume approximately 13 million gallons of water per year for carbon capture. With years of drought in southwestern Minnesota our aquifers are tapped out and our small towns struggle to keep up with water demand. Recently I was speaking with a Wabasso City Councilman about the water problems we continue to face. He replied, "We're literally sucking sand". We have a very finite supply of fresh water that we need to conserve.	Additional information has been added to Section 5.7.8.2 to address the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Appel, Dylan	2024-04-23	The DEIS states that during operation the proposed project will require about 38,501,733 kilowatt hours per year, and that this amount is "not anticipated to require the addition of power generation capacity." With the Minnesota legislature mandating electricity production be 100% carbon free by 2040, year after year we see coal power plants being decommissioned. Minnesota would experience a devastating 55-hour blackout in late January if wind and solar output is the same as it was in the year 2020, and electricity demand was the same as 2021 according to an American Experiment study. Once again, we do not have the resources to support this pipeline.	Thank you for your comment.	20243-204403-01
	Appel, Dylan	2024-04-23	<p>In conclusion, I feel this entire project is at the expense of the already marginalized American working class. SCS must provide meaningful solutions to the concerns listed above.</p> <p>Sources: https://files.americanexperiment.org/wp-content/uploads/2022/09/The-High-Cost-of-100-Percent-Carbon-Free-Electricity-by-2040-in-Minnesota.pdf https://www.cbsnews.com/minnesota/news/minnesota-launches-task-force-focused-on-problems-facingrural-ems/ https://www.npr.org/2023/05/21/1172679786/carbon-capture-carbon-dioxide-pipeline</p>	Thank you for your comment.	20243-204403-01
	Appel, Shirley	2024-02-22	My name is Shirley Appel, resident and taxpayer of Redwood County. I learned about Summit's proposal to construct a CO ₂ pipeline through our county from a neighbor. Since then, I have read about the proposal and have listened to presentations regarding concerns with the proposal. One of my many concerns with this project is the dangers associated with our water supply. One of Minnesota's greatest resources is our fresh water, using it for sustenance as well as for recreation. It is my understanding the proposed route for the pipeline includes wetlands, aquifers, and other water bodies. I feel Summit is vague on the impacts to our community's water supplies. This must be assessed in detail. With severe drought the past few years our water supplies have decreased substantially. Summit anticipates millions of gallons of water usage every year. It is crucial we conserve our fresh water for our drinking water supply.	Potential impacts on and mitigations for freshwater (groundwater and surface water) are discussed in Section 5.7.8. Potential impacts on and mitigations for wetlands are discussed in Section 5.7.9. Additionally, potential impacts on and mitigations for recreational resources, including water-based recreation, are discussed in Section 5.4.10.	20243-204403-01
	Appel, Shirley	2024-02-22	In the event of a leak or rupture more research needs to take place on the risks involved for our water supplies and what negative impacts it would present to fish, waterfowl, insects, birds and reptiles, and most importantly to our people. Another concern is	Risks of a potential CO ₂ release and potential impacts are described in Chapter 8 of the EIS. Chapter 8 also describes the steps that would be	20243-204403-01

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			medical response in case of a rupture or leak. Our small towns do not have the manpower, equipment or financial resources needed for a timely and successful response.	taken in the event of an accidental release and the steps that would be taken to prevent an accidental release.	
	Baka, Ryan	2024-02-23	<p>We all have a duty and responsibility to protect and care for our planet because of what it provides for us.</p> <p>I ask that the Public Utilities Commission and Department of Commerce take these issues into account in order to ensure that the Environmental Impact Statement (EIS) for the Otter Tail to Wilkin CO₂ Pipeline Project in Otter Tail and Wilkin Counties (Docket Number: 22-422) is a factual and thorough account of the project impacts. Minnesotans need a robust environmental review, and we need transparency, accountability, and regulatory oversight to ensure the greater public good and interests of communities impacted by these pipelines and all Minnesotans are respected and protected.</p>	Thank you for your comment.	20243-204403-01
	Batalden, Ryan	2024-02-22	<p>My name is Ryan Batalden. I live in Cottonwood County, MN.</p> <p>Summit wants to build a highly pressurized CO₂ pipeline, as close as they legally can, next to my house and farm site. I live and farm there with my wife and three young children. Summit has NO experience building or maintaining a pipeline of this type.</p>	Thank you for your comment. Detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Batalden, Ryan	2024-02-22	<p>Our local emergency services have NO equipment to deal with a CO₂ leak. Our local emergency services also have NO training to deal with a leak. The safety of my family and my community is FAR MORE important than the subsidized profits of a huge corporation that may well use that same CO₂ to frack for MORE fossil fuels!</p> <p>It is outlandish that this pipeline is even being considered.</p> <p>Thank you for your time,</p>	Sections 8.4 and 8.5 describe the steps that would be taken in the event of an accidental release of CO ₂ , including the training and provisioning of equipment to local emergency responders. Additionally, the applicant's draft Emergency Response Plan is included in Appendix N of the EIS.	20243-204403-01
	Baumann, Roger	2024-02-22	<p>The DEIS consistently fails to properly account for the real CO₂ emission and climate impacts of the project.</p> <p>Lifetime of Project: The applicant states that the anticipated lifetime of this project is 25 years. This means at the end of its life; the project could stop capturing the CO₂ from the ethanol plant. Unless the ethanol plant ceases operations at that point in time, it will continue to emit CO₂ unabated into the future.</p>	<p>See responses to more specific comments regarding CO₂ emissions and climate impacts below.</p> <p>Regarding the lifetime of the project, Section 2.7 describes project decommissioning. If the ethanol plant continues to operate beyond the life of the proposed project, its CO₂ emissions would not be captured.</p>	20243-204403-01
	Baumann, Roger	2024-02-22	<p>100% CO₂ Capture Rate: Summit states that the capture facility "is designed to capture 100% of the CO₂ produced by the ethanol plant." There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party.</p>	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent.	20243-204403-01
	Baumann, Roger	2024-02-22	<p>Additionally, the DEIS should emphasize that any CO₂ capture is solely associated with emissions from the ethanol fermentation process and provides zero reductions on the significant emissions from the facility's electricity use. Added CO₂ from electricity use: Carbon capture technologies are highly energy intensive and will significantly increase the carbon emissions at the facility from electricity use. The DEIS uses the Midwest Reliability Organization West Region average to calculate these emissions, which is unnecessarily inaccurate given the availability of the actual emissions factor from Great River Energy.</p>	<p>Section 2.1 of the EIS has been revised to clarify that the captured CO₂ is produced by the ethanol plant as part of its fermentation process, the amount of CO₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.</p> <p>Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 g CO₂e/MWh. This was calculated from LREC's energy resource mix, in which nearly half comes from clean energy sources. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 g CO₂e/kWh), which was used in the draft EIS, calculated electricity emissions have decreased.</p>	20243-204403-01

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	Baumann, Roger	2024-02-22	CO ₂ Storage: The DEIS assumes 100% of captured CO ₂ is being permanently stored underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols that would ensure it.	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
	Baumann, Roger	2024-02-22	Enhanced Oil Recovery: The DEIS fails to explain whether the applicant can sell any of its captured CO ₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. The DEIS incorrectly states that “Production of oil through EOR would not be dependent on the availability of CO ₂ produced by the ethanol plant.” This claim is contradicted by countless public statements from public officials in North Dakota and oil industry representatives.	The text questioned by the commenter in Section 5.7.2.3 was prefaced with the following: "if all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO ₂ , other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Berkholtz, Ric	2024-02-23	I have read about what CO ₂ pipelines entail and I strongly feel that such infrastructure is not the answer to climate change mitigation. On the contrary, they pose serious risks to community health and safety. It does not benefit the residents of Minnesota—only the fossil fuel companies seeking to conduct Enhanced Oil Recovery. Furthermore, they pose a risk to animals and humans alike. CO ₂ is an asphyxiant which is invisible and odorless, but toxic.	Thank you for your comment.	20243-204403-01
	Berkholtz, Ric	2024-02-23	CO ₂ pipelines pose great a risk to land and water as well. Across the country, aquifers have been breached and compromised by pipeline projects. Aquifers are precious and key to maintaining groundwater health and providing clean drinking water for people and animals. The acidic nature of CO ₂ would compromise both groundwater and surface water (lakes, streams, creeks, and rivers).	Section 5.7.8.2 addresses the potential impacts of an aquifer breach. Section 8.3.4.1 addresses the potential impacts of a CO ₂ release on water resources.	20243-204403-01
	Berkholtz, Ric	2024-02-23	What we really need are real solutions to the climate crisis. Namely, the preservation of lowland forests, the planting of new and native trees, and the protection of peatlands; the electrification of buildings and vehicles; and the implementation of sustainable farming on either existing farms or new farms.	Thank you for your comment. Chapter 6 discusses the potential use of sustainable farming practices as an alternative to the project. Only climate smart agricultural practices, energy efficiency measures, and alternative energy sources emerged as viable alternative strategies.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	COMMENTS ON PUC PROCESS This process has been a new one to us. We appreciated how Mr. Levi conducted the public hearings and treated all speakers and attendees with respect, along with the remaining state staffers. At the end of the hearings, both in May of 2023 and February of 2024, he took the time afterwards to walk around inviting questions from the attendees and engaged them to ask their questions. As expected, but still appreciated, Mr. Levi’s familiarization with the EIS and its appendages inspired a confidence level of the intensity and thoroughness of the completed study, in addition to a perusal of the material which revealed additional information was requested, supplied, and reviewed in compiling the EIS.	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	GENERAL COMMENTS Obviously landowners and interested parties are not trained in the areas required to review, regulate, construct and operate a pipeline of this magnitude and while we must rely on those experienced and trained to do so, we must also do our due diligence to insure the safety of those living in the area, impact on our environment, our little slice of Heaven on earth, and how it could affect the potential of our property’s future use, even if never explored, but not to restrict those choices we currently have. There is a projection that ethanol is phasing out and by the time this pipeline is operational, will be a moot issue and then if easements are signed, the pipeline could be subject to another project which would again need to be subject to review for permitting route by the PUC. Some of the comments relating to pipeline matters were summarized in earlier responses by the undersigned and part of the docket and are incorporated herein by reference, as well as responses from other landowners of similar safety matters.	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	PURPOSE We see this proposed pipeline to have little impact on the grand scheme of the world’s carbon emissions and so many outside things would need to change, such as private air travel, factory emissions. The current governmental administration in control supports tax dollars for subsidies and these projects. Another party in control might not. Landowners must rely on themselves to review the effects of this project and not on those that can set the rules and/or profit from the project for other gain. We have attended public meetings, listened to webinars, parts of PHMSA 2023 IA hearings, ND PUC hearings, conducted research, but again, the technical components to the design and structure etc of the pipeline are foreign.	Thank you for your comment.	20243-204403-01

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	Briese, Allen & Susan	2024-02-23	<p>RESPONSE TO COMMENTERS</p> <p>This Respondent attended the February 7, 2024, presentation at 6 pm in Fergus Falls. The hearing was fairly well attended, with landowners from the anticipated RA South and RA North line within a three-mile radius of the beginning of the FF to Breckenridge line. Landowners along RA North and RA Hybrid were frustrated on notice of public hearing received just days prior to the hearing. Due to time constraints, this Respondent was unable to listen to any other hearings or podcasts during this short response time. Below are a few comments on the speakers outside of the Respondent.</p> <p>1. Anthony Hicks. CEO of Green Plains Ethanol Plant. From an income-generating standpoint, he shared the economic benefits the entity. I suspect this would include the entity and private investors who do not necessarily live in the area or along the proposed routes. I refute his comments:</p> <p>a. Not considering the negatively on human life, vegetation or animals, but profits.</p> <p>b. How many additional employees who will live in the area will this add? Not enough in the grand scheme of the FF community to be considered a great positive effect.</p> <p>c. Additional noise factor and water ground source usage as a negative to those living nearby.</p> <p>d. Shared what projected and unproven economic benefits might be.</p> <p>e. What other options has the plant explored for CO₂ emissions reduction?</p> <p>f. What about the fuel emissions from the trucks bringing corn to and from the plant?</p> <p>As interesting as these biased comments were, the purpose of the hearing was to review and discuss the EIS, not the projected future P&L of the company and these comments to me did not seem relevant to the nature of the hearing. If Mr. Hicks did not focus his comments on safety.</p>	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	<p>Union Representatives. These comments were biased and not based on the EIS results, but on jobs, salaries and their opinion of economic benefits to communities and personal gain. Union staff will come in and, as represented at the hearing, they will be trained in this type of pipeline. They will most likely not be from the area and are not going to bring their families, buy a house, contribute to the community, send kids to school and pay local taxes. While there will be some influx of revenue, it will be short-lived and in the FF to Breckenridge route, it is 28 miles, so shared temporary housing and only for what, maybe up to five months in the area. Future maintenance of the line will be serviced by out of the area staff who are trained in carbon pipelines passing through and maybe buying some food and gas with occasional hotel room. The financial impact on the Fergus Falls and Breckenridge community is a bogus point. Providing jobs and income for on the road construction staff and to those entity shareholders/owners make profit to us does not fall within the scope of the EIS and comments did not discuss safety concerns.</p>	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	<p>Dale Schmidt. Landowner. Read an article he said he just found as he was attending the meeting. There are so many articles a researcher can find and review with the pros and cons. It is good to do additional due diligence to dig deeper for meaningful pros or cons relating to the project.</p> <p>4. Final Speaker. This gentleman represented that he worked in the industry. He had good points. However, it would be nice to know if his position would be the same if the proposed CO₂ line was asked to be constructed near or over his land.</p>	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	<p>COMMENTS ON EIS</p> <p>As represented previously, much of the logistics of building the pipeline by Summit Carbon (hereinafter SC) and projects and calculations, study within the PUC is foreign to the average layperson. SC's purpose is to build and operate the line for the profit of its private investors and for private gain. The PUC role is to ensure the safety of the pipeline on the 1) population; 2) environment; and 3) animal inhabitants as best can be determined from this projected line. The landowner's role is to protect the landowner's land investment and be adequately compensated if the landowner grants an easement. In some areas, it seems there is prejudice against landowners who happen to live in the path of the proposed pipeline that are not comfortable with it.</p>	Thank you for your comment. The Commission cannot set safety standards (Minnesota Rule 7852.0200, Subp. 2); however, the environmental review process aids "in the selection of a pipeline route and to aid in the understanding of its impacts and how those impacts may be reduced or mitigated" (Minnesota Rule 7852.0200, Subp. 3).	20243-204403-01
	Briese, Allen & Susan	2024-02-23	<p>RESPONDING TO THE EIS EXECUTIVE SUMMARY AND FULL DRAFT EIS</p> <p>January, 2024</p> <p>1. Pipeline Diameter. ES-1. We are comfortable with the previously determined PSI and 4 to 6-inch diameter and note under Supplemental Information Inquiry #3, it has been determined that the effects of a 3-inch pipe to 6-inch pipe reported no significant differences.</p> <p>2. Water Usage. Concerns how this will affect the area surrounding the ethanol plant re water usage. Not sure if annexing the property to the City of Fergus Falls and using city water reduces water tables or not. Maybe not even a point because I have no idea.</p>	Thank you for your comment. Water use is discussed in Section 5.7.8.	20243-204403-01

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			Respondent just hears concerns of use of water to convert is concern. Does SC need to follow the intense permitting process a landowner does when installing and using irrigation. [Note, I noted this later on the DNR will provide permitting.] Dry years, coupled with water usage could be concerning to environment. ES-2		
	Briese, Allen & Susan	2024-02-23	<p>3. Transparency. This has always been a challenge to obtain a clear and concise answer from SC and to see a pictorial of the exact location or more general location project areas, from the beginning after our original meeting with a SC representative. Initially, all SC shared when asked was a vague minute aerial map. Even in the EIS summary, ES-2, there is no map, one has to look to outside sources or try to find it on the PUC flashdrive or printed EIS. It was at the May, 2023, meeting as well. But finally, a copy that can be easily followed. Recorded easements are public data. Please incorporate the route maps into the text when describing the routes or reference where to find the maps. Also, it is a tad confusing in the full report where it refers routes as 1, 2 and 3. Maybe RA- North, AR 1, or something like that.</p> <p>4. Alternatives. ES2. The: 1) no action; 2) three routes; and 3) alternative technologies were discussed. At this time, it could be the no action, pending alternative technologies might be the most attractive to the landowners and adjacent landowners that are impacted by this proposed CO₂ pipeline related to safety measures or a moratorium until the PHMSA has completed its findings [discussed later in this response].</p> <p>This Respondent is wondering why the cost of the three routes is in the report. Why does that have a bearing on the EIS? Is not this project subsidized by the government, its members are entities that are privately owned, and uses taxpayer money, so if the investors do not make as much profit, that is the risk they take and which route is more expensive should not have any impact on any final route, if chosen.</p>	<p>Thank you for your comment. A map has been added to the Executive Summary, and maps are also provided in Chapter 4 and Chapter 5. Appendix B provides an overview map and detailed route maps for the three alternatives.</p> <p>In selecting a route for a pipeline routing permit, the Commission is required to consider the cost of the different routing options pursuant to Minnesota Rule 7852.1900, Subp. 3(E).</p>	20243-204403-01
	Briese, Allen & Susan	2024-02-23	<p>Human Settlement. ES-3 to ES-6.</p> <p>1. Aesthetics. ES-3. EIS states more residents on the RA North line. Mr. Levi informs me that is “building sites”. And how many is “more”. When determining a route, a few households with fewer actual residents is more comparable than just a building site. Generally, closer to a city there are younger families and in the flats, fewer, elderly and may even be vacant. [Not confirmed] This appears to be a summary and not necessarily factual. See response to 6 below and 8.2.3 on page 7.</p>	EERA agrees. Staff does not know how many residents live within a residence. Changes to the final EIS were made to clarify that EERA is referring to the number of residences as opposed to residents.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	<p>2. Cultural Resources. ES-3. Not understanding the reference to “Tribal culture”. Property is unique and the Briese tract contains much wildlife and offers an array of hunting opportunities that would be affected, in addition to recreational use. It would not be similar to a large even 100- acre flat field to the west.</p> <p>3. Environmental Justice. ES-4. No comment.</p>	EERA agrees. Section 5.4.2.2 has been revised to note that wildlife and their habitats could be impacted whether they hold Tribal cultural significance or not.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	<p>4. Land Use and Zoning. ES-4. While the impact of the proposed pipeline would be minimal to much of the land it would cover, which appears to be agricultural land that is farmed, it would be devastating to be near farmsteads and recreational land or potential future land that could be developed due to its safety concerns and usage restrictions. Any saavy landowner would want to keep options and use open for the landowner’s purposes and goals. A CO₂ pipeline would have a negative effect on specific and unique tracts of land. It would be extremely prejudicial to forcibly coerce a landowner to allow an unwanted pipeline and infringe upon that landowner’s constitutionally protected rights.</p> <p>5. Noise. ES-4. Not entirely got the grasp of this section. But no comment. The immediate area by the plant is already subject to city, road, and airport noise factors.</p>	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	<p>6. Populated Areas. ES-4. This area is of concern. This concern was raised by this Respondent at the public hearing. The PUC has redefined populated to fit the scenario. Prejudicial to rural residents and farm residents who produce food. The PUC “Populated areas are defined for this analysis as incorporated areas or legal entities, and census designated places . . .” Further to state “There would be no impacts on populated areas because no populated areas are within 1,600 feet of the route width for any of the three route alternatives.” [emphasis added] So, then is one to understand this to mean residents not residing within a municipality, but are township, county and state residents can be considered to be at risk and collateral damage to a leak or ruptured pipeline?</p> <p>Dictionary definition: In a prior response, there was provided upwards of 100 country residents within a 4-mile radius of the plant, plus the City and developments along the Pelican River. This responder believes all lives are valuable.</p>	Minnesota Rule 7852.1900, Supb. 3(A) requires the Commission to consider the impact of a pipeline to, among other considerations, the "existence and density of populated areas." Minnesota Rule 7852 provides no definition of "populated area." Section 5.4.6 has been revised to clarify the definition used in the EIS for populated areas and to note that the EIS describes potential impacts on the human environment, regardless of whether they would occur within defined populated areas. Section 5.4.5 and the detailed route maps in Appendix B have been updated to reflect the residences identified by the commenters.	20243-204403-01

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			In addition, on this pictorial below, there is omitted the residence site within that 1,600 feet for 2 of the properties – the shohouse and the 2 story house are residences but were identified in yellow instead of red on the routing map for RA South. Please update the map found on page 2 of 19 of the RA-South [Alt 3] map. See also response to 1 above and 8.2.3.		
	Briese, Allen & Susan	2024-02-23	7. Property Values. ES-4. This area is of concern. Respondent disagrees that property values once the pipeline is in place would not be affected by a CO ₂ line nearby. But it really can only be projected and not factual at this point. Or maybe it would not be. Land values could be affected by the line. Not so much if farmland, but for the wooded, recreational, and hunting land. For land close to a town on a river the value could be diminished as any lotting or platting process would need to adhere to the underground line and could inhibit development opportunities, growth for the area and financially to any developer.	Thank you for your comment. Section 5.4.7 has been revised to indicate that impacts on a property's value during operation of the project are not expected to significantly affect a property's value.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	8. Public Health and Safety. ES-5. As previously discussed, and this Respondent didn't have the chance before this submission was due to review, but of training to the plant and local area EMTs, etc. and SC providing the appropriate equipment. How the turn off valve works and SC and FFGP protocol. Somewhere it was asserted that SC could provide appropriate safety mask features, as updated, to area residents close to any line. This would be a necessity, even just for the comfort level of the landowner. 9. Public Services and Infrastructure. ES-5. See comment 8. No other comment. As with health insurance, one never knows the true extent of coverage until something happens.	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	10. Recreation. ES-5. This is discussed elsewhere in the comments herein. 11. Socioeconomics. ES-6. This paragraph represents "local labor will be used, increasing employment in the area". This has been unclear. Calculations from outside sources represent it would increase the current plant's employees by 2.5. SC assures landowners that laborers will be skilled, Unions are in favor of this project (and as presented at the February 7, FF hearing), who will come and go with increased local income similar to a tourism season. Reps checking the lines will be skilled and most likely travel from site to site along the line. Please explain what type of labor force this will create and how does it affect the environment per this study? In addition, what does the cost factor to construct each of the lines matter for the determination of placement of a line for environmental impact studies? If, as stated elsewhere in this EIS, the land values will be the same, how does this create a "generate property tax revenues" . . . "during the first year of operations". What about the following years, how can this be predicted when fossil fuels under the current administration are being phased out?	Thank you for your comment. Section 5.4.11.2 discusses potential impacts associated with the labor force in more detail as well as potential impacts. About half of the anticipated 250 workers are expected to be local. Potential impacts on local economies are expected to be short term and minimal. Cost is a listed factor in Minnesota Rule 7852.1900, Subp. 3. Cost is just one of the many factors PUC must consider when making a decision on a pipeline routing permit. Tax revenues are assessed based on the value of the pipeline and capture facility and other commercial equipment, not the easement. The final EIS has been modified to clarify this point. The EIS does not speculate on future policy decisions related to fossil fuels.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	12. Tribal Treaty Rights. ES-6. No Comment.	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	Economies. ES-6. 1. Agriculture. Loss of farmland and having to farm around the easement area could be problematic. The suggested damages, in addition to easement payment for 2 to 3 to 5 years, should be 10 years. 2. Industrial. No comment.	Thank you for your comment. Landowner agreements are outside the scope of the EIS.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	3. Tourism. Other than as stated previously in these comments the loss of use by the landowner, no comment. Archaeological and Historic Resources. ES-7. 1. Archaeological Resources. No comment. 2. Historic Architectural Resources. No comment.	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	Natural Environment. ES-7. 1. Air Quality and Greenhouse Gas Emissions. No comment except that the number of semis to and from the plant current emitted into the air during transport. It does appear the EIS addresses. 2. Climate Change. ES-8. While considerable, this project is just a small footprint in the world's global warming and carbon emissions reduction. Foreign countries are building plants. The phrase "Drought conditions might require contingency water sources." That is	Thank you for your comment. Water use is discussed in Section 5.7.8.2. Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to	20243-204403-01

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			discerning. For example, in winters such as 2023-24, the water usage from the plant and lack of moisture in the ground be absorbed to compensate for no snow coverages, how do the experts answer how that affects landowners’ water source and levels? 3. Geology and Topography. ES-8. No comment. Proper restoration per the easement agreement would need to be fulfilled by SC.	include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	
	Briese, Allen & Susan	2024-02-23	4. Public and Designated Lands. ES-8. No comment. 5. Rare and Unique Resources. ES-8. No Comment.	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	6. Soils. ES-8. Landowner would need to satisfy Landowner with restoration in any easement agreement. 7. Vegetation. ES-9. The farmland can be restored by proper coverage, but some studies indicate could take up to 10 years until disrupted soil reaches its before construction base. Woody vegetation would be of particular concern to landowners who reside near or in wooded areas, water, ground shrubs and grass and use the area for hunting and recreational purposes. What “disturbing less than 1 acre” to a proponent of the proposed pipeline is subjective and can be minimal; but in the eyes of a landowner in conflict with landowner’s intent for the land use could be significant.	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	8. Water Resources. ES-9. This was good to read that permits will be granted in alignment with DNR regulations (per comments noted previously). But this is an area of concern to area landowners that there may not be enough water for all. What if the footprint of the converter is increased and it uses more water than expected or expands? Does water usage again need to be permitted? 9. Wetlands. ES-9. No comment. This is public land. 10. Wildlife and Their Habitats. ES-9. Natural habitat wildlife could be affected greatly in the event of a leak or rupture. It could take time for the wildlife to return and thus inhibit a hunting paradise to be tainted. Could construction during mating season for birds and mammals affect that? Would the additional noise and disruption during construction cause the deer to move to other, quieter areas? Would waterfowl not land in a construction zone? Probably. That would affect the landowners’ hunting and nature watching enjoyment, although temporary until wildlife returns to the disrupted area.	8. Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has also been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2. 9. Thank you for your comment. 10. Section 5.7.10.2 discusses potential impacts on wildlife. This section acknowledges the concern that wildlife will be displaced during construction. Section 5.4.10.2 discusses potential impacts on hunting and fishing.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	Chapter 8 Accidental Release of CO ₂ . Mr. Levi suggested Respondent review this in detail. While there is some new data to the Respondents, most of the information in this section has been previously hashed over, noted, and brought before SC and the PUC. Certainly, it is not Respondent’s intention to discredit or minimize the groundwork SC staff, PUC, or others have put into this project, investigating, answering questions, designing the plans and speculations. Some of the sections in Appendix G are just too complicated for laypeople to understand, i.e. 5 and 6, appendix reports to disbursement and line sensitivity, etc., although 8 on page 7 of 9 relating to pipeline pressure was as previously represented and reassuring since the PSI on this line will be relatively low this Respondent is information than other lines. Respondent will take additional time to review this section. Some comments. “A large rupture of the pipeline is unlikely to occur”. “Leakage is the main form . . .” Pg 8-1. 8.1.1.1 Leaks are lower hazard. 8.2.3 Public Safety, etc. reads: RA-North has 33 residences [emphasis added] . . . RA-Hybrid has 39 . . . RA-South has 34 residences . . . [Note in _____ that there are 2 additional residences to add in RA-South to make it 36] Under Human Settlement, Aesthetics in the summary it reads: “RA-North would have several more residents [emphasis added] . . . RA-South would have fewer residents . . . compared to RA-Hybrid.” After the February 7 hearing, I did question Mr. Levi on this and he informed me the PUC could not count “residents” only “residences”. I do not believe the two words are interchangeable and each has its own meaning. Just in the pictorial under 6 herein there are 24 residents in 6 residences. With the projected four-mile radius of the plant and line, there are as	Staff agrees that "resident" and "residence" are not interchangeable words. The final EIS has been revised for clarity.	20243-204403-01

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			<p>mentioned previously the appx 100 residents, in addition to those living to the East and in the Fergus Falls city, with developments north and south along the Pelican River and Otter Tail River in what this summary defined as “populated” areas. It maybe has been found that the preferred route is more jagged than other routes and the premature pursuit of the easements along the RA-South has flaws. See 1 and 6 on page 4 and the map on page 5 herein.</p> <p>8.3 Effects in event of rupture. The disclosure here is threatening, but this Respondent also compared it to a medical drug disclaimer we do often see in ads, where this entire list of everything and anything possible is disclosed. The question is then, “is one overthinking this risk?” I think the answer is maybe, but not having any potentially dangerous pipeline close to residences v. allowing one with the risk, albeit minimal, but still unknown, is a question to ponder for the landowner.</p>		
	Briese, Allen & Susan	2024-02-23	<p>APPENDIX REVIEW. Very brief and quick and lots of technical data provided by experts with knowledge.</p> <p>Appendix A. Final Scoping Decision. Respondent would like more time to review this.</p> <p>Appendix B. Detailed Route Maps. Great to have these available as printed.</p> <p>Appendix C. Aboveground Facility Drawings.</p> <p>Appendix D. Minnesota Environmental Construction Plan. Would like more time to review; but expect that any landowner entering into an easement agreement could negotiate some of these practices.</p> <p>Appendix E. Winter Construction Plan. Would like more review; but expect that any landowner entering into an easement agreement could negotiate some of these practices. Originally thought winter construction was not requested.</p> <p>Appendix G. Accidental Release Dispersion Reports and Summary of PHMSA Regulations. Mr. Levi suggested concerned landowners review this Appendix in detail. Comments follow.</p> <p>Appendix G provides detailed information on regulations and pipelines. It may be the MN PUC would issue a moratorium until the PHMSA rules and follow the stricter guidelines between the state and federal regulations? If the ND PUC or other state allow a line, shouldn't the lines have the same regulations since the line is all connected?</p> <p>Again, this section, in addition to other sections, is very comprehensive and contains material and information foreign to the Respondent, as a lay person. Expressing concerns may be areas already addressed and proven either way as safe or unsafe. At the FF February 7 evening session, Mr. Levi took the time to show landowners these important areas and the illustrations of a rupture and projected analytical effects. Pg. 6 and 7. However, page 9 the data under Figure 2 description seems discerning in that there is no early warning of a rupture and dissipation time is fast. Our yards are not inner city types, we can have acres which could take longer than 3 minutes to get out of any leak or rupture dissipation area.</p> <p>See attached handout from PHMSA, dated May, 2023. Additional Data. Exhibit A.</p> <p>Appendix H. Sample Routing Permit.</p>	<p>Thank you for your comment. Should the project be constructed, safety and operation of the pipeline as it continues in North Dakota would be regulated in the same way by PHMSA, since regulations for operation are the same in all states. Siting this pipeline, however, is state-specific.</p>	20243-204403-01
	Briese, Allen & Susan	2024-02-23	<p>Appendix I. Supplemental Inquiries and Responses.</p> <p>Inquiry 1. Just noting thinking was odd public data noted as could be redacted.</p> <p>Inquiry 2. The comments throughout the EIS related to noise and that effect on the area was noted and something Respondent had not previously focused on and noted the hours of operation for construction. Inquiry 2.5. Vegetation preservation, permanent tree removal or planting remains concerning; but SC outside comments it works with landowners to minimize is good.</p> <p>Inquiry 2.6-12. Noted communication re waterbody matters and the project.</p> <p>Inquiry 3. Stated previously, good to know that a 3 or 6 inch pipeline makes little difference.</p> <p>Inquiry 3.4. Energy usage. Hopefully extra use will not affect landowners' lines.</p> <p>Inquiry 4. 6&7. Does electricity and installation of a fan for LRCEA require placement on any landowner's land or just within the area substation?</p> <p>Inquiry 4. 12. Assuming SC would make every effort for full cleanup.</p> <p>Inquiry 4. 18. Assuming if farm animals are affected, SC would compensate landowner? Or if vegetation is use for crop income?</p> <p>Inquiry 4. 35. When do the landowners get a chance for input and to know about the SC meeting with the OTC commissioners in Sept of 2023?</p> <p>Inquiry 4. 36. Why would odorant create concerns with pipeline? Respondent has not seen that it would be effective? SC is representing it would not be?</p>	<p>Thank you for your comment.</p>	20243-204403-01

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			<p>Inquiry 4. 40. It would seem transportation to and from the ethanol plants creates carbon emissions.</p> <p>Inquiry 5. Shows the Frost Heave Study and construction plan. Would assume experts prepared.</p> <p>Seems odd that the data is reacted w/o knowing the reasons.</p> <p>Inquiry 6. Contains a lot of technical information and pictorials.</p> <p>Inquiry 7. 5f. Addressing water usage and land use</p> <p>Inquiry 7. 6. Shouldn't the plant have an estimate on this?</p>		
	Briese, Allen & Susan	2024-02-23	<p>Inquiry 8.3. Reviewed this and appears SC working with the PHMSA regulations and exceeds 49 CFR 195.260(c): “(c) On each pipeline at locations along the pipeline system that will minimize or prevent safety risks, property damage, or environmental harm from accidental hazardous liquid or carbon dioxide discharges, . . . those compliance deadline requirements would be economically, technically, or operationally infeasible.”</p> <p>Inquiry 9. 4. The response to this inquiry appears to be complete and on the side of overcautious, perhaps a response due to the landowners’ safety and state and federal agencies’ safety concerns?</p> <p>Inquiry 10. Mr. Levi’s January 19, 2024, EM to staff and SC was noted and addressed earlier in this response as to why construction cost matters for the EIS.</p> <p>Appendix J. Agency Correspondence.</p> <p>Appendix K. Environmental Justice Screen Report. Respondent not sure what this means, but looks like a lot of the technical data]</p> <p>Appendix L. Minnesota Unanticipated Discoveries Plan.</p> <p>Appendix M. Alternative Technologies Supplemental Information.</p> <p>Appendix N. Applicant’s Draft Emergency Plan. This appears to be similar in nature to a previous draft response plan and is dated September 12, 2022. The outline contains the chain of command to make the assessment to send an ERT to the area which, unfortunately, in most cases, would be after the 3 to 7-minute immediate release. It is also noted that SC met with the OTC commissioners on September 15, 2023, to discuss the implementation of the plan. It is assumed the City of Fergus Falls and area rural town fire departments would have the means and education to address but a thought is that if vehicles stall and the emergency is down a mile driveway, how is that to be handled?</p> <p>Also, Respondent would anticipate this plan might be updated from time to time if the pipeline is construction and new information on operations and similar matters evolve. Again, safety masks provided and periodically updated by SC in the event of a leak or rupture would bring some comfort.</p> <p>A final notation and unable to pinpoint the location, but as of October 5, 2023, now the projected project date construction date is from March to July of 2025 with no winter construction. Imagine that is subject to change.</p>	Thank you for your comment.	20243-204403-01
	Briese, Allen & Susan	2024-02-23	<p>SUMMARY</p> <p>Landowners and adjacent landowners along the three proposed pipeline routes have safety concerns for any CO₂ pipeline close to residences or over landowners’ property. There are also individuals and entities of the position there are no or minimal safety concerns. See Exhibit B. This process of the EIS has been about this in Minnesota for Wilkin and Otter Tail Counties, but also keeping a close eye on this process are landowners residing in eight additional southwestern Minnesota counties who could be affected by CO₂ pipeline construction and abutting states as well. While the MN PUC looks at Minnesota law, it must also recognize the fact there are concerns from landowners and entities in the additional states the Midwest Carbon Project is anticipated to run through.</p> <p>Thank you to the time and talents of those conducting and reporting on this study.</p> <p>Respectfully submitted: Allen and Susan Briese (COMMENTOR INCLUDED 10 ADDITIONAL PAGES OF ATTACHMENTS)</p>	Thank you for your comment.	20243-204403-01
	Brodt, Kelsey	2024-02-22	The applicant states that the anticipated lifetime of this project is 25 years. This means at the end of its life, the project could stop capturing the CO ₂ from the ethanol plant. Unless the ethanol plant will also cease operations at that point in time, it will continue to emit CO ₂ unabated into the future.	Section 2.7 describes project decommissioning. If the ethanol plant continues to operate beyond the life of the proposed project, its CO ₂ emissions would not be captured.	20243-204403-01
	Brodt, Kelsey	2024-02-22	The DEIS fails to explain whether the applicant can sell any of its captured CO ₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. The DEIS incorrectly states that “Production of oil through EOR would not be dependent on the availability of CO ₂ produced by the ethanol plant.” This claim is contradicted by countless public statements from	The text questioned by the commenter in Section 5.7.2.3 was prefaced with the following: "if all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota	20243-204403-01

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			public officials in North Dakota and oil industry representatives. This is not a true solution. An ounce of prevention is worth a pound of cure. Have them spend their money in better ways to help stop climate change.	using other sources of CO ₂ , other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	
	Buresch, Michael	2024-04-23	I am a farmer, landowner, land renter and resident of Jackson County, MN. I am part of a larger operation that with a footprint across the middle of the county. We have declined allowing participating in Summit Carbon Solutions CO ₂ pipeline project on land that we own. We have rented land that some of our landlords have granted rights to be included in the project depending upon the route. Whatever happens I and my family will be affected by this pipeline. Although Summit is only asking for a permit for 28 miles of pipeline, they publicly have announced plans connecting the majority of ethanol plants in West Central and Southern Minnesota, shouldn't this EIS be addressing the entire project?	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Buresch, Michael	2024-04-23	Public Health and Safety Risks CO ₂ pipelines operate at very high pressure (much higher than a natural gas pipeline). CO ₂ is also an asphyxiant that is colorless, odorless, and heavier than air. Those exposed to high concentrations of CO ₂ may experience fainting, incapacitation, asphyxiation, respiratory and cognitive damage, cryogenic burns, and even death. The rupture at Satartia, MS proved these dangers are real not conjecture.	Thank you for your comment.	20243-204403-01
	Buresch, Michael	2024-04-23	Pipeline ruptures: If a rupture occurs, the result could be a rapid, uncontrolled release of CO ₂ over a large swath of land. There is little to no independent expert modeling examining the consequences and area of impact of a CO ₂ pipeline rupture. What are safe setback distances from homes, businesses, farms and livestock facilities? What will happen in the case of a pipeline leak – above ground, underground, or underwater? How far will the CO ₂ disperse, and what will its effects be? How will the impacts of a rupture be modeled and proven so that public safety will not be compromised? Can we as citizens depend on the validity of dispersion models paid for by Summit? How will Summit monitor pipeline performance to determine if a leak is occurring. How quickly can the line be shut down in the case of a failure? How far apart will shut offs be placed to contain the amount of CO ₂ leaked? Will these valves be controlled remotely, or must an operator manually close them?	Chapter 8 describes the impacts of a potential rupture. Section 8.3.1.3 describes the independent dispersion modeling performed by an independent contractor, and results of that modeling are presented in Appendix G. Section 2.3.2.1 describes the mainline valves. Section 8.5 provides additional mitigation measures to protect against an accidental release and to limit impacts if one should occur.	20243-204403-01
	Buresch, Michael	2024-04-23	First responders and health professionals: CO ₂ pipelines pose unique problems for first responders and health care providers. Because CO ₂ is colorless and odorless, both victims and first responders have no way of knowing what is causing the health problems. In addition, first responders require special equipment, including non-internal combustion engines, to respond to a CO ₂ disaster. What kind of burden will this put on local EMS and health providers in the case of an accident, large leak or rupture? How will they be prepared to respond, given their unique needs?	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-01
	Buresch, Michael	2024-04-23	Air pollution: Industrial sources like ethanol plants with carbon capture can still emit toxic, healthdamaging air pollution (e.g., volatile organic compounds, particulate matter, etc.). The air pollutants emitted by these facilities can affect lung and heart function, imply a higher risk of respiratory disease and cancer, and increase smog, which can affect air visibility, damage plant life, and be deadly to humans.	Thank you for your comment. Emissions from the capture facility are shown in Table 5-38 and are further discussed in the text following that table. Emissions from the ethanol plant are covered in the Title V Permit for the plant.	20243-204403-01
	Buresch, Michael	2024-04-23	In addition to CO ₂ from Ethanol Plants what other CO ₂ producers with their own unique pollutant compounds could be added into this network and what would these compounds have on pipe corrosion, valves and other physical components of this pipeline system that will impact public safety?	The project pipeline would carry CO ₂ captured from the ethanol plant. Corrosion monitoring and protection are addressed in Chapter 2.	20243-204403-01
	Buresch, Michael	2024-04-23	Regulatory gaps: Federal regulations governing this new and risky technology are limited and under review. For example, the federal rules don't currently require CO ₂ pipelines, which can rupture, to be a safe distance from sensitive sites. PHMSA is now in the process of creating specific CO ₂ pipeline rules.	Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline's vicinity. The Commission's obligation is to identify a pipeline route consistent with the criteria found in statutes	20243-204403-01

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			How can the PUC ensure the safe routing and construction of this pipeline in the absence of credible guidance on critical issues like this? Do the citizens of Minnesota want a CO ₂ pipeline that does not conform to the new rules once they are finalized? Permitting and allowing this pipeline under the existing rules will only endanger the public.	<p>and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements. Section 3.4 of the EIS has been revised with this information.</p> <p>PHMSA regulations (that is, their appropriateness) and related standards for CO₂ pipelines are outside the scope of the EIS. Section 3.6 acknowledges that PHMSA is currently conducting rulemaking proceedings on proposed amendments to its pipeline safety rules, and that the Commission states that it would be prudent for EERA staff and the applicant to take that information into account, even if the updates have not been finalized. Appendix G of the EIS further summarizes the extensive and detailed PHMSA CO₂ pipeline regulations applicable to the construction, operation, and maintenance of such pipelines, and the status of pending PHMSA changes to such.</p> <p>EERA staff has been following PHMSA CO₂ pipeline rulemaking proceedings before and since issuance of the draft EIS. As of July 5, 2024, PHMSA has not published the Notice of Proposed Rulemaking that will describe the scope of new and amended regulations, and changes to existing rules and regulations are not known. Therefore, as ordered by the Commission, it is not possible for the EIS to include “a discussion of mitigation strategies and measures to ensure public safety including, but not limited to, measures consistent with the proposed and final federal rules to the extent available” (Commission. September 26, 2023. Order Approving Scope of Environmental Review and Denying Stay. eDockets No. 20239-199149-01). To the extent applicable, Section 3.6 and Appendix G of the EIS have been updated with the above information.</p> <p>Thank you for your comment. To EERA staff’s understanding, the Commission must make a decision on a route permit for the project that is consistent with Minnesota statutes and rules. The applicant has stated its proposed CO₂ pipeline would be designed, constructed, and operated to meet PHMSA regulations, including any operational changes to PHMSA regulations that may occur in the future.</p>	
	Buresch, Michael	2024-04-23	<p>Pipeline risks to land, water, and natural resources</p> <p>One of the things that Minnesota takes immense pride in is our natural heritage. Beyond the damage done during the construction phase of the project, what happens to the land, water, air, and all living creatures that depend on a vibrant ecosystem for survival?</p>	Thank you for your comment.	20243-204403-01
	Buresch, Michael	2024-04-23	Dangers to water and waterbodies: The proposed route for Summit’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota’s precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Buresch, Michael	2024-04-23	<p>Water use: Carbon Capture and Sequestration (CCS) can also double water requirements and increase toxic wastewater discharge. There must be a careful and case-specific assessment of how the installation and operation of carbon capture equipment will impact and exacerbate existing water use and pollution sources.</p>	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01

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	Buresch, Michael	2024-04-23	Land degradation: This project is going to cut through roads, ditches, tile lines, and prime farmland—are we supposed to take it on faith that this will be “back to normal” in two or three years? Other pipeline projects in the Midwest are still suffering yield reduction and damage to land years after project completion and “restoration”. My conclusion from farming areas where heavy construction has occurred is that damage to the land is permanent and that the affected areas will not return to profitable production. Pipeline operators should be held liable for crop damage for as long as the damage occurs via damage clauses in their easements. The current language in this draft is more of a promise beyond initial construction.	Thank you for your comment. As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term. Landowner agreements with the applicant are outside the scope of the EIS.	20243-204403-01
	Buresch, Michael	2024-04-23	Geohazards: The geotechnical assessment in the Environmental Assessment Worksheet (EAW) is cursory and inadequate. A CO ₂ pipeline in Satartia, MS, experienced a dangerous rupture because the ground it was in collapsed after some heavy rain. This could and should have been anticipated by the company if they had properly studied the region for geohazards and other geological risks. Minnesota shouldn’t make the same mistake.	Section 8.3.1.3 discusses the Satartia accident, including a table summarizing significant differences between the proposed project and the pipeline involved in the Satartia incident.	20243-204403-01
	Buresch, Michael	2024-04-23	Economic Benefits? Summit and its supporters are making big promises about the benefits to Minnesota’s rural communities—in employment, tax income, and economic growth—but provide very little credible evidence to back up these promises. Independent academics from the University of Iowa have pointed out that these claims overestimate the benefits and ignore the costs to rural communities, local governments, and the surrounding environment. <ul style="list-style-type: none"> • How many and what kind of jobs will this project really bring to local communities? Large projects like this usually bring skilled workers from outside the area and from out of state leaving mostly crumbs for the local economy beyond the restaurants, lodging and trailer parks. • What are the hidden costs—like the burdens on local government or community resources? Local governments are spending hours gathering information for Summit’s design efforts. Outside workers bring outside social problems as well. • Summit makes vague claims that local farmers will see huge revenue gains by getting access to lowcarbon fuel markets. Can those claims be backed up with real numbers? As a corn producer I will believe these claims when I see better market prices. • How will this project really impact the local tax base? Hard numbers are hard to guarantee, for example the Wind Energy Revenues for Jackson County are less than projected as the transmission capacity available to Jackson County Producers is less than in the past. Will Summit reduce or cut off some plants because others, closer to the destination increase their production or cut better deals reducing the value of a line or lines? 	Thank you for your comment.	20243-204403-01
	Buresch, Michael	2024-04-23	Who will be liable if there’s an accident with the pipeline or construction causes damage to the natural environment, farmland, or built structures?	Summit has stated that it would be responsible for 100 percent of costs in case of an accident. Sections 2.6 and 8.4 have been updated to clarify.	20243-204403-01
	Buresch, Michael	2024-04-23	CO ₂ Pipeline easements are granted in perpetuity in Minnesota, shouldn’t these easements have a finite life, like the life of the line, perhaps 50 years, at which time the pipeline operator will have to renegotiate or decommission the line? Is there a published plan describing how the line will be decommissioned at the end of its life? Abandoning it without filling the pipe with a medium like bentonite clay eventually allows potentially harmful ground water movement.	Section 2.7 describes project decommissioning. This section was revised to describe the financial assurances to be provided by the applicant for costs associated with decommissioning. Landowner agreements are outside the scope of the EIS.	20243-204403-01
	Bute, Marnie	2024-02-22	As a land owners in Wilkins county, my husband and I I oppose the construction of the carbon dioxide pipeline in northern Minnesota. This project raises significant environmental concerns, including the risk of leaks and potential harm to local ecosystems.	Thank you for your comment.	20243-204403-01
	Bute, Marnie	2024-02-22	We must prioritize sustainable solutions that protect our environment and communities for future generations. Have they thought about stop producing ethanol? This whole nightmare would go away. Government subsidies ethanol and now they subsidize carbon dioxide capture. Once that funding goes away this will also go away. We have so many other challenges, seems this one has not been thought through. Can’t even get a good answer about the storage of the gas and what Cannon will happen to it. Once the funding is no longer there and who would be responsible. There’s just way too much to unpack here and not enough answers . #NoToCO ₂ Pipeline #ProtectOurEnvironment	As stated in the final scoping decision, the appropriateness of federal and state policies regarding carbon capture and ethanol, including tax credits and other incentives, is outside the scope of the EIS.	20243-204403-01

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	Butler, Misty	2024-02-22	My name is Misty Butler. I live in rural Lac qui Parle county in Minnesota. I own some land and a pond out here, that we use recreationally. We invite friends and family to camp and swim in the pond from late spring to early fall and get great enjoyment from it. I care deeply about preserving the health of that pond and spend many hours a year maintaining it. As a result issues concerning water and water health are close to my heart and continually pique my interest. The proposed route for Summit's pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota's precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Butler, Misty	2024-02-22	As I have watched our pond throughout recent years, I have noticed and been concerned about water levels and what the results of climate change and droughts. It has been very concerning to me to watch the water table drop throughout the year and it continues to be of concern. Much of southern Minnesota is suffering from the consequences of drought and overcommitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit "anticipates" an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and casespecific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impacts of those appropriations on water resources. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent with its true demands for water resources?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Carter, Kathy	2024-02-23	I am a landowner in northern Iowa (Floyd County), directly affected by the proposed Summit pipeline. A lot of us were taken very much by surprise in late 2021 when we received mailings that stated "we're going to put a pipeline through your property". Since then, we've learned a LOT. Way too much to go into detail here, but one of the main things is that, as a company, Summit excels at evading and spinning and being dishonest and non-transparent. We have a long list of instances that support that. Now, the company is failing to pay counties for inspection services that have been contracted.	Thank you for your comment.	20242-203795-01
	Carter, Kathy	2024-02-23	As for the environmental impact itself, let me tell you this: I have a narrow piece of ground they want to cross, and the ground contains both flood plain and a steep rise covered with mature oak , walnut, and pine trees. Summit claims they can bore under it all "without any surface disruption" and no damage to my 80+ year old oak trees. Yet, another landowner with a property very similar to mine, with just a narrow stream running through it, has been told that they will clear cut the band of trees bordering that stream. I have seen other instances where they have told landowners they will cut a strip; indeed, all the easement contract language indicates that, like natural gas lines, etc, all brush & trees would be cut and the easement must remain clear. This is in direct contradiction to Summit's claim that they will not damage my timber. Do I believe a thing Summit claims? Not after listening to them, reading hundreds of articles, and being a part of the Iowa Utilities Board permit hearing -- not on your life. Do NOT ALLOW SUMMIT TO PROCEED.	Thank you for your comment.	20242-203795-01
	Childers, Amy	2024-02-23	My name is Amy Childers. I am a resident of the Fergus Falls area. I have lived and worked here 17 years. I am an environmental scientist. I am concerned about the amount and quality of research done on the impact of this proposed pipeline to the Otter Tail River ecosystem and landscape. More analysis is needed on the impacts to the rivers and landscape. Also more research is needed into the effects on the groundwater resources of the area from construction to operation.	Thank you for your comment. Stand-alone studies concerning water resources are outside the scope of the EIS.	20243-204403-01
	Childers, Amy	2024-02-23	More information needs to be provided about the capture rate and actual efficiency of the process versus the ecological impacts to the area's natural resources. Much more research is needed into the efficiencies of the CO ₂ capture process and environmental impacts.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. A stand-alone study concerning carbon capture technology is outside the scope of the EIS.	20243-204403-01
	Christensen, Linda	2024-02-14	We moved to OTTER Tail COUNTY after retiring because of all the lakes and wetlands. We are very concerned about this Co2 pipeline. One possible line could be under Otter Tail river!!! According to DEIS a rupture would not impact our fish and wildlife. HOW DO THEY KNOW THIS????? Have they proved it elsewhere?	The Otter Tail River would be crossed via HDD. Potential impacts of a pipeline rupture on water resources and aquatic resources are addressed in Section 8.3.4.	20243-204403-01

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	Christensen, Linda	2024-02-14	From what I have read they also have said if this project is decommissioned they will not take responsibility for care of the pipes. Who will? Also what about the extra electricity. I have been told that it will double what the ethanol plant is now using. Who will pay for that??	Section 2.7 describes the decommissioning process. This section was revised to describe the financial assurances to be provided by the applicant for costs associated with decommissioning. Section 5.4.9 describes electricity use for the existing ethanol plant and the proposed project.	20243-204403-01
	Christensen, Ronald	2024-02-14	I am a retired truck driver spending my time fishing in summer and winter. It sounds to me that this pipeline could possibly ruin my retirement along with the lakes and wetlands that I enjoy. I am very concerned that rivers are in several of the pipelines. What happens if there is a rupture? What happens to the wild life?	The project's impacts on water resources are addressed in Section 5.7.8, and impacts on wildlife are addressed in Section 5.7.10. Chapter 8 addresses the potential for a pipeline rupture and associated impacts.	20243-204403-01
	Christensen, Ronald	2024-02-14	Their claim of 100% capture?? This is not supported by any data or information or third party. CO ₂ is a hazardous material in high concentrations. The DEIS consistently underplays the known and unknown risks of transporting CO ₂ in pipes with high pressure. I really believe that this is a very dangerous plan to all of us just to make Summit wealthy.	Thank you for your comment. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent.	20243-204403-01
	Christenson, Brooke	2024-02-23	Hi my name is Brooke and I believe CO ₂ pipelines are still destructive and not a good solution to carbon emissions.	Thank you for your comment.	20243-204403-01
	Christenson, Jaci	2024-02-22	I am a full-time volunteer working for clean water, sustainable climate and upholding treaty rights. With 60% of Minnesota's iconic water impaired to the point that it is no longer safe to consume fish from and/or drink water from and/or swim in, it is past time that we address the current impacts and permit no more harm to our waters/wetlands.	Thank you for your comment.	20243-204403-01
	Christenson, Jaci	2024-02-22	Minnesota's recent experience with Line 3/93 tar sands pipeline construction demonstrates the serious harms that it causes on water resources, as well as a tendency by state agencies to underaccount for those impacts. I volunteer with Waadookaawad Amikwag, the multi-cultural community group of volunteers that is monitoring construction damages from Line 3/93 and have seen the damage firsthand in 60 field visits. Through thermal imaging and on the ground, field work we discovered aquifer breaches, frac outs, wetland destruction, threats to wild rice, remediation damages and dewatering and aquifer drawdown--all from construction. The Line 3 Environmental Impact Statement (EIS) and Enbridge were misleading/incorrect as to the impacts. Equally disturbing is the fact that all of these impacts were predicted/forewarned by scientists and Indigenous people but abhorrently ignored by Enbridge, Public Utilities Commission, the state agencies, Governor Walz and legislators. We would be remiss to ignore what we learned from L3/93 in evaluating CO ₂ pipelines. If we take these seriously into account, the conclusion is clear--no more pipelines through Minnesota's wetlands.	Thank you for your comment.	20243-204403-01
	Christenson, Jaci	2024-02-22	Dangers to water and water bodies: The proposed route for Summit's pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota's precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Christenson, Jaci	2024-02-22	Water use: Much of southern Minnesota is suffering from the consequences of drought and overcommitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit "anticipates" an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and casespecific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impact of those appropriations on water resources. Looking at Line 3/93 we saw that after construction began Enbridge asked for (and received) a 10-fold increase in their dewatering permit. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company (Enbridge, Summit or any other applicant) is not transparent with its true demands for water resources?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has also been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Christenson, Jaci	2024-02-22	Aquifer Damage: Summit's preferred route, RA-South, crosses a surficial beach ridge aquifer in Otter Tail County. The DNR has said that the area is "prone to significant groundwater discharge," and the applicant's initial groundwater investigation confirmed that "artesian groundwater conditions are present" along that beach ridge system. In early feedback on the DEIS, the DNR noted that "Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant, long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations	20243-204403-01

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			and that “breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.” This, along with our state’s first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers more seriously. Waadookawaad Amikwag has documented the impacts to wetland ecosystems from aquifer breaches. Water samples collected upstream and downstream of the breached aquifer (and analyzed at an accredited lab) verify the hydrological changes and altered natural composition of the wetland. Enbridge was excused from meaningful geological/hydrological investigation and as a result we have 4 verified aquifer breaches and Waadookawaad Amikwag is investigating more.	that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	
	Christenson, Jaci	2024-02-22	HDD Drilling: The DEIS also states that “drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet [drinking water quality certification standards] would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA.” The DEIS does not discuss the risks of applying drilling mud, especially with additives not approved by MDH, to the land. The DEIS says that “drilling fluids and additives for the HDD would be non-toxic to the aquatic environment and humans,” however, even supposedly “non-toxic” drilling fluid is chemical waste that has been found to be harmful to plant and animal species. Summit’s preferred route and alternative route, RA-Hybrid, would both cross three rivers (Pelican River, Otter Tail River, and Bois de Sioux River) via the HDD mention. Enbridge and the L3/93 EIS minimized the rate of Horizontal Directional Drilling (HDD) failure and frac out of drilling mud, when in actuality frac outs occurred in 67% of the water crossings. In the Line 3/93 HDD crossing of East Savanna River, there were 6 frac outs--clearly a terrible place to put a pipeline.	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	20243-204403-01
	Christenson, Jaci	2024-02-22	Wetlands: In Table 5-40 on p. 5-98 of the DEIS it states that “the loss of wetlands would be less than 0.01 acre.” However, Table 5-4 on p. 5-24 says that for Summit’s preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. And Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres. Which is it?? And let’s start treating wetlands and water as the incredible resource that it is.	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.	20243-204403-01
	Collins, Kathryn Flaig	2024-02-19	I am writing in opposition to construction of the proposed Summit Carbon Recapture Pipeline in Redwood County. As a citizen with land in the area near the pipeline, I am concerned about the safety of this project. The pipeline is projected to go across or near land with multiple waterways, including the Redwood River, Coalmine Creek (which crosses my land), and the Cottonwood River. The pipeline would use technology that has not been proven to be effective and safe. A pipeline leak would not only create hazards through the air but could pollute waterways and make the water acidic. An accidental release of carbon dioxide under high pressure into the air or water would be detrimental to human, animal and plant life in the area.	Thank you for your comment. The commenter references an area in Redwood County. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS. Risks of a potential CO ₂ release and potential impacts on humans and aquatic environments are described in Chapter 8 of the EIS.	20243-204403-01
	Collins, Kathryn Flaig	2024-02-19	Although the building of the pipeline would create a short term boost to the economy, its main benefit would be to ethanol producers and oil companies. According to ethanol promotional literature, companies plan to use the carbon credits gained to make additional ethanol, thus creating more carbon pollution. There are safer ways to remove CO ₂ from the atmosphere. Planting trees and/or planting carbon removing plants between row crop plants would be much safer ways to remove excess carbon dioxide.	The EIS analyzes the proposed project, including alternatives that lower the CI score of the ethanol produced at the ethanol plant. An alternative that does not include ethanol production was not studied in the EIS because it would not meet the purpose of the project.	20243-204403-01
	Collins, Kathryn Flaig	2024-02-19	Please do not risk environmental devastation in Redwood County for the benefit of short term economic gains of a few companies and their shareholders. Those most likely to gain from the pipeline are those who wish to continue polluting the atmosphere of our planet through the production of additional ethanol and/or promotion of continued use of petroleum products. The citizens of Minnesota and Redwood County, in particular, deserve better. Vote no to the construction of Summit’s Carbon Recapture Pipeline. Thank you for your attention to this matter.	Thank you for your comment. The commenter references an area in Redwood County. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01

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	Coppin, Loni	2024-02-23	With so much air and water pollution today, and the climate crisis that is having more major impacts than ever, I am concerned that this Draft Environmental Impact Statement does not go far enough.	Thank you for your comment.	20243-204403-01
	Coppin, Loni	2024-02-23	My first concern about possible hazardous impacts has to do with the construction of the pipeline itself. Not enough attention is being given to pipeline construction, and this has resulted in recent aquifer breaches. Also, any breach of oil in a pipeline is going to be very harmful to agricultural land, to other ecosystems and its non-human inhabitants, and to the water. We cannot afford to have more land and water compromised because of pipeline breaches.	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	20243-204403-01
	Coppin, Loni	2024-02-23	Another concern has to do with CO ₂ emissions. It seems to me that not enough analysis has been done to fully understand the level of harmful CO ₂ emissions to both victims and rescue workers should there be a breach in a pipeline.	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-01
	Coppin, Loni	2024-02-23	At this time on Earth, we must do everything we possibly can to safeguard the air, water, and land. That means we must stop building those projects that can cause more harm than good. Attempting to find carbon capture solutions that have not been proven so far to be as viable as they claim does not give us the right to continue with "business as usual."	Thank you for your comment.	20243-204403-01
	Daly, Mike	2024-02-23	I, Mike Daly, am a retired engineer who lives in the Wolf Carbon Capture pipeline corridor that is proposed for Eastern Iowa. What Summit pipeline accomplishes in the Midwest will set precedence for what Wolf and subsequent pipelines encounter. That is why I am concerned about the DEIS for the Otter tail to Wilkin County statement. I have been studying the Carbon capture technology and pipeline build out for the last 3 years. It seems that many government officials rely on what they think is the expertise of the pipeline companies like Summit. This is a new technology, and the pipeline companies exhibit a bold and rash persona of expertise concerning the Carbon Capture technology. One way to verify what they boast of as factual is to demand extensive testing and unbiased research. As I read through Summits documentation and the DEIS, I notice statements that seem factual but may be only half-truth and misleading.	Thank you for your comment.	20243-204403-01

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	Daly, Mike	2024-02-23	<p>This pipeline should not be approved without a clear understanding of the risks to human health and meaningful measures to ensure the safety of people and animals in the area. The DEIS does not mention any meaningful safety measures for a rupture and instead suggests that it is “reasonable” for Summit to simply supply indoor CO₂ detectors for residences within 1,000 feet of the project.</p> <p>The DEIS does not consider the burdens this will put on local EMS and health providers in the case of a pipeline rupture or accident or an assessment of how they should be prepared to respond given the unique needs. The DEIS includes Summit’s September 2022 Emergency Response Plan (Appendix N). This plan is not only outdated but also unclear as to how local EMS and first responders will interact with the applicant in the event of a leak or rupture.</p>	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-01
	Daly, Mike	2024-02-23	The DEIS states that the PUC “cannot set safety standards” for Summit’s proposed pipeline. PHMSA has expressly said in public that state and local authorities can exercise their powers to regulate land use—including setback distances. The PUC must consider where the pipeline is placed and what is the safest option for Minnesotans, which means the PUC can and should determine what routing, setback, and depth requirements are necessary to adequately protect Minnesotans.	Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements. Section 3.4 of the EIS has been revised with this information.	20243-204403-01
	Daly, Mike	2024-02-23	This project is going to cut through roads, ditches, tile lines, and prime farmland. The pipeline projects in the Midwest have caused yield reduction and damage to land years after project completion and “restoration”.	Thank you for your comment. As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term.	20243-204403-01
	Daly, Mike	2024-02-23	The DEIS concludes a leak of CO ₂ “would slow plant growth” and that the rupture of the pipeline would instantly freeze the surrounding soil and “instantly kill all herbaceous ground vegetation” but provides no measures to avoid these impacts, nor does it discuss the long-term impacts of such damage on the soils and vegetation.	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. EERA staff recommended special permit conditions to avoid impacts of a potential CO ₂ release, as described in Section 8.5.3. Section 8.3.4.3 has been revised to include language regarding potential long-term effects of freezing on soils and vegetation.	20243-204403-01
	Daly, Mike	2024-02-23	The DEIS acknowledges that “soil compaction would be unavoidable. that even if soils were decompacted, “some compacted soils could remain.” Soil compaction can have serious consequences in terms of water infiltration and drainage and should not be dismissed as an insignificant impact.	Section 5.7.8.2 indicates that groundwater recharge could be impacted by soil compaction. Section 5.7.6 explains that the applicant would comply with required permits and implement its Minnesota ECP and Minnesota APP, which would minimize impacts on soils. The text in Section 5.7.6 has been revised to indicate that while most impacts on soils during construction would be minimal and temporary, some impacts could be long term..	20243-204403-01

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	Daly, Mike	2024-02-23	The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit “anticipates” an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is disconcertingly ambiguous. Why should Minnesota risk fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent with its true demands for water resources?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Daly, Mike	2024-02-23	In early feedback on the DEIS, the DNR noted that “Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer and that “breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.” This, along with our state’s first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers more seriously.	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	20243-204403-01
	Daly, Mike	2024-02-23	According to the DEIS, CO ₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would be unlikely to impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence. Though the DEIS does note some harm may come to animals in the event of a rupture, it relies heavily on the assumption that animals will simply move out of the rupture area to avoid the release. The reason for this assumption is not provided and is contradicted by information in the rupture report in Appendix G which suggests the impacts of a rupture would be nearly immediate.	CO ₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to local vegetation or wildlife. Potential impacts on wildlife from a CO ₂ rupture could result first from the physical force of a rupture and secondarily from localized short-term high levels of CO ₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO ₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most mobile wildlife species would follow their natural instincts and would attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a	20243-204403-01

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				rupture might be exposed to high levels of CO ₂ , which could be toxic for species unable to leave the area of the release.	
	Daly, Mike	2024-02-23	Summit states that the capture facility “is designed to capture 100% of the CO ₂ produced by the ethanol plant.” There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities.	20243-204403-01
	Daly, Mike	2024-02-23	Additionally, the DEIS should emphasize that any CO ₂ capture is solely associated with emissions from the ethanol fermentation process and provides zero reductions on the significant emissions from the facility’s electricity use. Carbon capture technologies are highly energy intensive and will significantly increase the carbon emissions at the facility from electricity use. The DEIS uses the Midwest Reliability Organization West Region average to calculate these emissions, which is unnecessarily inaccurate given the availability of the actual emissions factor from Great River Energy.	Section 2.1 of the EIS has been revised to clarify that the captured CO ₂ is produced by the ethanol plant as part of its fermentation process, the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use. Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 g CO ₂ e/MWh. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 g CO ₂ e/kWh), which was used in the draft EIS, calculated electricity emissions have decreased.	20243-204403-01
	Daly, Mike	2024-02-23	<p>The DEIS assumes 100% of captured CO₂ is being permanently stored underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols that would ensure it.</p> <p>The DEIS fails to explain whether the applicant can sell any of its captured CO₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. The DEIS incorrectly states that “Production of oil through EOR would not be dependent on the availability of CO₂ produced by the ethanol plant.” This claim is contradicted by countless public statements from public officials in North Dakota and oil industry representatives.</p>	The text questioned by the commenter in Section 5.7.2.3 was prefaced with the following: "if all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO ₂ , other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR. Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
	Daly, Mike	2024-02-23	The DEIS states that during operation the proposed project will require about 38,501,733 kilowatt hours per year, and that this amount is “not anticipated to require the addition of power generation capacity.” However, the DEIS fails to clearly state how much electricity the ethanol refinery is currently using. For that information, the public must look in Appendix I. The DEIS does not explain how this doubling of the electricity use at the ethanol refinery will impact overall electricity for Lake Region Electric Cooperative. Who is paying for that electricity? Summit or the ethanol facility? And if the latter, will those cost increases be passed on to producers or other member-owners?	Section 5.4.9.2 contains relevant information regarding how LREC would support the project. This section has been updated to indicate that the applicant is solely responsible for necessary infrastructure upgrades (see Appendix I, Supplemental Information Inquiry 13 response and email from LREC).	20243-204403-01
	Daly, Mike	2024-02-23	In addition to the direct impacts of the 28 miles of pipeline included in Summit’s application, the DEIS does not account for the indirect and cumulative impacts of Summit’s entire project in Minnesota. This is despite Summit’s clear and public plans for a much larger buildout in Minnesota and recent statements that they will be applying for permits for additional parts of the network imminently. Allowing Summit to artificially segment permitting requests for multiple concurrent projects on one pipeline will prevent a thorough review of the cumulative impacts and potential environmental and climate damages of the project.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Daly, Mike	2024-02-23	Neither Minnesota’s state agencies nor Summit has any experience building, operating, or overseeing CO ₂ pipelines or carbon capture projects. The claims in the DEIS that this pipeline will have “minimal impact” across the board are unsupported by the existing evidence about carbon pipelines and pipeline construction generally. We need a careful analysis and credible assessment of how this project could affect our homes, lands, waters, and communities.	Thank you for your comment.	20243-204403-01

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	Darst, Wendy	2024-02-23	Hello- Carbon capture is an unproven process- and we know this process will enhance fossil fuel use through "Enhanced Oil Recovery" rather than moving us away from deadly technologies, while endangering land and communities across the Midwest.	Thank you for your comment.	20243-204403-01
	DeGier, Kenneth	2024-02-22	Before we start digging, we need to ask the question, do we really need to take out CO ₂ from the air? The answer is no. We are at some of the lowest concentrations of CO ₂ in the earth's atmosphere ever recorded. Why do we need to dig up and put pipes in God's earth that are not necessary? Putting in the pipeline will add more CO ₂ in the atmosphere not justifying the putting in the pipeline. The squeeze is not worth the juice.	Thank you for your comment.	20243-204403-01
	DeGross, Lydia	2024-02-23	My name is Lydia DeGross. I'm 18 years old and I live in South Minneapolis. I am worried about the impact climate change will have on my future, animals, and those who are most vulnerable to its effects. I know pipelines have a history of leaks that cause significant damage to the surrounding environment, so I expect a robust environmental impact assessment.	Thank you for your comment.	20243-204403-01
	DeGross, Lydia	2024-02-23	I believe the DEIS for this pipeline is insufficient. Neither Minnesota's state agencies nor Summit has any experience building, operating, or overseeing CO ₂ pipelines or carbon capture projects. The DEIS does not account for the indirect and cumulative impacts of Summit's entire project in Minnesota.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	DeGross, Lydia	2024-02-23	The claims in the DEIS that this pipeline will have "minimal impact" and that CO ₂ leaks would be unlikely to impact mammals, birds, reptiles, amphibians, insects, fish, and freshwater mussels, are unsupported by evidence. The DEIS fails to mention any negative impacts from construction on the ecosystem.	Chapter 5 discusses general project impacts on fish and wildlife. Chapter 8 provides a detailed, referenced discussion of the potential impacts on fish and wildlife posed by CO ₂ leaks and a CO ₂ pipeline rupture.	20243-204403-01
	DeGross, Lydia	2024-02-23	There is inconsistency in the reported impact on wetlands. In Table 5-40 on p. 5-98 of the DEIS, it states that "the loss of wetlands would be less than 0.01 acre." However, Table 5-4 on p. 5-24 says that for Summit's preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres.	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.	20243-204403-01
	DeGross, Lydia	2024-02-23	Summit states that the capture facility "is designed to capture 100% of the CO ₂ produced by the ethanol plant." There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 2.1 has been revised to clarify that the captured CO ₂ is produced by the ethanol plant as part of its fermentation process, the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.	20243-204403-01
	DeGross, Lydia	2024-02-23	This project poses a threat to public safety and health, agriculture, ecosystems, and water. CO ₂ is dangerous at high concentrations and those in the rupture impact zone are at risk. The DEIS does not mention any meaningful safety measures for a rupture and instead suggests that it is "reasonable" for Summit to simply supply indoor CO ₂ detectors for residences within 1,000 feet of the project. According to the PHMSA, the current emergency response requirements for this project are dangerously outdated. The PUC must determine what routing, setback, and depth requirements are necessary to adequately protect Minnesotans.	The draft EIS discusses PHMSA rules, regulations, and the pending rulemaking process PHMSA is undertaking for CO ₂ pipelines and acknowledges pending PHMSA changes to such regulations (see draft EIS, Chapter 3, Chapter 8, and Appendix G). PHMSA regulations (that is, their appropriateness) and related standards for CO ₂ pipelines are outside the scope of the EIS (Appendix A). Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline's vicinity. The Commission's obligation is to	20243-204403-01

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				identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements. Section 3.4 of the EIS has been revised with this information.	
	DeGross, Lydia	2024-02-23	This pipeline will cause yield reduction and damage to prime farmland, yet the DEIS fails to identify any measures the applicant should take to avoid these damages or repair them. Summit’s preferred route for this pipeline would impact significantly more acres of prime farmland across both the construction footprint and the operation footprint of the proposed project than the proposed alternatives.	While the applicant's preferred route, RA-South, was calculated to have the highest percent of prime farmland within the footprint (0.3 percent and 0.6 percent higher than RA-North for operation and construction footprint, respectively), the total acres of prime farmland in both construction and operation footprint for RA-South is greater than the total acres for RA-North and less than the total acres for RA-Hybrid. Additionally, impacts and mitigation to prime farmland and soils are discussed in sections 5.5.1.3 and 5.7.6.3.	20243-204403-01
	DeGross, Lydia	2024-02-23	A leak would kill plants, yet the DEIS provides no measures to avoid these impacts, nor does it discuss the long-term impacts of such damage on the soils and vegetation.	Impacts on vegetation are discussed in Section 8.3.4.3. Section 8.5 describes the steps that would be taken to help prevent an accidental release.	20243-204403-01
	DeGross, Lydia	2024-02-23	More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota’s precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive. Project construction has the potential to cause a breach in a confined aquifer which could have significant long-term impacts on aquifers.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	DeGross, Lydia	2024-02-23	The proposed route for Summit’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies while going through prime farmland and ecosystems. Given pipelines’ high potential to leak or rupture this project puts animals, the environment, and people’s health in danger.	Impacts on water resources are discussed in Section 8.3.4.1. Section 8.5 describes the steps that would be taken to help prevent an accidental release.	20243-204403-01
	DeGross, Lydia	2024-02-23	Additionally, carbon capture technologies are highly energy intensive and will significantly increase the carbon emissions at the facility from electricity use. Given our current climate and biodiversity crisis, we need a careful analysis and credible assessment of how this project could affect our homes, lands, waters, and communities. This will require more research and evidence to back up all claims.	Electricity use is described in Section 5.4.9.	20243-204403-01
	Dircks, Lisa	2024-04-23	NO to CO ₂ Pipelines!!! Private Companies taking land for personal gain is Wrong !! All these Companies want is the money grab in the Inflation Reduction Act. They don't care about the danger these Pipelines have or land they will ruin. I am in Iowa trying to stop these and we need to STOP them everywhere!!!	Thank you for your comment.	20243-204403-01
	Dornfeld, Tess	2024-02-23	As a fourth generation Minnesotan, I'm very concerned about the impacts and risks that this proposal, and the larger project it is clearly part and parcel of, pose to our water resources in particular, as well as important farmland, rural communities, and emergency responders. The DEIS needs to thoroughly account both for the recent and ongoing drought conditions in the state, and future projections. We know these conditions are only going to get more extreme and unpredictable. A guess at 20 million gallons of water every year is a huge commitment and needs to be analyzed carefully for the lifetime of the project. The risks to water resources in the construction process are also not addressed sufficiently, especially given our recent experience in the state of aquifer breaches from pipeline construction. Obviously past permitting processes have not been robust enough and groundwater and aquifer damage needs to be treated seriously from the start.	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Dyce, Darwin	2024-02-22	What follows are just a few of my concerns regarding Draft Environmental Impact Statement (DEIS) for the Otter Tail to Wilkin CO ₂ Pipeline Project. Summit’s application misleads and skirts around vital information pertaining to environmental and human impact of the CO ₂ Pipeline, because such considerations interfere with their profit margin. I urge the PUC to look seriously at the human and environmental concerns that arise with the CO ₂ Pipeline. We all know that such a pipeline can and will break. I have many friends who are First Responders and would arrive on the scene to protect the public when such breaks occur. Adequate information to provide basic protections to First Responders does not exist in this plan. A pipeline rupture releases CO ₂ that is both colorless and odorless. First Responders do not have the necessary equipment to deal with a pipeline break, nor is there a plan for communities to obtain additional funding to acquire such equipment. Although	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The	20243-204403-01

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			the plan speaks to multiple company personnel as playing roles in an emergency response, it ignores the fact that it has only one full-time employee at the capture facility. First responders deserve more information and equipment to respond to such an event. Their lives and the lives of others are at stake.	Emergency Response Plan included as Appendix N is a draft plan that would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	
	Dyce, Darwin	2024-02-22	The application speaks to 28 miles of pipeline, yet the DEIS conveniently ignores the indirect and cumulative impacts of the entire project, a project that clearly is intended to expand. Segment permitting for multiple projects prevents a thorough review of the cumulative impacts and potential environmental and climate damages of the project.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Dyce, Darwin	2024-02-22	It is also apparent that Summit will likely have no responsibility to monitor or maintain once the pipeline is decommissioned.	Section 2.7 describes project decommissioning. This section was revised to describe the financial assurances to be provided by the applicant for costs associated with decommissioning.	20243-204403-01
	Dyce, Darwin	2024-02-22	We are increasingly dependent upon ever decreasing sources of clean water. Native Americans are correct in pointing out Mni Wiconi (Water is life). The DEIS fails to discuss the impacts of an increase of water use on an already dwindling supply. The carbon capture process can double water requirements at a facility, in addition it will increase toxic wastewater discharge. Summit has not been transparent about water related issues. It has not finalized its water appropriation sources or volumes needed for construction. It is not in the best interests of Minnesotans to allow fresh drinking water to be put at risk.	Impacts on water resources are discussed in section 5.7.8. Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Dyce, Darwin	2024-02-22	Our state has first-hand knowledge of how damaging fractured pipelines can be. The DEIS must consider more seriously the damage that can occur to aquifers. Breaching shallow aquifers has long term groundwater impacts. In addition, it is unwise to ignore the impact of harmful drilling fluid on plants and animals. Summit’s preferred route crosses 3 rivers magnifying risk. The DEIS ignores far too many risks to critical habitats and wetlands. As I said these are just a few of my concerns. Looking out for present and future generations is your charge, I urge you not to give a green light to this project.	Groundwater impacts and mitigation are addressed in Section 5.7.8.2. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	20243-204403-01
	Erickson, Stephen	2024-02-23	We do not need more pipelines!	Thank you for your comment.	20243-204403-01
	Fischer, Simona	2024-02-12	I am an architect and sustainability expert with projects around the state of Minnesota, and I know how difficult it is to track the impact of buildings and infrastructure projects. I am concerned that the DEIS has issued an oversimplified statement that falsely minimizes the potential impact of a CO ₂ pipeline in two areas The application inaccurately claims that the capture facility “is designed to capture 100% of the CO ₂ produced by the ethanol plant.” There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by data or verified by a third party.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios for 100 percent, 70 percent, 40 percent, and 10 percent.	20243-204403-01
	Fischer, Simona	2024-02-12	Also, carbon capture technologies are energy intensive due to electricity use. The DEIS calculation is oversimplified and omits actual emissions factors that are from Great River Energy.	Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 g CO ₂ e/MWh. This was calculated from LREC’s energy resource mix in which nearly half comes from clean energy sources. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 g CO ₂ e/kWh),	20243-204403-01

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				which was used in the draft EIS, calculated electricity emissions have decreased.	
	Fischer, Simona	2024-02-12	The DEIS also fails to discuss the impacts of an increase in water use on local water supply to surrounding communities. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge.	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Fischer, Simona	2024-02-12	The proposed route for Summit’s pipeline network also includes water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota’s waters and the wildlife ecosystems that will be affected.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Fischer, Simona	2024-02-12	Minnesotans deserve a comprehensive, science-based review of impacts of any proposed pipeline, and frankly, there are dozens of better climate solutions out there that are better than fast-tracking a poorly conceived pipeline project without proper vetting.	Thank you for your comment.	20243-204403-01
	Flaig, Patricia & Jean	2024-02-19	As part owners of farmland in Redwood County, we are writing to voice our opposition to the pressurized pipeline proposal put forth by Summit Carbon Solutions. The reasons for opposition center around its impact on the environment as well as climate. 1) While capturing carbon dioxide might seem like a positive step, using it to help or promote other businesses to produce more carbon dioxide such as the fracking in North Dakota results in a net zero gain in the struggle to improve air quality and in the fight to reduce negative effects on climate. It does not appear to address the issue of simply reducing the amount of carbon dioxide released into the air.	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Flaig, Patricia & Jean	2024-02-19	2) Approval of this proposal would promote more ethanol production and subsequently more carbon dioxide. It takes a great deal of energy to produce ethanol, so this “green solution” is not really a solution.	Thank you for your comment.	20243-204403-01
	Flaig, Patricia & Jean	2024-02-19	3) Transporting captured carbon dioxide in a pressurized pipeline through prime farmland and essential rivers, streams and aquifers creates a huge potential for an ecological disaster. a. Even a small leak into the ground could destroy vegetation. This begs the question of how long would it take to restore this production land, and what do farmers and those who rely on farmers do while waiting for safe restoration to occur. b. It is our understanding that when carbon dioxide is dissolved in water, it creates an acidic liquid which when leaked into waterways would deplete the oxygen and subsequently kill all plant and animal life. These waterways are a part of a larger watershed so the potential harm would not necessarily be localized. c. An explosion of a pressurized pipeline could endanger all those living in the area. d. An ecological or environmental disaster usually takes specialized teams and equipment to contend and contain the situation. Rural areas and surrounding small farming communities do not have those resources nor the financial wherewithal to acquire them on short notice.	Chapter 8 describes the risk of a CO ₂ release and potential impacts.	20243-204403-01
	Flaig, Patricia & Jean	2024-02-19	4) The use of taxpayers money via tax credits needs to be refocused. Tax credits should be given to companies who reduce their emissions and not those who simply shift them around. Also, farmers should be included. Tax monies could be used to educate farmers about carbon farming and incentives given to those who incorporate it into their overall operation. Farmers and communities could be given financial help to create and maintain more green spaces in and around their farms and communities. As the saying goes, “it takes a whole village,” or in this case, it takes a whole county or state to make sure life on this planet is sustainable. We can not ignore the Common Good, that which is good for all. The people of Redwood County and the state of Minnesota deserve that. This proposal needs to be rejected.	As stated in the final scoping decision, the appropriateness of federal and state policies, including tax credits and other incentives, regarding carbon capture and ethanol is outside the scope of the EIS.	20243-204403-01

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			Respectfully submitted, Patricia Flaig Riley Jean Flaig Crummett		
	Fossen, Heath	2024-02-22	I am a current landowner and will soon be a resident of Wilkin County, just a few hundred feet from this pipeline. I have concerns about the water usage needed for this project, not just the Ottertail/Wilkin leg, but the entire line slated for southern MN as well. Much of southern Minnesota is suffering from the consequences of drought and over-commitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit “anticipates” an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. My family's rural homestead relies on a private well for drinking water, I am concerned that the water needed for this project will deplete/contaminate the drinking water in my area. Will I be forced to drill a deeper well (who pays for that?) or worse yet- have to purchase bottled water for my family to survive?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has also been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Fossen, Heath	2024-02-22	It also seems there hasn't been much research done on the excessive amount of electricity needed to run the carbon capture operation. Electrical grids across the US are notorious taxed on a daily basis. The DEIS states that during operation the proposed project will require about 38,501,733 kilowatt hours per year, and that this amount is “not anticipated to require the addition of power generation capacity.” However, the DEIS fails to clearly state how much electricity the ethanol refinery is currently using. For that information, the public must look in Appendix I. The DEIS does not explain how this doubling of the electricity use at the ethanol refinery will impact overall electricity for Lake Region Electric Cooperative. Who is paying for that electricity? Summit or the ethanol facility? And if the latter, will those cost increases be passed on to producers or other member-owners? If twice as much carbon is emitted during the capture process, perhaps this isn't the most efficient method to pursue.	Section 5.4.9.1 has been updated with the electricity currently being used by the ethanol plant. Section 5.4.9.2 contains relevant information regarding how LREC would support the project. This section has been updated to indicate that the applicant is solely responsible for necessary infrastructure upgrades (see Appendix I, Supplemental Information Inquiry 13 response and email from LREC).	20243-204403-01
	Fossen, Heath	2024-02-22	In addition to the direct impacts of the 28 miles of pipeline included in Summit’s application, the DEIS does not account for the indirect and cumulative impacts of Summit’s entire project in Minnesota. This is despite Summit’s clear and public plans for a much larger buildout in Minnesota and recent statements that they will be applying for permits for additional parts of the network imminently. Allowing Summit to artificially segment permitting requests for multiple concurrent projects on one pipeline will prevent a thorough review of the cumulative impacts and potential environmental and climate damages of the project.	Thank you for your comment. The full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Fossen, Heath	2024-02-22	Please do not allow Minnesota to be the guinea pig for a project of this magnitude. There are other, more sustainable methods of carbon capture that require far less degradation of land and depletion of fresh water.	Thank you for your comment.	20243-204403-01
	Fossen, Heidi	2024-02-22	Hello - I am a landowner, past and (soon to be) future resident of Wilkin County, my farmland has been cited by Summit as a possible route for the carbon pipeline project and over the past couple of years Summit has approached my family several times trying to get us to sign their easements in a rude and almost forcible manner. The proposed route is also a few hundred feet from my elderly mother's farmstead where she has lived for the past 50 years, this land and farmstead has been in my family for almost 100 years now. I grew up here and will take over this farm and land when my mother becomes too old. Hopefully my children will take it over for me when I become too old.	Thank you for your comment.	20243-204403-01
	Fossen, Heidi	2024-02-22	I appreciate the research the Dept of Commerce did for this project and am very concerned about climate change and do think we should be taking measures now to fight climate change. However, I don't believe this pipeline project exhibits a responsible solution to the climate change crisis. To be clear, I am a proponent of carbon capture and think that it will be needed in order to fight this crisis but there are other methods of carbon capture that do not involve degrading precious farmland and using billions of gallons of freshwater [that we do not have]. Many new studies at research schools all over the world (like the University of Wisconsin and University of Minnesota) have come up with safer, cheaper and more ecofriendly carbon capture solutions involving plants such as switchgrass and other native plants. It is possible to capture carbon without degrading hundreds of miles of farmland and wasting billions of gallons of precious, non-renewable, fresh water.	Thank you for your comment. An alternative that does not include ethanol production was not studied in the EIS because it would not meet the purpose of the project.	20243-204403-01

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	Fossen, Heidi	2024-02-22	Throughout this process, we have been getting conflicting figures (from Summit and the PUC) on how much fresh water is going to be needed to build this pipeline and operate it for the next 20+ years. As you know, this area (and most of the Midwest) has been in various levels of drought for the past several years with no sign of a turnaround. Is it really in the best interest of the state to allow an outside company to drain our aquifers, leaving our rural communities without adequate drinking water and water for irrigational needs related to livestock and crop production? Please go back and take another look at the short- and long-term water calculations needed for this pipeline and reassess if Summit's consumption of this valuable, community resource is going to be worth it for Minnesotans in the long run. Please consider the entire buildout of this project- not just the 28 miles in Ottertail and Wilkin counties. Regardless of how much carbon is in the air, we all die without adequate drinking water and food to eat.	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has also been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Fossen, Heidi	2024-02-22	I am also concerned about a potential rupture/leak. It is unclear if/when the pipeline will be tested for leaks, and if leaks can even be detected. If there is a large-scale rupture, the EMS team in tiny Breckenridge MN is not equipped to respond to such a disaster; people, plants and animals can die. This tiny community is not prepared or equipped to mitigate a leak or accident of any kind regarding carbon gas. Also, we've recently been notified from our insurance company that there are "a lot of red flags that could lead to a gap in coverage as it relates to liability for damages and/or bodily injury related to this pipeline". I think we also need solid clarification on who is responsible for all the scenarios surrounding a rupture/accident that happens on privately held land. I know safety is the utmost concern for this project by all involved, but let's be real-with a project of this magnitude (the first ever of its kind worldwide), there WILL be mistakes/leaks/accidents/injuries- there ALWAYS are. And in the end, it is always the rural communities that are left scarred and picking up the pieces, not the corporation that was responsible for the mess in the first place. All I ask is that we take a hard look at environmental disasters that have happened in the past and learn from the way those were handled between corporate America and local residents.	As detailed in Section 2.3.2.2, the applicant would install a pipeline internal inspection tool to monitor pipeline integrity. The applicant would monitor the system from a control center and assess conditions to ensure the pipeline is operating within established parameters (see Section 2.6.1). The applicant would also run a real-time model of the pipeline system, and if conditions of the model do not match the conditions of the pipeline, alerts would notify controllers to potential leaks. Section 8.4 describes the steps that would be taken in case of a rupture, and Section 8.5 describes the steps that would be taken to prevent an accident and reduce impacts if a leak or rupture occurred. Section 5.4.7.2 has been revised to address the availability and cost of property insurance, and to note that the applicant has agreed to indemnify landowners for any losses resulting from the applicant's use of the easements.	20243-204403-01
	Fossen, Heidi	2024-02-22	For the past several generations, my family and the families of these small communities have been responsible stewards of farmland and water resources in the Red River Valley, please do not sell out to an out of state company that is looking to make a quick buck on current tax incentives, rape our land and deplete our fresh water supply. This project does not benefit Minnesotans or the environment and there is other, more ecofriendly options for carbon capture available that should be considered.	Thank you for your comment. An alternative that does not include ethanol production was not studied in the EIS because it would not meet the purpose of the project.	20243-204403-01
	Furshong, Peg	2024-02-22	My name is Peg Furshong, and I am a landowner in the proposed 242-mile footprint of this proposed CO ₂ project for the state of Minnesota. As a mother, farmer and Minnesota taxpayer, I am opposed to being a 'pilot' project for this this extraction industry to make millions of dollars while putting rural Minnesotans at risk. After reading the EIS – it seems to be a template for other projects not relevant to this specific project in Minnesota. Much of the DEIS cites "best practices" in general without detailing them and their application in Minnesota. There are significant promises made by Summit Carbon Solutions without substance and details on how these promises will be addressed or implemented. Below I have indicated concerns and would like the PUC to further investigate concerns shared by many before proceeding with this routing application.	See the responses to specific comment topics below.	20243-204403-01
	Furshong, Peg	2024-02-22	With reference to: CO ₂ Rupture Impact Zone: According to the analysis in the DEIS, the potential impact radius for levels of CO ₂ that would be "immediately dangerous to life or health" is 617 feet. This expands to 910 feet for lower concentrations that cause dizziness, drowsiness, severe muscle twitching, and unconsciousness within a few minutes. Although Summit indicates that it will take 25 minutes for the system to shut off the relevant valves in the event of "abnormal operation," the DEIS does not mention any meaningful safety measures for a rupture and instead suggests that it is "reasonable" for Summit to simply supply indoor CO ₂ detectors for residences within 1,000 feet of the project. But the rupture report in Appendix G states that "a full rupture results in impact distances too quickly for an early warning device, such as an oxygen detector, to be effective." This pipeline should not be approved without a clear understanding of the risks to human health and meaningful measures to ensure the safety of people and animals in the area. This proposed pipeline is planned to be at the foot of our farm driveway which would be 100 yards from our house and less than 16 feet from our pasture where we graze our cattle. Are we expendable? According to the Iowa Utility Board	Text in Section 4.5 on valve closure time has been corrected from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not	20243-204403-01

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			hearings – it would cost rural communities approximately \$9,600 per EMS responder for the equipment necessary to respond to a CO ₂ incident. MN Rural EMS departments budgets already struggle – the other key element is that responders need to be in electric vehicles and as far as I know, not one rural EMS department in MN has electric vehicles. The other solution that Summit has mentioned at public meetings was to have regional response teams – well, by the time we wait for a ‘crew’ to be dispatched to a rural incident, the damage would be done. Back in February of 2020, a rupture in rural Mississippi resulted in 45 people being transported to area hospitals. Think about this footprint – what area hospitals would have ER rooms for 45 people? You would be taking people to St. Cloud, Fargo, and Sioux Falls. Those 45 people may not have died from the rupture but years later, they are still suffering from the side effects of exposure to the CO ₂ .	outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	
	Furshong, Peg	2024-02-22	Compliance with PHMSA Rules: The DEIS accepts Summit’s assurances that it will “comply with federal emergency response requirements,” but as noted in a Pipeline Safety Trust report and by the Pipeline Hazardous Material Safety Administration (PHMSA) itself, the current emergency response requirements are dangerously outdated. As a state entity, the MN Public Utilities Commission should be putting Minnesotan’s wellbeing and safety over out-of-state, for-profit businesses interests. We should be your priority, not Summit Carbon Solutions and their investors. This is a “first of its kind” project that has NEVER been proven at this scale. Currently, there is no such pipeline in the upper Midwest – by approving this proposed project you will be creating a new pipeline corridor that will impact Minnesota’s Natural Heritage for generations. You need to error on the side of caution and public interest. Setbacks: The DEIS states that the PUC “cannot set safety standards” for Summit’s proposed pipeline. PHMSA has expressly said in public letters to CO ₂ pipeline companies like Summit that state and local authorities can exercise their powers to regulate land use—including setback distances—and that “nothing in the federal pipeline safety law impinges on these traditional prerogatives of local—or state—government.” The PUC must consider where the pipeline is placed and what is the safest option for Minnesotans, which means the PUC can and should determine what routing, setback, and depth requirements are necessary to adequately protect Minnesotans. We are asking you to protect rural communities – this segment of the proposed project will begin in the Fergus Falls community – a densely populated community that will risk and endanger lives.	Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements.	20243-204403-01
	Furshong, Peg	2024-02-22	Geologic Hazards: The DEIS does not address whether the applicant has conducted geologic hazard surveys pursuant to the PHMSA Bulletin here: https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2022-06/2022-11791.pdf	Geologic hazards are addressed in Sections 5.7.3 and 5.7.6. Text regarding geohazard assessments that would comply with the recommendations in PHMSA Advisory Bulletin 2022-01 has been added to both sections.	20243-204403-01
	Furshong, Peg	2024-02-22	Dangers to water and waterbodies: The proposed route for Summit’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota’s precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Furshong, Peg	2024-02-22	There has been no modeling of a rupture in a moving waterway. Being that the company who did the EIS is from Texas – do we trust their judgement when it comes to concerns and conditions we face in the northern climates. What happens when there is a leak or rupture under an icecap? How is a rupture handled during the winter months? While I have limited capacity and am not a scientist or engineer – I can deduct that the impacts would likely be much different during the winter than the summer. Look at this winter for example – we have water pipes in a variety of communities rupturing when we have a warm/cold cycle that happens with the erratic temperatures from January through April. How will that freeze/thaw cycle impact this infrastructure? If we have a rupture during the colder weather – with that impact the time people will be exposed to dangerous levels of CO ₂ ?	Sections 8.3.1 and 8.3.4 have been revised to discuss the potential impacts of ice covering waters or wetlands at the point of a rupture. In general, if CO ₂ released from the pipeline was trapped by ice, then the CO ₂ would release more slowly into the atmosphere as it traveled laterally under the ice until it escaped through cracks or gaps in the ice, thereby decreasing the impact distance (the distance the CO ₂ would travel through the air). The EIS modeled the worst-case scenario where the CO ₂ is not trapped by ice. In the event of a pipeline rupture that caused CO ₂ to be trapped by ice covering a waterbody, CO ₂ could remain in contact with the water for more time and the concentration of carbonic acid could increase. In other words, the water and aquatic species could experience a greater impact from the CO ₂ , but the atmosphere would experience less CO ₂ , and the risk to humans and other terrestrial species would be lower. As noted in Section 5.7.3.4 and Section 8.1, the applicant has committed to conducting a Phase I Geohazard Assessment to identify areas surrounding the pipeline that may be prone to large earth movement, as	20243-204403-01

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				recommended by PHMSA in its June 2022 Advisory Bulletin, and EERA staff recommends that the results of the Phase I assessment, and any subsequent assessments, should be provided to the Commission.	
	Furshong, Peg	2024-02-22	Water use: Much of southern Minnesota is suffering from the consequences of drought and over-commitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit “anticipates” an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and casespecific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impact of those appropriations on water resources. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent with its true demands for water resources? I have attended several in person meetings where Summit Carbon Solutions has given various answers to questions around how much water is going to be needed to run the carbon capture equipment. They have not been transparent in their application or the proceedings leading up to this process. They have also been approaching local utilities asking for water – it is my understanding based on volume needed, they are required to go through the MN DNR water appropriations process. If so, it seems like they are already trying to circumvent regulatory processes. The best answer we have been given is that the carbon capture process with double the water demands that an ethanol plant already uses. Currently it takes 3 to 3.5 gallons of water to produce 1 gallon of ethanol. Add carbon capture to the mix and it now becomes 6 to 7 gallons of water per one gallon of ethanol. That now becomes 12 to 13 million gallons of water per year per proposed plant in Minnesota (currently at 6 plants in 10 counties) Does Minnesota really have that much fresh drinking water to give to a private – for profit – company over the next twenty years. It seems highly unlikely that we will have that kind of water with climate and drought conditions. This is not sustainable – what research has been done to ensure that our aquifers will not be depleted by this extractionist industry?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has also been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Furshong, Peg	2024-02-22	Aquifer Damage: Summit’s preferred route, RA-South, crosses a surficial beach ridge aquifer in Otter Tail County. The DNR has said that the area is “prone to significant groundwater discharge,” and the applicant’s initial groundwater investigation confirmed that “artesian groundwater conditions are present” along that beach ridge system. In early feedback on the DEIS, the DNR noted that “Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer and that “breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.” This, along with our state’s first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers more seriously. What baseline studies are being done to ensure that extractionist companies are not putting our natural heritage (water) at risk?!	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	20243-204403-01
	Furshong, Peg	2024-02-22	HDD Drilling: The DEIS also states that “drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet [drinking water quality certification standards] would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA.” The DEIS does not discuss the risks of applying drilling mud, especially with additives not approved by MDH, to the land. The DEIS says that “drilling fluids and additives for the HDD would be non-toxic to the aquatic environment and humans,” however, even supposedly “non-toxic” drilling fluid is chemical waste that has been found to be harmful to plant and animal species. Summit’s	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an	20243-204403-01

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			preferred route and alternative route, RA-Hybrid, would both cross three rivers (Pelican River, Otter Tail River, and Bois de Sioux River) via the HDD mention.	inadvertent release of drilling mud and describes potential impacts in Chapter 5. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	
	Furshong, Peg	2024-02-22	Wetlands: In Table 5-40 on p. 5-98 of the DEIS it states that “the loss of wetlands would be less than 0.01 acre.” However, Table 5-4 on p. 5-24 says that for Summit’s preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. And Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres. Which is it??	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover, and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.	20243-204403-01
	Furshong, Peg	2024-02-22	<p>Impacts of a Leak or Rupture on Animals: According to the DEIS, CO₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would be unlikely to impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence. Though the DEIS does note some harm may come to animals in the event of a rupture, it relies heavily on the assumption that animals will simply move out of the rupture area to avoid the release. The reason for this assumption is not provided and is contradicted by information in the rupture report in Appendix G which suggests the impacts of a rupture would be nearly immediate.</p> <p>The Otter Tail is home to a river ecology that supports freshwater mussels – they often spend their entire lifetime (decades) within a 15’ area - they will not simply ‘get out of the way’.</p> <p>Critical Habitats: Summit’s preferred route would cross over or near several waterfowl protection areas, including the Orwell 9 Unit and Ridgeway WPA in Otter Tail County. The DEIS notes that some of these areas will be avoided during construction but fails to consider the impacts to these features in the event of a leak or rupture.</p>	CO ₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to local vegetation or wildlife. Potential impacts on wildlife from a CO ₂ rupture could result first from the physical force of a rupture and secondarily from localized, short-term high levels of CO ₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO ₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most mobile wildlife species would follow their natural instincts and would attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO ₂ , which could be toxic for species unable to leave the area of the release.	20243-204403-01
	Furshong, Peg	2024-02-22	<p>Enhanced Oil Recovery: The DEIS fails to explain whether the applicant can sell any of its captured CO₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. The DEIS incorrectly states that “Production of oil through EOR would not be dependent on the availability of CO₂ produced by the ethanol plant.” This claim is contradicted by countless public statements from public officials in North Dakota and oil industry representatives.</p> <p>Early on during the public meetings Summit officials publicly said that their CO₂ would not be used for EOR and now they no longer make those statements. In fact, they have gone out of their way to say that once they deliver the CO₂ to ND, they have no control over what happens. (They will just collect their money from the 45Q and be on their way.) The fact is, once the 45Q program sunsets – there are no protections in place that keep the CO₂ in the ground.</p>	The text questioned by the commenter in Section 5.7.2.3 was prefaced with the following: "if all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO ₂ , other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Furshong, Peg	2024-02-22	Environmental Justice Communities: The DEIS acknowledges that the project will directly intersect a defined environmental justice community but does not account for the burden of the potential health and safety impacts of a leak or a rupture, not to mention any negative impacts from construction on the ecosystem. The DEIS also fails to assess the cumulative impacts of this project in relation to existing pollution or health disparities in the area.	Chapter 8 has been revised to include a new section (8.3.1.2) describing effects on environmental justice populations in the event of an accidental release of CO ₂ .	20243-204403-01
	Furshong, Peg	2024-02-22	<p>Complete Network Impacts: In addition to the direct impacts of the 28 miles of pipeline included in Summit’s application, the DEIS does not account for the indirect and cumulative impacts of Summit’s entire project in Minnesota. This is despite Summit’s clear and public plans for a much larger buildout in Minnesota and recent statements that they will be applying for permits for additional parts of the network imminently. Allowing Summit to artificially segment permitting requests for multiple concurrent projects on one pipeline will prevent a thorough review of the cumulative impacts and potential environmental and climate damages of the project.</p> <p>It doesn’t take much to figure out the only reason that Summit Carbon Solutions (SCS) only applied for the 28.5 segment in MN was because currently SCS has been unsuccessful in getting their infrastructure and sequestering permits in Iowa, South Dakota and North</p>	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01

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			Dakota. It is disappointing that we are wasting taxpayer dollars (not only at the state level but on the local level – countless hours of time on the backs of taxpayers) on this project when it is a pipeline to nowhere. It is also telling that states who have several pipelines and have been in the pipeline permitting business for many years are concerned about this project and the risks involved.		
	Gardner, Annah	2024-02-22	<p>The DEIS fails to provide a thorough assessment of this project’s impacts.</p> <p>A lot of information and analysis is missing, including:</p> <ul style="list-style-type: none"> - The DEIS does not discuss the risks of applying drilling mud, especially with additives not approved by MDH, to the land. - The DEIS fails to discuss the impacts of an increase in water use on local water supply. 	Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2. Water use and impacts are addressed in Section 5.7.8.2. Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Gardner, Annah	2024-02-22	<p>there is not a detailed and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources.</p> <ul style="list-style-type: none"> - Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impacts of those appropriations on water resources. 	As stated in Section 5.7.8.2, water supply appropriations would be regulated by DNR-issued permits that would have conditions to minimize impacts on groundwater resources. DNR would review permit applications and would not issue a permit if the amount of water to be withdrawn would adversely affect the aquifer or other users. Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Gardner, Annah	2024-02-22	According to the DEIS, CO ₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would be unlikely to impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence.	CO ₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to local wildlife. This is discussed in Section 8.3.4.2 of the final EIS.	20243-204403-01
	Gardner, Annah	2024-02-22	Summit states that the capture facility “is designed to capture 100% of the CO ₂ produced by the ethanol plant.” There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios for 100 percent, 70 percent, 40 percent, and 10 percent.	20243-204403-01
	Gardner, Annah	2024-02-22	<p>The DEIS assumes 100% of captured CO₂ is being permanently stored underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols that would ensure it.</p> <ul style="list-style-type: none"> - The DEIS fails to explain whether the applicant can sell any of its captured CO₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. 	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01

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				Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	
	Gardner, Annah	2024-02-22	The DEIS also fails to assess the cumulative impacts of this project in relation to existing pollution or health disparities in the area. - In addition to the direct impacts of the 28 miles of pipeline included in Summit's application, the DEIS does not account for the indirect and cumulative impacts of Summit's entire project in Minnesota.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Gardner, Annah	2024-02-22	There is not a detailed discussion of decommissioning, so the public and state agencies cannot know what human and environmental impacts the plan will have into the future.	Section 2.7 describes project decommissioning. This section was revised to describe the financial assurances to be provided by the applicant for costs associated with decommissioning.	20243-204403-01
	Gooch, Van	2024-02-22	I am Dr. Van Gooch, Professor emeritus of the University of Minnesota -Morris. I am also a member of the Citizens for a Sustainable Future-Alexandria. We are very concerned about the environment and the reduction of carbon dioxide emission. On the surface the CO ₂ Pipeline Project has a good sound to it. In reality, as we have looked at it in detail, the plan is a disaster. The company proposing this pipeline has no background that qualifies them for this project. It seems that they see a "money tree" and they are going for it.	Thank you for your comment.	20243-204403-01
	Gooch, Van	2024-02-22	The high pressure of the pipeline is a danger. Carbon dioxide is in the air all of the time. But a CO ₂ pipeline burst is very dangerous for humans as it reacts with water to form carbonic acid. People have died from areas where high CO ₂ has been released. The pipeline burst in water again forms into carbonic acid and again is a disaster for our valued aquatic environments.	Risks of a potential CO ₂ release and potential impacts on humans and aquatic environments are described in Chapter 8 of the EIS.	20243-204403-01
	Gooch, Van	2024-02-22	Most importantly it is a huge amount of money that has very little effect on the problem. There are so many other ways this money could be used to mitigate the climate change problem, I ask that the Public Utilities Commission and Department of Commerce seriously consider not approving this proposal. It is mostly useless and high in potential for danger to the public and to the environment. Environmental groups, such as ours, highly oppose this project as a potential administrative failure.	Thank you for your comment. As stated in the final scoping decision, the appropriateness of federal and state policies regarding carbon capture and ethanol, including tax credits and other incentives, is outside the scope of the EIS.	20243-204403-01
	Goose, Leanna	2024-02-09	Hello my name is Leanna Goose. I live in northern Minnesota. I would advise the Public Utilities commission to not allow CO ₂ pipelines to be put anywhere in Minnesota. These are not solutions to climate change they only prolong the current overuse of fossil fuels and allow companies to continue to pollute. They are dangerous and not needed. What is needed is pressure on polluters to stop the carbon emissions. We are beginning to see the disastrous effects of climate change today and we need true solutions. CO ₂ pipelines are a false solution.	Thank you for your comment.	20243-204403-01
	Goyette, Chuck	2024-02-23	Andrew I live in Red Lake Falls Mn. Area. I am very much opposed to a CO ₂ pipeline. Mother Nature does not need further threats, damage to waterways, lakes, rivers, wetlands. No!!!	Thank you for your comment.	20243-204403-01
	Graney, Edith	2024-02-22	My name is Edith Graney. I was born and raised in Minnesota and care about the land and the people who live here. The Summit Carbon Capture pipeline is not a good idea for Minnesota. Rural areas don't have extensive emergency response capabilities. The rupture of a high-pressure pipeline would overwhelm the local services.	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-01
	Graney, Edith	2024-02-22	The water usage for this project is unclear regarding initial need and ongoing water needs for the carbon capture and compression operation. The present DEIS is for only part of the planned extensive pipeline network that Summit has planned. We need an accurate assessment of the entire project, not a piece-by-piece approval process.	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added	20243-204403-01

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				to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	
	Gurian-Sherman, Doug	2024-04-18	<p>My name is Doug Gurian-Sherman, and the following comments concern the proposed CO₂ pipeline routing permit in Otter Tail and Wilkins Counties in Minnesota. I am a resident of Minneapolis, MN. I attest that these comments are true and accurate to the best of my knowledge. Where I mention the DEIS, it is only to provide specific examples to illustrate broader points regarding the routing permit application.</p> <p>I submit this testimony as provided by Judge Moseng’s first and second pre-hearing orders from June and September 2023 respectively. These include section 6 of the June 2023 order, which allows for non-party testimony according to MN rule 1405.0800.</p> <p>I am an agricultural scientist, with a doctorate degree in plant pathology from the University of California, Berkeley. I conducted post-doctoral research for the U.S. Department of Agriculture, acted as a risk assessment scientist for the U.S. Environmental Protection Agency on pesticides and biotechnology, was an advisor for the U.S. Food and Drug Administration on food biotechnology, and was a senior scientist for several science-based environmental non-profit organizations. I have also authored scientific publications on agriculture and climate change. I therefore have expertise on agricultural sciences and practices relevant to the potential environmental risks and benefits of the pipeline, including climate change. My CV is attached at the end of my comments.</p>	Thank you for your comment.	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	My testimony evaluates the potential for the proposed pipeline to cause harm directly and indirectly to the environment of the area and to nearby communities. In this context it is important to consider the proposed pipeline and the ethanol plant it would serve as part of the larger industrial agriculture industry of the region and the state. The production of corn for the plant is part of the row crop industry of the state and region, and the influence of the pipeline on that local, regional and international industry and its impacts on the environment and communities is therefore directly relevant to the permit process. My testimony evaluates agricultural aspects of the proposed pipeline. I do not consider the operation of the ethanol plant, such as possibly supplying energy to the plant by renewable sources such as solar or wind.	Thank you for your comment.	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	Although the proposal for the permit claims that its approval would result in a net benefit for the climate and environment, a broader perspective of the relevant science leads to conclusion that significant net harm is the more likely outcome. Therefore, I conclude that the best course for the environment and the local communities would be to reject the permit, or a no action alternative.	Thank you for your comment.	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	<p>My conclusion that net harm is a more likely outcome relies on analysis of actual changes in corn and related crop cultivation in the area caused in part by the success of the corn ethanol industry over the past 15 years, which is fostered by renewable fuel standards (RFS) that provide incentives and subsidies. These subsidies are scheduled to continue for many years. Additionally, the low carbon fuel standards (LCFS) that the pipeline is intended to access would provide further incentives for the cultivation of additional corn for ethanol.</p> <p>The incentives of the RFS and other related trends have resulted in the past 15 years in substantial expansion of corn into previously uncultivated areas in MN near the proposed pipeline. This results in large release of CO₂ and increases in the CI of ethanol corn, as well as other large environmental impacts. The intention of the RFS and LCRS incentives is to support and expand the corn ethanol industry. Therefore, although predictions always have associated uncertainty, the most likely outcome if the pipeline is approved, based on the actual recent history in the region as well as an intended purpose of the RFS and LCFS, is the continuing expansion of corn for ethanol production.</p> <p>Corn cultivation for ethanol or other purposes such as livestock feed causes great environmental harm. Broadly speaking, it is important for the context of this pipeline proposal to recognize the immensity of harms from industrial agriculture such as the production of corn for ethanol. Agriculture is the largest human use of land and fresh water, it is the largest source of the major water pollutants nitrogen and phosphorus, is responsible for up to a third of climate change and is one of the top causes of the global biodiversity crisis^{1,2,3} We cannot reach climate goals, even with the elimination of fossil fuels, without substantially reducing the climate impacts of agriculture.</p>	Thank you for your comment.	20244-205651-01

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			<p>4 Agriculture is responsible for about 25% of Minnesota’s climate emissions, which is close to that of transportation and power generation. Known harms that may be exacerbated from the pipeline project in the region from corn grown for ethanol include contamination of drinking water wells and other supplies, lowering of water tables through irrigation affecting multiple ecosystem functions and recreation (and hence economies like tourism). They also include harm to biodiversity from land use change, fertilizer and sediment in surface water, and pesticide pollution, in addition to negative climate impacts. Industrial corn production is among the largest contributors to these harms.</p> <p>A related concern is whether in conjunction with the pipeline, the LCFS would provide enough incentives to meaningfully reduce the environmental impacts of ethanol corn cultivation. If so, would those improvements offset expansion of corn or related row crops into currently uncultivated areas? I argue that while some improvements may occur, they are at best equivocal, minor, and would not offset the greater harm from expanded production of corn into currently uncultivated areas. There are also trends in corn production that are making it more harmful to the environment by measures other than climate change, calling into question claims that it will become more sustainable overall under the LCFS, which does not incentivize reduction of non-climate risks.</p> <p>1 Roesch-McNally, G.E. et al. 2017. Barriers to implementing climate resilient agricultural strategies: The case of crop diversification in the U.S. Corn Belt. Glob. Environ. Change. 48: 206-215. https://doi.org/10.1016/j.gloenvcha.2017.12.002</p> <p>2 Rockström, J. et al. 2020. Planet-proofing the global food system. Nature Food. https://cgspace.cgiar.org/server/api/core/bitstreams/c90a1b58-4e81-48e1-a172-0a5ad294665f/content . Note that although this reference is a global perspective, it very much applies on the local and regional scales in MN.</p> <p>3 Diaz et al. 2019. Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES. Bonn, Germany: IPBES Secretariat. At: https://www.mari-odu.org/academics/2018su_Leadership/commons/library/Summary%20for%20Policymakers%20IPBES%20Global%2</p> <p>4 Dooley, K. et a. 2018. Missing pathways to 1.5 oC: The role of the land sector in ambitious climate action. Climate Land Ambition and Rights Alliance. Available at: https://static1.squarespace.com/static/610ffde0dd5c39015edc6873/t/65524d91dc73dc2fbf4a68ae/1699892631263/Missing+Pathways+FULL+Report.pdf.0Assessment.pdf</p>		
	Gurian-Sherman, Doug	2024-04-18	<p>Additionally, for any hope of the expressed climate goals of the project to be accomplished, the carbon from the plant must be permanently sequestered in the ground and not increase other sources of fossil CO₂. However, there is no assurance that carbon dioxide from this ethanol plant could not be diverted for extraction of additional fossil fuels. This must be fully evaluated under MN Rule 7852.1900, subpart 3, section I. as a cumulative potential effect related to anticipated future pipeline construction. If used for fossil fuel extraction, the pipeline CO₂ would produce the exact opposite effect of one of the main purposes and social justifications of the project. This is especially troubling in the context of this project because most captured CO₂ is currently used for fossil fuel extraction, and fossil fuel production areas that might use carbon dioxide for this purpose occur in the general region of the pipeline.</p>	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	<p>Another important consideration is whether the project would be good for the local economy. There would be temporary pipeline jobs and some possible small stimulation of the local economy as well as local taxes. However, sociological literature has documented over several decades that industrial agriculture’s net effects on local socioeconomic wellbeing are more likely to be negative. In addition, temporary labor from elsewhere is often associated with local exploitation, for example trafficking of disappearance of native women.^{5,6} This is a consistent problem with pipeline projects and must not be ignored. For all these reasons the pipeline permit should be rejected.</p> <p>5 Minnesota Public Radio and Associated Press. 2021. Six men, including two Line 3 workers, arrested in human trafficking sting. At: https://www.mprnews.org/story/2021/07/03/six-men-including-two-line-3-workers-arrested-in-human-trafficking-sting</p> <p>6 Cohen, L. 2023. The role pf environmental law in addressing the violent effects of resource extraction on native women. Harvard Law J. at: https://journals.law.harvard.edu/elr/wpcontent/uploads/sites/79/2023/04/HELR-Vol.-47.1-Cohen.pdf</p>	Section 5.4.8.2 has been revised to note the potential for violence associated with the presence of temporary workers. The applicant's commitment to educating all employees and contractors about prevention of human trafficking has been added to Section 5.4.8.3. In addition, Section 5.4.8.3 has been revised to add an EERA staff recommendation for a special permit condition requiring the applicant to provide its Human Trafficking Prevention Training for Commission review 30 days prior to submittal of the Plan and Profile.	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	<p>Carbon Intensity Land Use</p> <p>The carbon intensity (CI) of corn ethanol according to Scully et al 2021 is 52.1-78.3g CO₂eq/MJ.⁷ By comparison, gasoline’s CI is 93-101g CO₂eq/MJ. However, land use changes can alter the CI of ethanol corn and elevate it to above that of gasoline. The National Wildlife Foundation and U.S. Department of Energy note that this can raise corn ethanol levels to 24% above that of gasoline. In fact, it is likely that the CI of corn ethanol used for this project would be as great or greater than that of gasoline if the project succeeds as</p>	Section 6.1.3 has been revised to discuss the debate between Lark et al. and GREET model authors.	20244-205651-01

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			<p>intended. Likely changes in land use, especially expansion of corn for ethanol into currently uncultivated (“natural”) areas in the region are important in the context of both direct and indirect environmental impacts.</p> <p>Specifically, conversion of previously uncultivated land, for example grasslands-prairie, forest, or wetlands, to row crops such as corn, results in release into the atmosphere of huge amounts of stored carbon from soil or standing tree biomass. These are major reservoirs of carbon which have very large climate impacts. The release of this CO₂ occurs over a period of decades from soil or wetlands once converted to annual row crops like corn. Therefore, possible land use changes related to corn ethanol production have large implications for the CI of the corn ethanol plant for a long time.</p> <p>These considerations are relevant under MN Rule 7852.1900, subpart 3, sections B. and I. concerning environmental and cumulative effects respectively. If the intended purpose of the pipeline to make the plant more profitable or economically successful are achieved, that will provide incentive to expand ethanol production within the existing plant or others if markets support it. Although expanding electric car markets may eventually work against this, use of ethanol in the medium term and possible use in other classes of vehicles or aircraft and continuing renewable fuel standards (RFS) nationally and in Minnesota would support increasing ethanol use for years to come.</p> <p>Conversion of large amounts of uncultivated land in the region to corn and other row crops over the past 15 years has been demonstrated by research by Lark et al. (2015).⁸ One of the major national hotspots for this conversion has been in northwestern and northcentral Minnesota as well as eastern and central North and South Dakota, that is, in the vicinity of the proposed pipeline.⁹ My rough estimation based on Lark et al. (2015) is that this amounts to up to several hundred thousand acres in MN over this time. Much of this conversion has been for corn, and over half does not involve conversion of Conservation Reserve Program land back into crop production. This research was consistent with several other research papers concerning the upper Midwest and covered the period between 2008-2012 and 2008-2016 respectively, that is, after renewable fuel standard policy changes in 2007 that were intended to discourage such conversion of uncultivated land to biofuel crops.</p> <p>These authors also note that in 2014 new provisions in the Farm Bill included insurance penalties for converting uncultivated grasslands to crops. However, conversion of forested lands was not covered by this policy. And importantly much of the converted land in the area near the proposed pipeline in Minnesota was forested rather than grassland (as is more common farther west). Research covering 2008-2016 further implicated corn ethanol subsidies under the 2007 revisions of the RFS for raising the price of corn and indirectly other field crops such as soybeans and wheat.¹⁰ Soybeans, along with corn are two of the main crops being grown in newly cultivated soil in the MN regions of the proposed pipeline.</p> <p>These scientists found that when newly cultivated domestic land was included in the determination of CI for corn, it was no less than gasoline but more likely at least 24% greater. It is important to note that this large impact on CI from newly cultivated areas would occur even if additional measures for growing crops sustainably were used due to incentives from LCFS (which is mostly unlikely, as discussed below). Due to the relative magnitudes of the effects, even if widely enacted such measures would not entirely offset the emissions of CO₂ from conversion of uncultivated lands to corn or related crops. Additionally, as discussed below, the agricultural measures to further reduce CI have not been shown to reliably sequester more carbon in soil in the most thorough and recent science research. Soil carbon sequestration is the primary means of reducing CI for several of these conservation practices. It is important to note that some other previous studies have included the potential for land use change to increase CI, but those focused mostly on international regions and underestimated domestic sources. So, the findings of Lark et al. (2022) supplant that earlier research.¹¹</p> <p>Additionally, these trends in newly cultivated corn acres increased fertilizer use by 3-8% and increased measures of water quality degradation by 3-5%. Increases in fertilizer use are contrary to claims that greatly reduced fertilizer use is likely under LCFS incentives and would reduce CI. Such actual increases in nitrogen fertilizer use would, to the contrary, increase the CI of corn grown for ethanol production by increasing production of the potent greenhouse gas (GHG) nitrous oxide.¹²</p> <p>One way that increased corn production may occur without expanded acreage is by higher productivity (yield) per unit of land, and this has been important for several decades over the mid to late twentieth century and is still a factor. But clearly the actual expansion of cultivated land in the past several decades shows that yield gains alone are not sufficient to prevent expansion of cropland. Importantly, there is no good research evidence that new technologies such as GMOs or gene editing will change this trend significantly.^{13,14} Furthermore, one of the primary ways to increase yield has been to increase nitrogen fertilizer use.</p> <p>Even where the RFS result in expansion of corn on currently cultivated land rather than uncultivated land for expanded ethanol production, that would still likely result in a corresponding increase of previously uncultivated land used for corn or related row crops. This would occur by displacement of corn or other crops grown for other purposes onto currently uncultivated land, especially</p>		

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			<p>livestock feed, since demand trends for those other purposes is generally increasing. In other words, the total corn and other field crops acreage for all purposes needs to be considered, because they collectively determine land use and are linked economically. Therefore, both direct and indirect drivers of conversion of uncultivated land to corn production (and other row crops), with its very high negative climate and other environmental impacts, should be expected if the pipeline succeeds as intended. Expanded demand for corn for ethanol, which is most likely to be supplied from the local region, when possible, would therefore directly and indirectly put pressure on expanding corn acreage into uncultivated nearby land.</p> <p>Although increasing corn production is only one possibility, it is a reasonable one and therefore must be evaluated as part of any reasonable EIS.</p> <p>Given that expansion of corn into previously uncultivated lands has been the case over the past 15 years, the burden for showing that this trend would not be exacerbated by the pipeline must be convincingly demonstrated. However, based on my analysis, this has not been done and the pipeline permit should be rejected.</p> <p>7 Scully, M.J. et al. 2021. Carbon intensity of corn ethanol in the United States: state of the science. <i>Environ. Res. Lett.</i> 16(4), 043001. At: https://iopscience.iop.org/article/10.1088/1748-9326/abde08/pdf.</p> <p>8 Lark, T.J. et al. 2015. Cropland expansion outpaces agricultural and biofuel policies in the United States. <i>Environ. Res. Lett.</i> doi:10.1088/1748-9326/10/4/044003</p> <p>9 Lark, T.J. et al. 2022. Environmental outcomes of the US Renewable Fuel Standard. <i>PNAS</i>. https://doi.org/10.1073/pnas.2101084119</p> <p>10 Lark, T.J. et al. 2022. <i>ibid</i></p> <p>11 Lark, T.J. et al. 2022. <i>ibid</i></p> <p>12 Lark, T.J. et al. 2022. <i>ibid</i></p> <p>13 Gurian-Sherman, D. 2009. <i>Failure to yield: Evaluating the performance of genetically engineered crops</i>. Union of Concerned Scientists, Cambridge, MA. Available at: https://www.ucsusa.org/sites/default/files/2019-10/failure-to-yield.pdf</p> <p>14 Khaipho-Burch, M. et al. 2023. Scale up trials to validate modified crops’ benefits. <i>Nature</i>. 621: 470-473</p>		
	Gurian-Sherman, Doug	2024-04-18	<p>Improved Agricultural Practices for Climate and the Environment</p> <p>Several sustainable agricultural practices are touted as likely to be adopted or much more widely adopted by farmers growing corn for ethanol. Some of the more widely touted and discussed practices are no-till, growing cover crops, and reducing nitrogen (N) fertilizer use. As discussed below, to the contrary there is reliable data that shows that very few corn acres in MN use these either no-till or cover crops. And there are reasons why this is not likely to change much in the foreseeable future. Importantly, for both cover crops and no-till, the recent and best data contradict claims that they increase the sequestration of CO₂ in the soil, which if it occurred would benefit climate and reduce the CI of ethanol corn. A substantial reduction in N fertilizer use is also questionable and may also not have the intended effect of reducing GHGs or at least not to the extent claimed.</p>	Thank you for your comment.	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	<p>This is important because, as shown above, the pipeline and carbon sequestration proposed by the applicants is not assured if the CO₂ is used for recovery of petroleum that would not otherwise be produced, as is often the case. And if the project succeeds and thereby provides economic incentive for expansion, it is likely to occur in significant part through conversion of currently uncultivated land, with its great environmental and climate impacts. These impacts mean that the project is more likely to cause substantial negative climate and other environmental impacts than positive ones.</p>	<p>Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO₂ transported by the project could be used for EOR. To analyze impacts of the proposed project (Chapter 5), the EIS assumes the current level of ethanol production is maintained. Chapter 6 analyzes two alternative technologies—a suite of agricultural practices and a suite of energy use and efficiency changes—and assumes the current level of ethanol production is maintained with no land use change associated with expanded crop conversion from forestland, wetlands, or grazing lands. All cropland analyses assume historical persistence of conventional management pre-1980s for the region supplying feedstock to the ethanol plant. Emissions associated with introducing another variable (increase or decrease in ethanol production) would needlessly complicate the analysis of these alternative technologies. The final EIS has been revised to discuss the land use change debate between Lark et al. and GREET model authors.</p>	20244-205651-01

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	Gurian-Sherman, Doug	2024-04-18	<p>Therefore, it is important to ask whether additional environmentally desirable farming practices may occur in conjunction with corn ethanol production associated with the pipeline, and whether if adopted they would reduce CI. As discussed below, these outcomes are unlikely except to a limited extent, which will therefore more likely result in increased net environmental and climate harm when cultivation of currently uncultivated land is accounted for.</p> <p>It is unlikely that favored sustainable agriculture practices will be adopted to a substantial degree, or that they will improve the climate and environmental footprint of corn ethanol significantly.</p> <p>Nitrogen fertilizer use may be reduced somewhat. Nitrogen (N) fertilizer use is important for GHG (greenhouse gas) production in agriculture because some of it is converted in the soil by microbes to the very potent GHG nitrous oxide. In general, the less N fertilizer used the less nitrous oxide produced. But several factors in addition to the availability of precision farming resources determine how much N fertilizer is used.</p> <p>As noted above, expansion of corn acres for ethanol production in recent years led to increases in nitrogen fertilizer use, not reductions.¹⁵ Furthermore, implementation of several practices to reduce nitrogen contamination to water supplies by reducing use in sandy soils in Wisconsin, similar to many soils in the MN region that includes the pipeline, still resulted in contamination of groundwater with dangerous levels of nitrates.¹⁶ With pressure to maximize corn yields which requires adequate fertilizer levels, and greater likelihood of losses of nitrogen below corn root zones in sandy soil, it is even more difficult to substantially reduce nitrogen use in practice.¹⁷</p> <p>Profit margins per unit of corn production are usually small, and even negative in many years. This pushes the industry to focus heavily on increasing production, farm size, and production efficiency rather than activities that reduce environmental harm.¹⁸ Precision farming in the form of reduced nitrogen fertilizer use may have some positive effects but this has not been substantial so far, possibly because of the related costs of the technology, such as field mapping and the cost of GPS services and specialized equipment. In addition, time and resource allocations often work against separating fertilizer applications over the growing season and especially at times of greatest crop growth and uptake. Another contrary factor can be that even though higher amounts of fertilizer application is less efficient in terms of crop growth response and yield, when fertilizer prices are low relative to crop prices, there may still be incentive to apply more. This may be doubly problematic because the lower corn uptake efficiencies at higher application rates usually result in exponentially greater release of the potent GHG nitrous oxide from the soil.</p> <p>Large reductions in N, even where possible in some fields in some years, is not generalizable. As discussed above, this is difficult to accomplish and even when some reductions are achieved, they may have limited impact. It is also contradicted, as noted above, by recent data for such corn which showed increases rather than decreases in N fertilizer use.¹⁹ Small or moderate reductions in N would also be advantageous, but proportionally less than larger ones.</p> <p><i>15 Lark, T.J. et al. 2022. ibid</i></p> <p><i>16 Kraft, G.J and W. Stites. 2003. Nitrate impacts on groundwater from irrigated-vegetable systems in a humid north-central U.S. sand plain. Agro. Eco. Environ. 100: 63-74. doi:10.1016/S0167-8809(03)00172-5</i></p> <p><i>17 When water is available, nitrogen fertilizer is quickly converted to nitrate by soil microbes. Nitrate is very water soluble and passes through sandy soil, below corn roots, much more quickly than in less sandy soils.</i></p> <p><i>18 Roesch-McNally, G.E. et al. 2017. Ibid</i></p> <p><i>19 Lark et al 2022. ibid</i></p>	<p>The EIS analyzes the two alternative technologies ordered by the Commission. The Commission cannot select either of these alternative technologies as an action alternative; however, the information provided will inform the Commission’s decision to issue a pipeline routing permit.</p> <p>Minnesota Rule 4410.2300(H) indicates that an EIS shall include “a thorough but succinct discussion of potentially significant adverse or beneficial effects generated” by the proposed project and each major alternative with “[l]ess important material ... summarized, consolidated, or simply referenced.” Factors to be considered include “the impact and the relevance of the information to a reasoned choice among alternatives” and “the relationship between the cost of data and analyses and the relevance and importance of the information.” As a result, the draft EIS provided a range of agricultural practices and a range of implementation rates from zero percent to 75 percent.</p> <p>The commenter suggests that the EIS include a feasibility study concerning these agricultural practices. Such an analysis is not commensurate with the importance of the impact and the relevance of the information to a reasoned choice among pipeline routing alternatives. As such, the EIS provides a range of implementation rates from zero percent to 75 percent to account for the uncertainty associated with implementation. Section 6.2.3. has been revised to include endnotes referencing the suggested studies discussing the challenges and opportunities associated with implementing alternative agricultural practices. Further, the EIS summarizes challenges farmers might face implementing these practices in Section 6.2.3.4.</p>	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	<p>Additionally, large reductions in fertilizer use, such as proposed in the DEIS to reduce CI, could have negative consequences for soil carbon storage, touted as a means of reducing CI in corn grown for ethanol. Research has shown that increases in soil carbon sequestration, or conversely loss of soil carbon into the atmosphere as CO₂, is related to both carbon sources such as crop residues or composts and amounts of other vital nutrients and especially nitrogen as a limiting resource.^{20,21,22} The soil microbes that convert soil carbon to CO₂ or to more stable soil carbon, require sufficient amounts of all of these nutrients. The research has found that when too little nitrogen is available, soil microbes do not build soil carbon reserves even when otherwise sufficient carbon is available. Also, the recommended amounts of nitrogen fertilizer from agronomists that are typically used in determining N fertilizer application rates including possible reductions, take only the crop needs into account, but not the amounts needed by soil microbes responsible for soil carbon levels. So, if nitrogen fertilizer amounts are substantially reduced to just meet crop requirements, such as for LCFS, it may work against the stated goals of increasing soil carbon sequestration by supplying too little for soil microbes. As noted in the cited</p>	<p>The EIS analyzes the two alternative technologies ordered by the Commission. The Commission cannot select either of these alternative technologies as an action alternative; however, the information provided will inform the Commission’s decision to issue a pipeline routing permit.</p> <p>Minnesota Rule 4410.2300(H) indicates that an EIS shall include “a thorough but succinct discussion of potentially significant adverse or beneficial effects generated” by the proposed project and each major alternative with “[l]ess important material ... summarized, consolidated, or simply referenced.” Factors to be considered include “the impact and the relevance of the information to a reasoned choice among alternatives” and “the relationship between the cost of data and</p>	20244-205651-01

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			<p>references, more research is needed to understand these issues more fully, but certainly they show that claims about substantial reductions in N fertilizer in ethanol corn are at best premature.</p> <p>Much of the land for corn cultivation in north central and northwestern MN contains sandy soils that originated as glacial outwash. These soils hold less moisture and often require higher levels of fertilization because more fertilizer may be carried below the root zone by precipitation or irrigation compared to other soils.²³ This makes it more difficult to reduce the amount of fertilizer applied and means that more of it and more applied pesticides are likely to leach into groundwater, increasing harm. These conditions must be addressed in any adequate EIS.</p> <p><i>20 Chaplot, V. and P. Smith. 2023a. Cover crops do not increase soil organic carbon stocks as much as has been claimed: What is the way forward? Glob. Change. Biol. DOI: 10.1111/gcb.16917</i></p> <p><i>21 Chaplot, V. and P. Smith. 2023b. Cropping leads to loss of soil organic matter: How can we prevent it? Pedosphere, 33: 8–10. https://doi.org/10.1016/j.pedsph.2022.06.002</i></p> <p><i>22 Zeng, W. et al. 2023. Nitrogen deficiency accelerates soil organic carbon decomposition in temperate degraded grasslands. Sci. Total Environ. 881, 163424.</i></p> <p><i>23 Wright, J. 1990. Irrigation water management considerations for sandy soils in Minnesota. Minnesota Extension Service, University of Minnesota. Accessed April 7, 2024 https://conservancy.umn.edu/bitstream/handle/11299/207558/MN2500_AGFO_3875.pdf?sequence=1</i></p>	<p>analyses and the relevance and importance of the information." As a result, the draft EIS provided a range of agricultural practices and a range of implementation rates from zero percent to 75 percent.</p> <p>One of these alternative agricultural practices discussed in the EIS was reducing synthetic nitrogen-based fertilizers. The commenter suggests that the EIS include an independent study of nitrogen fertilizer application rates and the resultant impacts on GHG emissions, soil microbes, and soil carbon sequestration rates. Such an analysis is not commensurate with the importance of the impact and the relevance of the information to a reasoned choice among pipeline routing alternatives. Section 6.2.3. has been revised to include endnotes referencing the suggested studies discussing the challenges and opportunities associated with implementing alternative agricultural practices. Section 6.2.3.1 discusses the challenges associated with the different modelling software tools.</p>	
	Gurian-Sherman, Doug	2024-04-18	<p>Additionally, these soils are also more susceptible to drought and irrigation of them in MN typically relies on surficial (shallow) aquifers that are susceptible to being depleted and thereby harming area water supplies for both residents and biodiversity and reducing resupply of deeper aquifers. The increasing irrigation in Minnesota from multiple crops including corn has already harmed water access by residents and others in the region of the proposed pipeline, including indigenous communities.^{24,25} In addition to increased irrigation on sandy soils, climate change is also leading to increased irrigation across the upper Midwest generally. This also occurs on existing corn ethanol cropland, causing harm to residential water supplies and harming the environment. Recent research suggests that corn for ethanol may be a driver of trends since the late 1990s of increasing irrigation of corn in central Minnesota that could contribute to supplying the ethanol plant.²⁶</p> <p><i>24 Xie, Y. and T.J. Lark. 2021. Mapping annual irrigation from Landsat imagery and environmental variables across the conterminous United States. Remote Sensing Environ. https://doi.org/10.1016/j.rse.2021.112445</i></p> <p><i>25 Searsey, D. and D. Rojanasakul. 2023. Big farms and flawless fries are gulping water in the land of 10,000 lakes. New York Times. https://www.nytimes.com/interactive/2023/09/03/climate/minnesota-drought-potatoes.htm</i></p> <p><i>26 Xie and Lark. 2021. <i>ibid</i></i></p>	Thank you for your comment.	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	<p>In other corn growing areas in Minnesota which are also susceptible to infiltration of agricultural chemicals into aquifers, toxic insecticides sulfoxaflor and neonicotinoids have been found in groundwater originating from corn and soybean fields.²⁷ They are also widely and commonly found in surface waters from the agricultural origins.²⁸ These insecticides are applied to close to 100% of seed corn, with approximately 95% of it never entering the plant but rather ending up in soil and water.²⁹ They are also very water soluble and persistent, which facilitates them entering groundwater and surface water compared to many other pesticides. Their extreme toxicity to beneficial organisms including pollinating bees, makes them especially harmful at very low concentrations. They are also a substantial threat to many other organisms from aquatic invertebrates to birds, including threatened and endangered species, especially because they have become nearly ubiquitous in recent years, more so than previous insecticides used on corn. ^{30,31,32} Expansion of corn for ethanol due to success of the proposed pipeline is likely to exacerbate these harms.</p> <p><i>27 Thompson, D.A. et al. 2021. Prevalence of neonicotinoids and sulfoxaflor in alluvial aquifers in a high corn and soybean producing region of the Midwestern United States. Sci. Total. Environ. https://doi.org/10.1016/j.scitotenv.2021.146762</i></p> <p><i>28 Thompson et al. 2021. <i>Ibid</i>.</i></p> <p><i>29 Gurian-Sherman, D. 2017. Alternatives to neonicotinoid-coated corn seed: Agroecological methods are better for farmers and the environment. Center for Food Safety, Washington, DC. Available at: https://www.centerforfoodsafety.org/files/alternatives-to-neonics_v9_23186.pdf</i></p> <p><i>30 US EPA. 2023. Imidacloprid, Thiamethoxam and Clothianidin: Draft Predictions of Likelihood of Jeopardy and Adverse Modification for Federally Listed Endangered and Threatened Species and Designated Critical Habitats. At: https://www.epa.gov/system/files/documents/2023-05/ESA-JAM-Analysis.pdf</i></p> <p><i>31 Douglas, M. et al. 2020. County-level analysis reveals a rapidly shifting landscape of insecticide hazard to honey bees (Apis</i></p>	Impacts of pesticide use to support ethanol production are discussed in Section 7.2.2.2.	20244-205651-01

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			<i>mellifera</i>) on US farmland. <i>Sci. Reports</i> . https://doi.org/10.1038/s41598-019-57225-w 32 DiBartolomeis, M. et al. 2019. An assessment of acute insecticide toxicity loading (AITL) of chemical pesticides used on agricultural land in the United States. <i>PLoS ONE</i> 14(8): e0220029. https://doi.org/10.1371/journal.pone.0220029		
	Gurian-Sherman, Doug	2024-04-18	<p>Other agricultural conservation practices have been suggested as possibly being used with ethanol corn. One such practice is no-till or reduced tillage (or conservation tillage). Reduced tillage is among the most accepted conservation practices for industrial agriculture. This is in part because it fits relatively well with the overall trend toward reduced labor requirements for industrial corn production because it relies heavily on herbicide use rather than more labor-intensive tillage to control weeds. This is especially true for genetically engineered herbicide-resistant corn of the past three decades because the herbicides can be applied directly to the crop without harming it (although this use is threatened by herbicide resistant weeds).</p> <p>Soils remain cooler without tillage which can delay germination and seedling emergence and this can be a disincentive in northern climates with already short growing seasons. But in part to address the perceived greater vulnerability to pests due to delayed seedling emergence, virtually all corn seed is now pre-treated by pesticide/seed companies with fungicides and neonicotinoid insecticides.³³</p> <p>Both patented genetically engineered seed and pesticide seed treatments, which have occurred over the past 20-30 years, are part of the trends toward biologically and ecologically simplified and environmentally harmful agriculture which is increasingly more capital and less labor intensive. Corn seed today is several times more expensive to farmers than it was a generation ago.</p> <p>All of these trends lock-in today's huge corn farms into these practices through loans and the sunk costs of machinery, farm structures, costly chemical and seed technologies, and corporate research agendas which lock-out more diversified and environmentally sound practices.</p> <p>34,35,36 This makes it increasingly difficult to employ most ecologically sound farming practices, which by definition rely on increased biological complexity and diversity like rotating three or four different crops and growing cover crops rather than the common corn monoculture or simple corn-soybean rotation that is overwhelming common for corn in the Midwest. Greater crop diversity and other ecological practices are somewhat more labor intensive and require more adaptable, rather than increasingly highly specialized, machinery.</p> <p>This biological complexity that is antithetical to today's industrial corn ethanol farms is necessary to achieve the best environmental and climate outcomes. For example, long crop rotations, and including cover crops, can reduce the need for pesticides and N fertilizers by over 90% and have multiple benefits for the climate.^{37,38}</p> <p>33 Gurian-Sherman, D. 2017. Ibid.</p> <p>34 Roesch-McNally, G.E. et al. 2017. <i>ibid</i></p> <p>35 Vanloqueren, G and P.V. Baret. 2009. How agricultural research systems shape a technological regime that develops genetic engineering but locks out agroecological innovations. <i>Res. Policy</i>. :10.1016/j.respol.2009.02.008</p> <p>36 Clapp, J. 2021. The problem with growing corporate concentration and power in the global food system. <i>Nature Food</i>. https://doi.org/10.1038/s43016-021-00297-7</p> <p>37 Davis, A.S. et al. 2012. Increasing Cropping System Diversity Balances Productivity, Profitability and Environmental Health. <i>PLoS ONE</i> https://doi.org/10.1371/journal.pone.0047149</p> <p>38 Hunt, N.D. et al. 2020. Fossil Energy Use, Climate Change Impacts, and Air Quality-Related Human Health Damages of Conventional and Diversified Cropping Systems in Iowa, USA. <i>Environ. Sci. Technol.</i> 54:11002–11014</p>	<p>The EIS analyzes the two alternative technologies ordered by the Commission. The Commission cannot select either of these alternative technologies as an action alternative; however, the information provided will inform the Commission's decision to issue a pipeline routing permit. Minnesota Rule 4410.2300(H) indicates that an EIS shall include "a thorough but succinct discussion of potentially significant adverse or beneficial effects generated" by the proposed project and each major alternative with "[l]ess important material ... summarized, consolidated, or simply referenced." Factors to be considered include "the impact and the relevance of the information to a reasoned choice among alternatives" and "the relationship between the cost of data and analyses and the relevance and importance of the information." As a result, the draft EIS provided a range of agricultural practices and a range of implementation rates from zero percent to 75 percent.</p> <p>The commenter suggests that the EIS include a feasibility study concerning these agricultural practices. Such an analysis is not commensurate with the importance of the impact and the relevance of the information to a reasoned choice among pipeline routing alternatives. As such, the EIS provides a range of implementation rates from zero percent to 75 percent to account for the uncertainty associated with implementation. Section 6.2.3. has been revised to include endnotes referencing the suggested studies discussing the challenges and opportunities associated with implementing alternative agricultural practices. Further, the EIS summarizes challenges farmers might face implementing these practices in Section 6.2.3.4.</p>	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	<p>Instead, the only farming practices that are likely to be adopted widely by corn ethanol farmers without substantial subsidies and other policies as incentives are those that will fit well with the current efficiency and production paradigms. Cover crops, which are important for the environment and soil quality generally fit much less well into this paradigm than conservation tillage, which can include no-till. This is because of the cost of the seed and the additional labor for sowing it, as well as timing issues in northern regions and the lower cover crop biomass that often results, and perceptions concerning reduced yield of corn. This is supported by the fact that despite the USDA advocating for cover crop use over the past 15 years or so they were grown on only about 5% of row crop acres in the U.S. in 2012.³⁹ And while there have been some small increases in cover crop acreage in the Midwest, there has been less in MN compared to more southerly states.⁴⁰ There was no substantial change in cover crop acreage between 2012 and 2017, with most parts of the state using cover crops on less than 3% of acres, and few areas with more than 6% coverage. Research has shown some yield losses in corn associated with cover crop cultivation (other research has refuted such yield loss). And although this may vary</p>	<p>As stated in the EIS, an "accessible and reproducible evaluation of alternative agricultural practices applicable to west central Minnesota was necessary." The COMET-Farm tool was chosen because it was produced by a government agency (USDA) and is publicly available at no cost, allowing for duplication of results by interested persons. Section 6.2.3. has been revised to include endnotes referencing the suggested studies discussing the challenges and opportunities associated with implementing alternative agricultural practices. Section 6.2.3.1 discusses the challenges associated with the different modelling software tools.</p>	20244-205651-01

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			<p>considerably with the types of cover crop and management practices, it has been difficult to persuade farmers to adopt them. In Minnesota, the short growing season makes it more difficult to establish cover crops. If the pipeline alone would reduce the accepted CI below what is needed to receive credits from LCFS programs such as California’s, it is unclear that there would be sufficient additional incentive for many corn ethanol farmers to adopt cover crops. Certainly, this cannot be accepted without much more substantial evidentiary support.</p> <p>The single practice that is relatively amenable to corn ethanol growers, conservation tillage or to a much lesser extent no-till, is not likely to increase soil carbon sequestration, which would otherwise reduce the CI of corn ethanol. This is contrary to the claims of many supporters of corn ethanol. The outputs from agriculture climate models such as the COMET model provided in the DEIS Appendix M show substantial removal of CO₂ and reduction of the CI associated with management practices of no-till and cover crops (clover), presumably through soil carbon sequestration (Appendix M is not explicit about this). But as explained below, recent science contradicts such soil carbon sequestration.</p> <p>39 Dunn et al. 2016. <i>Perceptions and use of cover crops among early adopters: Findings from a national survey. J. Soil Water Conserv.</i> 79(1): 29-40.</p> <p>40 Deines, J.M. et al. 2022. <i>Recent cover crop adoption is associated with small maize and soybean yield losses in the United States. Glob Change Biol.</i> 29:794–807. DOI: 10.1111/gcb.16489</p>		
	Gurian-Sherman, Doug	2024-04-18	<p>Many research papers, beginning with Baker (U of MN) in 2007, challenged the then prevalent idea that no-till increased carbon sequestration in row crops.⁴¹ Baker found, in a review of many previous research papers, that the apparent increases in soil carbon attributed to no-till was likely an artifact of the measurement methods used in conducting most research. Due to cost and time constraints and standardization, most research sampled soil only to depths between about 5 and 30 centimeters (cm). However, for annual row crops most of the crop residues, roots and root exudates that contribute to soil carbon storage occur close to the soil surface, specifically in the top 30 cm or so. Therefore, most carbon was concentrated in these upper levels in no-till, while deeper soil horizons where no-till contributed little were typically not measured.</p> <p>High measured carbon amounts from nearer the surface for no-till were improperly assumed to apply to the entire depth of the soil profile. When Baker analyzed the minority of research papers that included deeper soils levels, he found that there was no statistically supportable evidence of higher soil carbon sequestration for no-till. Subsequently, many research papers, even by respected soil scientists who previously supported the hypothesis of increasing soil carbon sequestration for no-till, confirmed Baker’s findings by around the mid-2010s that no-till cannot be relied upon to increase soil carbon sequestration. ^{42,43,44}</p> <p>It may be that government entities anxious to find climate solutions, especially those that are most readily acceptable to large industrial agricultural interests that dominate Midwestern farming, were overly eager to accept no-till as a climate solution, and less inclined to reconsider it.</p> <p>A second problem with no-till is that some weeds, especially aggressive annuals like several amaranth species, have been developing resistance to the most effective herbicides due to their overuse on GMO corn and soybeans which are the large majority of these crops in the U.S. Therefore, it is harder to forego tillage indefinitely and many farmers that practice no-till or conservation tillage revert to heavier tillage periodically, which can significantly reverse many of the benefits of no-till (such as reducing soil erosion).</p> <p>41 Baker, J.M. et al. 2007. <i>Tillage and soil carbon sequestration—What do we really know? Agricul. Eco. Environ.</i> 118:1–5</p> <p>42 Blanco-Canqui, H and R. Lal. 2008. <i>No-Tillage and Soil-Profile Carbon Sequestration: An On-Farm Assessment. Soil Sci. Soc. Am. J.</i> 72: 693-701</p> <p>43 Powlson, D.S. et al. 2014. <i>Limited potential of no-till agriculture for climate change mitigation. Nature Climate Change.</i> DOI: 10.1038/NCLIMATE2292</p> <p>44 Ogle, S.M. et al. 2019. <i>Climate and Soil Characteristics Determine Where No-Till Management Can Store Carbon in Soils and Mitigate Greenhouse Gas Emissions. Sci. Rpts.</i> https://doi.org/10.1038/s41598-019-47861-7</p>	Section 6.2.3. has been revised to include endnotes referencing the suggested studies discussing the challenges and opportunities associated with implementing alternative agricultural practices.	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	<p>Other practices cited as increasing soil carbon sequestration are unlikely to be widely adopted by industrial corn farmers. Cover crops are one such practice that is widely agreed to have multiple environmental benefits. But as with no-till, recent analysis has called into question the ability of cover crops to reliably increase soil carbon sequestration.⁴⁵ This analysis notes several of the same problems as were found previously with no-till research including shallow soil assays and not accounting for differences in soil density, as well poor experimental design in many cases. Of the few studies reviewed that were adequate, there was no trend toward increased soil carbon sequestration. It should be noted that there are many different cover crop species and how they are grown and managed may also</p>	Section 6.2.3. has been revised to include endnotes referencing the suggested studies discussing the challenges and opportunities associated with implementing alternative agricultural practices.	20244-205651-01

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			<p>affect sequestration. But as of the present, the claim's that adoption of cover crops will increase soil carbon sequestration is not scientifically supportable.</p> <p>It should also be noted that soil carbon sequestration aside, cover crops provide several other important benefits such as reducing soil erosion, improving soil quality, increasing water infiltration, providing habitat for beneficial organisms and so on.</p> <p>But as noted above, cover crop seed is an additional expense, and typically cover crops are not harvested and sold in industrial cropping systems. They may be grazed in more diverse farming systems and the value of grazing livestock thereby increased, while the livestock supply manure to the soil. But this kind of diversity is not generally compatible with industrial agriculture specialization such as corn for ethanol. Some cover crops may be harvested, but this may compromise their possible contribution to soil carbon. All these considerations discourage the use of cover crops by industrial corn producers. And in fact, as noted above, the percentage of corn acres using cover crops in MN is tiny. It certainly should not be accepted that they will be more widely adopted given the history of their use unless and until it can be shown in actual reliable and appropriate research.</p> <p><i>45 Chaplot, V. and P. Smith. 2023a. Cover crops do not increase soil organic carbon stocks as much as has been claimed: What is the way forward? Glob. Change Biol. DOI: 10.1111/gcb.16917</i></p>		
	Gurian-Sherman, Doug	2024-04-18	<p>Finally, estimations of the CI for corn grown for the ethanol plant must be evaluated carefully. For example, where the permit application suggests that the CI for this corn may be lower than national averages, the details of how this is determined must be carefully addressed because as noted above, some of these methods use older research and highly contested or refuted conclusions. In addition to examples discussed above, another way that models may underestimate CI involves indirect nitrous oxide emissions. Indirect emissions are those that occur from nitrogen originating from farms but that has moved beyond them, such as from streams that acquire nitrogen from field runoff or leaching. Research in Minnesota determined that values commonly used in agricultural climate models may underestimate nitrous oxide emissions by 40% overall in the corn belt, and indirect emission from stream receiving nitrogen from crop fields by 3 – 9-fold.⁴⁶ These concerns suggest that the current CI value of the corn supplied to the ethanol plant may be considerably higher than claimed.</p> <p><i>46 Turner, P.A. et al. 2015. Indirect nitrous oxide emissions from streams within the U.S. corn belt scale with stream order. PNAS. 112(32):9839-9843 www.pnas.org/cgi/doi/10.1073/pnas.1503598112</i></p>	<p>The CI Score metric used in the draft EIS reflects the net emissions of the full life cycle analysis according to the United States Department of Energy Argonne National Laboratory's GREET model, and results are current as of the release date of the draft EIS. Argonne has developed this full fuel-cycle model to estimate energy use and emissions from transportation fuel/vehicle technology systems. The model includes detailed information on corn farming and chemical manufacturing. The model and its documents are posted at http://greet.anl.gov. Argonne's annual releases of the latest R&D GREET are comprehensive in order to inform the life cycle analysis technical community and elicit stakeholder feedback. Not all pathways and data in R&D GREET are appropriate for use in circumstances where a high level of quantitative certainty or precision is required. Inclusion of a pathway or module in R&D GREET does not necessarily represent U.S. Government concurrence for any specific use, but instead is intended to gather technical feedback and advance the science of life-cycle analysis. The current (2023) estimated Argonne GREET CI scores of the Otter Tail facilities align with the most up-to-date studies analyzing the CI of corn ethanol. Section 6.2.3. has been revised to include endnotes referencing the suggested studies discussing the challenges and opportunities associated with implementing alternative agricultural practices. Section 6.2.3.1 discusses some modeling platforms available to estimate various GHG emissions associated with agricultural systems. One of the alternative agricultural practices discussed in the EIS included reducing synthetic nitrogen-based fertilizers. Such an analysis is not commensurate with the importance of the impact and the relevance of the information to a reasoned choice among pipeline routing alternatives, as the discussion in Chapter 6 includes nitrogen emissions.</p>	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	<p>To summarize, the general trends involved with growing corn for ethanol production favors large farms with simplified agroecosystems that generally are antithetical to practices that increase soil carbon sequestration or that are better for the environment. There is some opportunity to use precision agricultural methods to reduce N fertilizer inputs, which could reduce nitrous oxide emissions to some extent, but large reductions are unlikely and not credible without adequate research support. And as noted, large reductions may result in lower soil carbon sequestration or even further reduction of soil carbon stores. I.e. increased release of CO₂ from soil may occur which would increase CI unless counterbalanced by reduced nitrous oxide. This balance is currently not known. The most likely practice to be adopted by ethanol corn farmers is no-till or conservation tillage, but those practices do not reliably increase soil</p>	<p>Thank you for your comment.</p>	20244-205651-01

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			<p>carbon sequestration and rely on heavy use of harmful herbicides in industrial agriculture. Additionally, reversion to tillage reverses several of the benefits, which is widely recognized as the permanence problem for soil carbon sequestration.</p> <p>Furthermore, recent changes in industrially farmed corn in the region show that by several measures, corn farming is becoming more harmful to the environment. These include the almost ubiquitous uses of neonicotinoid insecticide seed treatments where previously only about 30% of corn acres were treated with insecticides.⁴⁷ Similarly, harmful irrigation has been increasing in the region in recent years. This suggests that in some ways, and perhaps overall, the impact on the environment of ethanol corn, even on already cultivated acres, may become more harmful rather than less.</p> <p><i>47 Gurian-Sherman, D. 2017. Ibid. The volume of neonicotinoids used to treat seeds is lower than the previously sprayed or soil applied insecticides. However, in terms of the extent of harm to the environment, area treated and intrinsic toxicity are more important, and neonicotinoids are likely more harmful overall than previous corn insecticide use for those reasons.</i></p>		
	Gurian-Sherman, Doug	2024-04-18	<p>Socioeconomic Impact</p> <p>The trend in the production of corn and similar industrial crops is for larger and larger farms, where technology has been increasingly substituted for labor. To the extent that this supplants dangerous or debilitating work it is beneficial provided these benefits are equitably distributed. However, technology has mostly gone well beyond what is needed to reduce undesirable forms of labor in row crops. These benefits can be achieved without the massive concentration and industrialization of corn farming that has continued for many decades, especially since the mid-20th century.</p> <p>Mostly, the increasing dependence on external purchased and expensive inputs like fertilizers, pesticides, patented seed, and larger and more specialized machinery has supplanted much of the previous local income for labor that would be circulated to provide a local economic multiplier effect. Instead, much of the profit from farming now goes to distant parts of the supply chain of those inputs. This technological substitution, driven by small margins in corn profits due to frequent overproduction and extreme concentration in grain aggregator corporations and a technology treadmill that pushes farmers to adopt new expensive technologies, has contributed to the hollowing out of local economies. Now most of the local economic value in many rural areas no longer comes from agriculture. The combined effects of these trends have been found repeatedly through rural sociological research to result in socioeconomic harm for rural areas dominated by industrial agriculture such as corn ethanol.⁴⁸ To the extent that this pipeline is successful and contributes to this trend, the greater the likely harm. Without evaluating these well documented effects, the claim of probable socioeconomic benefit is superficial and not adequately supported.</p> <p><i>48 Lobao, L. and C.W. Stofferahn. 2007. The community effects of industrialized farming: Social science research and challenges to corporate farming laws. Ag. Human Values. DOI 10.1007/s10460-007-9107-8</i></p>	Thank you for your comment. Text has been added to Section 5.5.1.2 acknowledging that if the project were to contribute to the current trend of larger, more technologically advanced farms, the local farm workforce could be adversely impacted.	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	<p>Summary and Conclusions</p> <p>The DEIS fails for several reasons to accurately evaluate the environmental impacts of the proposed carbon pipeline, and especially its climate and broader environmental impacts related to the cultivation of corn.</p> <p>It likely substantially underestimates the reasonable possibility that land use for corn, or indirectly other row crops like soybeans influenced by ethanol corn, will continue to expand further into nearby uncultivated land, releasing substantial amounts of CO₂ into the atmosphere for many years due to success of the pipeline. It would thereby result in much higher CI of the corn ethanol plant (or other plants).</p>	Section 6.1.3 has been revised to discuss the scientific debate about emissions associated with land use change between Lark et. al. and GREET model authors.	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	There is also no assurance that CO ₂ from the pipeline would not be used for the extraction of fossil fuels that would not otherwise be produced, as is a large percentage of currently captured CO ₂ emissions. This would be in direct contradiction to the climate goals of the project and the state of Minnesota.	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20244-205651-01
	Gurian-Sherman, Doug	2024-04-18	It is also unlikely that significantly more sustainable practices will be adopted by corn ethanol farmers and that those practices would reduce CI. As an aside, it would make much more sense for the State of Minnesota to shift such subsidies from corn ethanol to renewable electricity production (mainly wind, solar, and storage) and distribution which have much greater positive climate impacts even under the most favorable scenarios for corn ethanol. It would also make much more sense to substantially increase subsidies for moving farming toward more agroecologically diverse systems that have great environmental benefits, and to legislate policies that prevent cultivation on previously uncultivated land. All of these would have actual and substantial benefits for the environment and climate. To the extent that subsidies and policies for corn ethanol detract from those better investments, they can be rightfully labeled as detrimental.	An alternative that does not include ethanol production was not studied in the EIS because it would not meet the purpose of the project.	20244-205651-01

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			<p>The permit application appears to rely on outdated values for the climate benefits of practices like no-till and cover crops. This is not necessarily surprising because, as noted by Chaplot and Smith (2023a), there has been premature acceptance of these practices as beneficial for soil carbon sequestration when subsequent more careful analysis has shown that they are likely in error. This premature acceptance has shown up in government policy already, perhaps for political reasons, as noted by these authors, in the U.S. Build Back Better (infrastructure) legislation and in national legislation in France.</p> <p>Large reductions of N fertilizer use to further reduce CI are also highly questionable as described above.</p> <p>Similarly, in terms of improving the environment more generally, the adoption of practices that are most likely to occur with corn for ethanol, such as some reduction in fertilizer use or adoption of conservation tillage, will have only minimal environmental benefit overall for issues of climate, water quality, and especially biodiversity. They would be overwhelmed by the negative consequences of conversion of currently uncultivated land to corn ethanol or related production. There are also recent trends such as increasing irrigation of corn in the region, including on existing corn acres, that have negative environmental and social consequences that have not been properly considered so far.</p> <p>In terms of the socioeconomic impact, temporary jobs and a small number of permanent jobs that may be gained building the pipeline and small increases in the tax base do not consider broader socioeconomic impacts. Well-documented historic records of negative socioeconomic impacts of increasing agricultural industrialization on rural economies and communities, including harm to native women, must be evaluated and part of the EIS.</p> <p>In summary, the permit must be rejected as such and remanded to the agency with instructions to do a proper EIS. In addition, the best course for the climate, the environment and the community would be a “no action” option.</p> <p>Chaplot, V. and P. Smith. 2023a. Cover crops do not increase soil organic carbon stocks as much as has been claimed: What is the way forward? Glob. Change. Biol. DOI: 10.1111/gcb.16917</p>		
	Gustafson, Marcia	2024-02-23	<p>My name is Marcia Gustafson, and I live in Mankato. I am deeply concerned about the DEIS for the Otter Tail Wilkin CO₂ Pipeline Project because it does not adequately take into account that water is essential to life. The proposed route for Summit’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. Such a route has different potential impacts for each kind of water body involved. The DEIS does not fully address these various impacts, or in the case of wetlands has contradictory information on how many acres could be affected (see Tables 5-40 on p. 5-58; 5-4 on p. 5-24; and 5-52 on p. 143). We cannot be cavalier about our aquifers, wetlands, and rivers that can be damaged during construction or by breaches in the pipeline itself and can cause irreparable harm. Unfortunately, Minnesota has an example of this kind of damage with the Enbridge Line 3/93 where breaches have and are occurring, and Enbridge is not able to properly undo the damage, which is putting drinking water at risk in some communities. Today, February 23, 2024, I heard Cathy Wurzer on MPR interviewing former Governor Arne Carlson, who is 89 years old and sounds sharp as a tack. Near the end of the interview, Cathy asked him what a current concern of his was, and he responded with Minnesota waters. He thought that our waters are in danger. We have already polluted or damaged too many of our water resources and are not taking appropriate steps to safeguard those remaining into the future. So, I will end where I began by repeating "water is essential to life." This DEIS does not provide an adequate account of project impacts on water resources.</p>	<p>Thank you for your comment. Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover, and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.</p>	20243-204403-01
	Henriksen, Dan	2024-02-14	<p>To whom it may concern, I, Dan Henriksen own and farm in Redwood County, Mn and I have great concerns about the Ottertail to Wilkin branch of SCS CO₂ pipeline that in the future is proposed to cross our farms in Redwood County. The water needed for carbon capture is a huge concern for me as all living organisms need water to survive! Wells are drying up and rivers and streams are low. We cannot afford to give up the water needed for this private, for-profit company, to sequester such a minuscule amount of CO₂, that if all activities and processes needed to sequester are factored in, that more CO₂ will be emitted than stored!</p>	<p>Additional detail has been added to Section 5.7.8.2 to address the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following DNR request, when necessary. This information has also been added to Section 5.7.8.2.</p>	20243-204403-01
	Henriksen, Dan	2024-02-14	<p>If SCS is allowed to proceed with this project, thousands of drainage tile lines and tile systems will be crossed. Appendix E, 6.23 title states tile repair after pipeline installation. Nowhere in the paragraphs do I see anything about tile repair, only future tile installations. It also requires a "qualified tile technician" to submit a plan for future tile. Many tile systems are installed by farmers with their own equipment. Who would be a qualified tile technician in that case, and who would pay the extra costs incurred to get Summit the plans needed by this clause? In appendix E, paragraph 1, it states that any mitigation plans spelled out in the easement would take</p>	<p>Section 2.4.6 states that any drain tiles damaged during pipeline construction would be repaired before backfilling the trench. Section 6.7 of the applicant's APP (Appendix E) specifies the procedures and timelines for repair of drain tiles disturbed during construction. The APP notes that tile disturbed or damaged by pipeline construction would be</p>	20243-204403-01

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			precedence over the EIS. The easement given to me to consider for signing states many times states that Summit will repair to a REASONABLE condition, be it tile repair or bringing the land back to farmable condition. What does reasonable mean?? In appendix E,6.3 it states that in frozen conditions a ripper can be used to scarify the topsoil to aid in removal. How would the operator in this case be able to determine topsoil depth? If he goes too deep, mixing top and subsoil will occur and cause even more permanent damage to the land!	<p>repaired to its original or better condition, and that permanent repairs would be completed within 21 days after the pipeline is installed in accordance with the applicant's Minnesota ECP (Appendix D). Section 5.5.1.3 has been revised to include a reference to this mitigation measure. Agreements negotiated between the applicant and the landowner are outside the scope of this EIS.</p> <p>Regarding topsoil segregation under frozen conditions, as stated in Section 2 of the APP, agricultural inspectors would provide construction personnel with field training on specific topics (e.g., protocols for topsoil stripping), observe construction activities on agricultural land on a continual basis, and be responsible for verifying compliance with the APP.</p>	
	Henriksen, Dan	2024-02-14	Appendix F 2.8.2 states that in frost conditions that Summit has the right to modify the plans. What does this mean? Also, several parts of the DEIS it states that a County Inspector will oversee the project. It appears that in the DEIS the Ct will be an employee of Summit. It seems that fair and impartial judgement could become skewed easily with this arrangement. I have many other concerns, but too numerous to mention in this writing.	<p>Section 2.8.2 of the Winter Construction Plan states, “Trench topsoil will be segregated as practicable but modified dependent on depth of frost, thickness of topsoil, and the trenching method used.” Prior to this statement, the Winter Construction Plan states that “Where frozen blocks have been cut, excavation equipment (e.g., a backhoe or excavator) will be used to remove the large frozen blocks and to place them adjacent to the trench.” The sentence in question indicates that, depending on conditions, the ability to segregate topsoil would require flexibility in methodology. Segregation of topsoil in winter with a shallow frost depth would occur differently than with a deep freeze in more saturated soil conditions where soil may need to be cut in blocks. Workers may still be able to segregate soils with little to no frost layer in separate piles by topsoil and subsoil, but segregation may not occur in the same manner when soil must be stored in blocks.</p> <p>Per the sample routing permit, the Agricultural Monitor and County Inspector would be designated by the County, if appointed.</p>	20243-204403-01
	Henriksen, Dan	2024-02-14	I ask that the Public Utilities Commission and Dept of Commerce take these issues seriously and that the Ottertail to Wilkin CO ₂ Pipeline Project in Ottertail to Wilkin counties (Docket Number: 22-242) is a factual and thorough account of the project impacts. Minnesotans need a robust review, and neither Minnesota's state agencies or Summit has any experience building, overseeing or operating CO ₂ pipelines or carbon capture projects. We need a careful analysis and credible assessment of how this project could affect our homes, lands, waters and communities.	Thank you for your comment.	20243-204403-01
	Henriksen, Jolene	2024-02-15	To whom it may concern, I am Jolene Henriksen and my family owns land and farms in Redwood County Mn. We are greatly concerned about the Ottertail to Wilkin DEIS as our farms are in the pathway of the southern portion of the Summit pipeline. Dangers to water and waterbodies: The proposed route for Summit’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota’s precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4.	20243-204403-01
	Henriksen, Jolene	2024-02-15	Water use: Much of southern Minnesota is suffering from the consequences of drought and over-commitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit “anticipates” an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impacts of those appropriations on water resources. Why should	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals	20243-204403-01

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			Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent with its true demands for water resources?	following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	
	Henriksen, Jolene	2024-02-15	Aquifer Damage: Summit’s preferred route, RA-South, crosses a surficial beach ridge aquifer in Otter Tail County. The DNR has said that the area is “prone to significant groundwater discharge,” and the applicant’s initial groundwater investigation confirmed that “artesian groundwater conditions are present” along that beach ridge system. In early feedback on the DEIS, the DNR noted that “Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer and that “breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.” This, along with our state’s first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers more seriously.	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	20243-204403-01
	Henriksen, Jolene	2024-02-15	HDD Drilling the DEIS also states that “drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet [drinking water quality certification standards] would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA.” The DEIS does not discuss the risks of applying drilling mud, especially with additives not approved by MDH, to the land. The DEIS says that “drilling fluids and additives for the HDD would be non-toxic to the aquatic environment and humans,” however, even supposedly “non-toxic” drilling fluid is chemical waste that has been found to be harmful to plant and animal species. Summit’s preferred route and alternative route, RA-Hybrid, would both cross three rivers (Pelican River, Otter Tail River, and Bois de Sioux River) via the HDD mention.	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	20243-204403-01
	Henriksen, Jolene	2024-02-15	Wetlands: In Table 5-40 on p. 5-98 of the DEIS it states that “the loss of wetlands would be less than 0.01 acre.” However, Table 5-4 on p. 5-24 says that for Summit’s preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. And Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres. Which is it??	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover, and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.	20243-204403-01
	Henriksen, Jolene	2024-02-15	Impacts of a Leak or Rupture on Animals: According to the DEIS, CO ₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would be unlikely to impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence. Though the DEIS does note some harm may come to animals in the event of a rupture, it relies heavily on the assumption that animals will simply move out of the rupture area to avoid the release. The reason for this assumption is not provided and is contradicted by information in the rupture report in Appendix G which suggests the impacts of a rupture would be nearly immediate. Critical Habitats: Summit’s preferred route would cross over or near several waterfowl protection areas, including the Orwell 9 Unit and Ridgeway WPA in Otter Tail County. The DEIS notes that some of these areas will be avoided during construction but fails to consider the impacts to these features in the event of a leak or rupture. The DEIS discounts the direct and long-term impacts of pipeline construction on land and soil integrity in spite of the significant evidence of likely harm.	CO ₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to local vegetation or wildlife. Potential impacts on wildlife from a CO ₂ rupture could result first from the physical force of a rupture and secondarily from localized short-term high levels of CO ₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO ₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most mobile wildlife species	20243-204403-01

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				would follow their natural instincts and attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO ₂ , which could be toxic for species unable to leave the area of the release.	
	Henriksen, Jolene	2024-02-15	Land degradation: This project is going to cut through roads, ditches, tile lines, and prime farmland. There is a growing body of anecdotal evidence and peer-reviewed research that shows that pipeline projects in the Midwest have caused yield reduction and damage to land years after project completion and “restoration”. The DEIS does acknowledge that the reduced productivity from construction “typically would extend for 2 to 3 years, but could take up to 5 years, depending on impacts on soils from the construction disturbance,” but fails to identify any measures the applicant should take to avoid these damages or repair them. Prime Farmland and Farmland of Statewide Importance: All three routes would impact both Prime Farmland and Farmland of Statewide Importance, but Summit’s preferred route would impact significantly more acres of both across both the construction footprint and the operation footprint of the proposed project than the proposed alternatives.	Measures that the applicant would take to minimize impacts on soils and agricultural land are described in the Minnesota ECP in Appendix D and Minnesota APP in Appendix E. Text in Chapter 5 has been revised to indicate that impacts on crop production would be long term due to changes in soils from construction disturbance.	20243-204403-01
	Henriksen, Jolene	2024-02-15	Impact of Leaks or Ruptures on Vegetation: The DEIS concludes a leak of CO ₂ “would slow plant growth” and that the rupture of the pipeline would instantly freeze the surrounding soil and “instantly kill all herbaceous ground vegetation” but provides no measures to avoid these impacts, nor does it discuss the long-term impacts of such damage on the soils and vegetation. Instead, the DEIS states without proof that “local soil microbes, mycorrhizae, and soil animals such as worms, arachnids, and insects...would re-colonize after the area is restored.”	Chapter 2 discusses engineering and design elements incorporated into the project to reduce the likelihood of pipeline leaks or failure. Chapter 8 discusses potential impacts on vegetation and wildlife from slow leaks of CO ₂ and from a larger rupture. In the event of a pipeline rupture and large release, impacts on vegetation and soils would be highly localized to the area above the rupture. Re-colonization of the impact area would result from ecological succession processes that are well documented in areas that have experienced disturbance events of a similar source, duration, and effect on other projects of a similar scale.	20243-204403-01
	Henriksen, Jolene	2024-02-15	Soil Compaction: The DEIS acknowledges that “soil compaction would be unavoidable in unpaved areas of equipment and vehicle operation” and that even if soils were DE compacted, “some compacted soils could remain.” Soil compaction can have serious consequences in terms of water infiltration and drainage and should not be dismissed as an insignificant impact.	The commenter is referring to Section 9.1.1, which discuss unavoidable impacts during construction. Section 5.7 discusses soil compaction in greater detail. Section 5.7.6 has been revised to indicate that, while most impacts on soils during construction would be minimal and temporary, some impacts could be longer term.	20243-204403-01
	Henriksen, Jolene	2024-02-15	Geologic Hazards: The DEIS does not address whether the applicant has conducted geologic hazard surveys pursuant to the PHMSA Bulletin here: https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2022-06/2022-11791.pdf Risks to water and natural resources	Geologic hazards are addressed in Sections 5.7.3 and 5.7.6. Text regarding geohazard assessments that would comply with the recommendations in PHMSA Advisory Bulletin 2022-01 has been added to both sections.	20243-204403-01
	Henriksen, Samuel	2024-02-15	To whom it may concern, I am Samuel Henriksen and am a landowner and farm with my family in Redwood County MN. I am concerned with the Summit pipeline as the southern route passes through our land. The DEIS consistently fails to properly account for the real CO ₂ emission and climate impacts of the project. Lifetime of Project: The applicant states that the anticipated lifetime of this project is 25 years. This means at the end of its life, the project could stop capturing the CO ₂ from the ethanol plant. Unless the ethanol plant will also cease operations at that point in time, it will continue to emit CO ₂ unabated into the future.	Section 2.7 describes project decommissioning. If the ethanol plant continues to operate beyond the life of the proposed project, its CO ₂ emissions would not be captured.	20243-204403-01
	Henriksen, Samuel	2024-02-15	100% CO ₂ Capture Rate?: Summit states that the capture facility “is designed to capture 100% of the CO ₂ produced by the ethanol plant.” There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been	20243-204403-01

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				revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent.	
	Henriksen, Samuel	2024-02-15	Additionally, the DEIS should emphasize that any CO ₂ capture is solely associated with emissions from the ethanol fermentation process and provides zero reductions on the significant emissions from the facility's electricity use	Section 2.1 has been revised to clarify that the captured CO ₂ is produced by the ethanol plant as part of its fermentation process, the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.	20243-204403-01
	Henriksen, Samuel	2024-02-15	Added CO ₂ from electricity use: Carbon capture technologies are highly energy intensive and will significantly increase the carbon emissions at the facility from electricity use. The DEIS uses the Midwest Reliability Organization West Region average to calculate these emissions, which is unnecessarily inaccurate given the availability of the actual emissions factor from Great River Energy. CO ₂ Storage: The DEIS assumes 100% of captured CO ₂ is being permanently stored underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols that would ensure it.	Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 g CO ₂ e/MWh. This was calculated from LREC's energy resource mix in which nearly half comes from clean energy sources. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 g CO ₂ e/kWh), which was used in the draft EIS, calculated electricity emissions have decreased. Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent.	20243-204403-01
	Henriksen, Samuel	2024-02-15	Enhanced Oil Recovery: The DEIS fails to explain whether the applicant can sell any of its captured CO ₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. The DEIS incorrectly states that "Production of oil through EOR would not be dependent on the availability of CO ₂ produced by the ethanol plant." This claim is contradicted by countless public statements from public officials in North Dakota and oil industry representatives.	The text questioned by the commenter in Section 5.7.2.3 was prefaced with the following: "if all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO ₂ , other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Henriksen, Samuel	2024-02-15	The DEIS discounts the direct and long-term impacts of pipeline construction on land and soil integrity in spite of the significant evidence of likely harm.	Impacts on soils are addressed in Section 5.7.6, as are measures that would be implemented to minimize impacts. Most impacts would occur during construction. The text in Section 5.7.6 has been revised to indicate that some impacts on soils could be long term. Impacts on soils related to operation of the pipeline would be negligible.	20243-204403-01
	Henriksen, Samuel	2024-02-15	Land degradation: This project is going to cut through roads, ditches, tile lines, and prime farmland. There is a growing body of anecdotal evidence and peer-reviewed research that shows that pipeline projects in the Midwest have caused yield reduction and damage to land years after project completion and "restoration". The DEIS does acknowledge that the reduced productivity from construction "typically would extend for 2 to 3 years, but could take up to 5 years, depending on impacts on soils from the construction disturbance," but fails to identify any measures the applicant should take to avoid these damages or repair them. Prime Farmland and Farmland of Statewide Importance: All three routes would impact both Prime Farmland and Farmland of Statewide Importance, but Summit's preferred route would impact significantly more acres of both across both the construction footprint and the operation footprint of the proposed project than the proposed alternatives.	Measures that the applicant would take to minimize impacts on soils and agricultural land are described in the Minnesota ECP in Appendix D and Minnesota APP in Appendix E. Text in Chapter 5 has been revised to indicate that impacts on crop production would be long term due to changes in soils from construction disturbance.	20243-204403-01

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	Henriksen, Samuel	2024-02-15	Impact of Leaks or Ruptures on Vegetation: The DEIS concludes a leak of CO ₂ “would slow plant growth” and that the rupture of the pipeline would instantly freeze the surrounding soil and “instantly kill all herbaceous ground vegetation” but provides no measures to avoid these impacts, nor does it discuss the long-term impacts of such damage on the soils and vegetation. Instead, the DEIS states without proof that “local soil microbes, mycorrhizae, and soil animals such as worms, arachnids, and insects...would re-colonize after the area is restored.”	Chapter 2 of the draft EIS discusses engineering and design elements incorporated into the project to reduce the likelihood of pipeline leaks or failure. Chapter 8 discusses potential impacts on vegetation and wildlife from slow leaks of CO ₂ and from a larger rupture. In the event of a pipeline rupture and large release, impacts on vegetation and soils would be highly localized to the area above the rupture. Re-colonization of the impact area would result from ecological succession processes that are well documented in areas that have experienced disturbance events of a similar source, duration, and effect on other projects of a similar scale.	20243-204403-01
	Henriksen, Samuel	2024-02-15	Soil Compaction: The DEIS acknowledges that “soil compaction would be unavoidable in unpaved areas of equipment and vehicle operation” and that even if soils were decompacted, “some compacted soils could remain.” Soil compaction can have serious consequences in terms of water infiltration and drainage and should not be dismissed as an insignificant impact.	Section 5.7.8.2 indicates that groundwater recharge could be impacted by soil compaction. Section 5.7.6 explains that the applicant would comply with required permits and implement its Minnesota ECP and Minnesota APP, which would minimize impacts on soils. The text in Section 5.7.6 has been revised to indicate that, while most impacts on soils during construction would be minimal and temporary, some impacts could be long term.	20243-204403-01
	Henriksen, Samuel	2024-02-15	Geologic Hazards: The DEIS does not address whether the applicant has conducted geologic hazard surveys pursuant to the PHMSA Bulletin here: https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2022-06/2022-11791.pdf	Geologic hazards are addressed in Sections 5.7.3 and 5.7.6. Text regarding geohazard assessments that would comply with the recommendations in PHMSA Advisory Bulletin 2022-01 has been added to both sections.	20243-204403-01
	Henriksen, Samuel	2024-02-15	Minnesota’s recent experience with pipeline construction demonstrates the serious harms that it causes on water resources as well as a tendency by state agencies to under-account for those impacts. Dangers to water and waterbodies: The proposed route for Summit’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota’s precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Henriksen, Samuel	2024-02-15	Water use: Much of southern Minnesota is suffering from the consequences of drought and over-commitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit “anticipates” an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impacts of those appropriations on water resources. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent with its true demands for water resources?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Henriksen, Samuel	2024-02-15	Aquifer Damage: Summit’s preferred route, RA-South, crosses a surficial beach ridge aquifer in Otter Tail County. The DNR has said that the area is “prone to significant groundwater discharge,” and the applicant’s initial groundwater investigation confirmed that “artesian groundwater conditions are present” along that beach ridge system. In early feedback on the DEIS, the DNR noted that “Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer and that “breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.” This, along with our state’s first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers more seriously.	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the	20243-204403-01

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				confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	
	Henriksen, Samuel	2024-02-15	<p>HDD Drilling The DEIS also states that “drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet [drinking water quality certification standards] would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA.” The DEIS does not discuss the risks of applying drilling mud, especially with additives not approved by MDH, to the land.</p> <p>The DEIS says that “drilling fluids and additives for the HDD would be non-toxic to the aquatic environment and humans,” however, even supposedly “non-toxic” drilling fluid is chemical waste that has been found to be harmful to plant and animal species. Summit’s preferred route and alternative route, RA-Hybrid, would both cross three rivers (Pelican River, Otter Tail River, and Bois de Sioux River) via the HDD mention.</p>	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	20243-204403-01
	Henriksen, Samuel	2024-02-15	<p>Impacts of a Leak or Rupture on Animals: According to the DEIS, CO₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would be unlikely to impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence. Though the DEIS does note some harm may come to animals in the event of a rupture, it relies heavily on the assumption that animals will simply move out of the rupture area to avoid the release. The reason for this assumption is not provided and is contradicted by information in the rupture report in Appendix G which suggests the impacts of a rupture would be nearly immediate.</p> <p>Critical Habitats: Summit’s preferred route would cross over or near several waterfowl protection areas, including the Orwell 9 Unit and Ridgeway WPA in Otter Tail County. The DEIS notes that some of these areas will be avoided during construction but fails to consider the impacts to these features in the event of a leak or rupture.</p>	<p>CO₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO₂ from operation of the proposed pipeline would not elevate ambient CO₂ to a level that is detrimental to local vegetation or wildlife. Potential impacts on wildlife from a CO₂ rupture could result first from the physical force of a rupture and secondarily from localized, short-term high levels of CO₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most mobile wildlife species would follow their natural instincts and attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO₂, which could be toxic for species unable to leave the area of the release.</p> <p>Operation of the proposed pipeline would include integrated systems for detecting leakages, as well as protocols for addressing leaks promptly. Minor leaks of CO₂ from operation of the proposed pipeline would not elevate ambient CO₂ to a level that is detrimental to waterfowl and other wildlife within the Orwell 9 Unit or Ridgeway WPAs. As the comment notes, the pipeline route would avoid these areas. As a result, there would be negligible risk of impacts on these areas due to a pipeline rupture. This is because the potential impacts of a pipeline rupture would be highly localized and outside of the WPA boundaries.</p>	20243-204403-01

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	Henriksen, Samuel	2024-02-15	Wetlands: In Table 5-40 on p. 5-98 of the DEIS it states that “the loss of wetlands would be less than 0.01 acre.” However, Table 5-4 on p. 5-24 says that for Summit’s preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. And Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres. Which is it??	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover, and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.	20243-204403-01
	Honnold, Rikki	2024-02-23	Hey, I don't think we need another pipeline. I know this is old hat but somehow you all keep digging more pipelines for no good reason. I hope you consider this as you look to your legacy and for your children. I hope you can honestly sleep at night when you tell your kids that you thought this was necessary, despite all of the environmental reasons why people have already told you this isn't needed. Really, please, think about it.	Thank you for your comment.	20243-204403-01
	Huemann, Emily	2024-02-23	Hi, I’m Emily, a born and raised Minnesotan who cares about our natural resources and communities. I’m deeply concerned about the local and global impacts of this project. I’m particularly concerned about land degradation, and the impact report needs to fully represent these risks. Healthy land and healthy soil is a lifeline for farmers and for our whole world. I’m also concerned about the risks this project poses to clean water and healthy wetlands.	Chapter 5 addresses impacts of the project, including impacts on land use, soils, agriculture, water resources, and wetlands.	20243-204403-01
	Irlbeck, Brandon	2024-02-13	Please stop this project. This whole thing is complete nonsense. I farm and would be directly affected with this project crossing my farm.	Thank you for your comment.	20243-204403-01
	Irlbeck, Joel	2024-02-14	We are land owners that would be impacted by the pipeline and are very concerned about all of effects that would result in its wake. All of the damage done to our land and danger to our communities from leaks and water quality. We are against it and do not want it on our property!	Risks of a potential CO ₂ release and potential impacts are described in Chapter 8. Section 5.7.8 addresses water resources.	20243-204403-01
	Iverson, Ed	2024-02-22	Dear members of the Minnesota Public Utilities Commission, I am writing this as a very concerned citizen of Cottonwood County, Minnesota. I have farmed full time for 28 years in Cottonwood, Redwood, and Murray Counties. I have several concerns and thought I'd share some of them. 1. Setbacks: With a four-inch pipeline under 2,200 psi I would imagine that there would be a huge volume of CO ₂ released into the atmosphere. I asked a Summit Representative if he knew how much CO ₂ would be released, his answer was "I don't know." To be fair I'm sure somebody knows, they maybe just don't want us to know. I don't know how far the pipeline would need to be away from a residence to make it safe, but I would hope to see the word "miles" after the number rather than feet! In my opinion we need to look at the absolute worst-case scenario and plan for it to be worse. On January 9th, 2024, there was an earthquake reported near Crandon Wisconsin. Can a pipeline under 2,200 psi handle that? How will frost heaves affect the pipeline? From what I've heard, this pipeline will run through farmland at about a 3' depth, under normal circumstances, that is above the frostline. I have a lot of drainage tiles that are about 3' deep, who is going to want to work on tile repairs where this CO ₂ pipeline runs?	Chapter 8 and Appendix G detail the potential outcomes of a CO ₂ rupture, including impact distances and release volume. As described in Section 2.4.5, the pipeline would have a minimum cover depth of 54 inches, or 4.5 feet. Frost heave is addressed in Sections 5.7.6.2 and 8.1.	20243-204403-01
	Iverson, Ed	2024-02-22	2. Water Usage. The amount of water that this process will take is a staggering number. I think I can safely say "We don't have enough!" Weather cycles change all the time, but these last few years have been very dry. Do we really want to put another huge drain in our aquifer? At some point, we are going to lose the ability to recharge our water supply. We can't allow a company to come in, drop an 1,100' well, and tell everyone else "Sorry, we didn't see this coming."	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Iverson, Ed	2024-02-22	3. Easements. From what I have read in the EIS report, this looks to be a long-term mess, for a short-term solution. The design life is only 25 years?? Do I dare ask why the easements are forever? What could be pumped across our state in the future.... next to our homes....next to whatever is most precious to us? This might be a good place to use our "worst case scenario" ideas. I don't want to stand in the way of	Thank you for your comment. Landowner agreements are outside the scope of the EIS. Section 2.7 describes project decommissioning. This section was revised to describe the financial assurances to be provided by the applicant for costs associated with decommissioning.	20243-204403-01

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			progress, but I sure don't want progress to run me over...or in this case asphyxiate me. I was reading about the decommissioning plan. This plan looks like a direct path to water and or air pollution to me.		
	Iverson, Kathryn	2024-02-22	I do not support the Otter Tail to Wilkin CO ₂ pipeline project. I am a lifetime resident of Minnesota and am a grandmother. I have had the opportunity to live my life in Minnesota without concerns about horrendous water pollution, and this project would totally destroy our surface and aquifer water systems.	Thank you for your comment.	20243-204403-01
	Iverson, Kathryn	2024-02-22	Dangers to water and waterbodies: The proposed route for Summit’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota’s precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Iverson, Kathryn	2024-02-22	Water use: Much of southern Minnesota is suffering from the consequences of drought and overcommitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit “anticipates” an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and case specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impacts of those appropriations on water resources. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent with its true demands for water resources?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has also been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Iverson, Kathryn	2024-02-22	Aquifer Damage: Summit’s preferred route, RA-South, crosses a surficial beach ridge aquifer in Otter Tail County. The DNR has said that the area is “prone to significant groundwater discharge,” and the applicant’s initial groundwater investigation confirmed that “artesian groundwater conditions are present” along that beach ridge system. In early feedback on the DEIS, the DNR noted that “Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer and that “breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.” This, along with our state’s first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers more seriously.	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	20243-204403-01
	Iverson, Kathryn	2024-02-22	HDD Drilling: The DEIS also states that “drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet [drinking water quality certification standards] would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA.” The DEIS does not discuss the risks of applying drilling mud, especially with additives not approved by MDH, to the land. The DEIS says that “drilling fluids and additives for the HDD would be non-toxic to the aquatic environment and humans,” however, even supposedly “non-toxic” drilling fluid is chemical waste that has been found to be harmful to plant and animal species. Summit’s preferred route and alternative route, RA-Hybrid, would both cross three rivers (Pelican River, Otter Tail River, and Bois de Sioux River) via the HDD mention.	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in	20243-204403-01

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				Chapter 5. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	
	Iverson, Kathryn	2024-02-22	Wetlands: In Table 5-40 on p. 5-98 of the DEIS it states that “the loss of wetlands would be less than 0.01 acre.” However, Table 5-4 on p. 5-24 says that for Summit’s preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. And Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres. Which is it??	CO ₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to local vegetation or wildlife. Potential impacts on wildlife from a CO ₂ rupture could result first from the physical force of a rupture and secondarily from localized short-term high levels of CO ₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO ₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most, but not all, individuals of mobile wildlife species would follow their natural instincts and attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO ₂ , which could be toxic for species unable to leave the area of the release. Operation of the proposed pipeline would include integrated systems for detecting leakages, as well as protocols for addressing leaks promptly. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to waterfowl and other wildlife within the Orwell 9 Unit or Ridgeway WPAs. These WPAs are not crossed by any of the RAs. As a result, the potential effects of a rupture on those WPAs would be diminished by the distance between any potential point of release and the WPA boundary. The potential impacts of a pipeline rupture would be highly localized and outside of these WPA boundaries.	20243-204403-01
	Iverson, Kathryn	2024-02-22	Impacts of a Leak or Rupture on Animals: According to the DEIS, CO ₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would be unlikely to impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence. Though the DEIS does note some harm may come to animals in the event of a rupture, it relies heavily on the assumption that animals will simply move out of the rupture area to avoid the release. The reason for this assumption is not provided and is contradicted by information in the rupture report in Appendix G which suggests the impacts of a rupture would be nearly immediate. Critical Habitats: Summit’s preferred route would cross over or near several waterfowl protection areas, including the Orwell 9 Unit and Ridgeway WPA in Otter Tail County. The DEIS notes that some of these areas will be avoided during construction but fails to consider the impacts to these features in the event of a leak or rupture.	CO ₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to local vegetation or wildlife. Potential impacts on wildlife from a CO ₂ rupture could result first from the physical force of a rupture and secondarily from localized short-term high levels of CO ₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO ₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most, but not all, individuals of mobile wildlife species would follow their natural instincts and attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models	20243-204403-01

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				of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO ₂ , which could be toxic for species unable to leave the area of the release. Operation of the proposed pipeline would include integrated systems for detecting leakages, as well as protocols for addressing leaks promptly. The route width of the proposed pipeline abuts, but does not cross, the Orwell 9 Unit or Ridgeway WPAs. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to waterfowl and other wildlife within the Orwell 9 Unit or Ridgeway WPAs. As a result, the potential effects of a rupture on those WPAs would be diminished by the distance between any potential point of release and the WPA boundary. The potential impacts of a pipeline rupture would be highly localized and outside of these WPA boundaries.	
	Jennen, Gary	2024-02-26	This pipeline has a proposed route that runs close to where I live. In fact is runs next to where several of my neighbors live. If you are interested in how I feel about that, I refer you to the published articles about the pipeline rupture in Sataria, Mississippi. This rupture was supposedly caused by saturated soil. In my area we have very dry cycles and extremely wet cycles. In addition, we have extreme fluctuations of temperature. We also have had several dirt work operations that could compromise the pipeline.	Saturated soils alone do not pose a risk to pipelines. Under the right conditions, saturated soils combined with steep slopes can lead to slope failure (landslide), which can damage pipelines. The project would cross relatively flat topography with low landslide risk. The pipeline would be underground and would not be exposed to extreme fluctuations of temperature. The pipeline location would be marked, and anyone planning to excavate is required by state law to clear the location for underground utilities prior to beginning work.	20243-204403-02
	Jennen, Gary	2024-02-26	The safeguards that are mandated to stop a release of gas in a populated area seem totally inadequate in the event of a rupture. How many thousands of feet of pipeline would be emptied upon us in the event of a rupture? How often are valves required?	Federal code requires that valves be installed on each side of one or more adjacent water crossings that are more than 100 feet wide from high water mark to high water mark. Valves are also required at intervals no more than 15 miles apart if protecting a high consequence area (HCA) as defined in CFR § 195.450, and no more than 20 miles apart if not protecting an HCA. There is one potential HCA on the proposed southern route by the Fergus Falls Airport. The valves that protect the potential HCA are spaced at 4.8 miles. The longest distance of pipeline between valves is 13.9 miles and the shortest distance of pipeline between valves is 1.6 miles. Appendix G includes assumptions regarding potential release scenarios.	20243-204403-02
	Jennen, Gary	2024-02-26	As you can see, I am very opposed to this pipeline especially in my back yard. Don't expect any easements from me. CO ₂ has been referred to as the gas of life. Many scientists have discounted the ability of CO ₂ to cause climate change. There are many other forces that influence global temperatures more than CO ₂ . How many millions of tax dollars are being wasted trying to promote the construction of pipelines across the country?	Thank you for your comment.	20243-204403-02
	Jennen, Gary	2024-02-26	Traveling from the twin cities to where I live in West Otter Tail County, I see a sign that states "Carbon Capture is Safe". I have no problem with the safety of the carbon capture process. What I do have a problem with is the transport of CO ₂ in critical fluid phase which is very dangerous. Also when this project is sequestered underground, it creases a very dangerous hazard depending on future events.	Thank you for your comment.	20243-204403-02
	Jennen, Gary	2024-02-26	Why are we doing this? Why is the government heavily subsidizing this scheme? Just look at the entities promoting this. There are people hoping to glean millions of tax dollars from the promotion of this enterprise. There are entities promoting this looking for a cheap (government subsidized) source of CO ₂ for industrial purposes. This is a whole pipeline building industry put into operation at enormous tax payer expense to basically chase a ghost. Where I live mainly corn and soybeans are raised which would thrive on much higher CO ₂ levels than we have now.	Thank you for your comment.	20243-204403-02

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	Jennen, Kay	2024-02-21	I am writing because I live less than two miles downwind from the proposed pipeline. I am very concerned about possible environmental hazards to humans and animals that live near or could come into close proximity to the pipeline.	Thank you for your comment.	20243-204403-01
	Jennen, Kay	2024-02-21	This pipeline would be part of the world's largest of its kind and so warrants closer scrutiny before being built Intensive study is critical concerning even the validity of the need for a carbon-dioxide transfer pipeline.	Thank you for your comment.	20243-204403-01
	Jennen, Kay	2024-02-21	The scientific community has differing opinions on the effects of carbondioxide on the climate. A recent study titled " how much has the Sun influenced Northern Hemisphere temperature trends? An ongoing debate," published in the international scientific journal Research in Astronomy and Astrophysics by exports over a dozen international experts show conclusively that depending on the data sets used, it is entirely possible that most or all of the warming has nothing to do with man. Thank you for your consideration.	Thank you for your comment.	20243-204403-01
	Jensen, Pan	2024-02-14	My name is Pam Jensen and I live near Lamberton in Redwood County, MN. My husband and I own 19 acres adjacent to Summit's proposed CO ₂ pipeline route. Even though we live in Southern MN we care what happens to the land, water and residents all across MN. I'd like to point out several parts of the DEIS that you should consider revising. Pg. 9 – The project would provide a Net Benefit to GHG emissions because the CO ₂ sequestered from ongoing annual operations would outweigh construction and operation emissions. I don't think this considers the immense fuel cost of manufacturing the pipeline/materials, transporting the pipeline to the construction sites and the monitoring costs (every 2 wks. by vehicle, or as we were told by a Summit rep at an informational mtg–aerial fly-overs every 2 wks.!) Sequestering CO ₂ hasn't been proven as a successful method for reducing CO ₂ emissions. The small amount of CO ₂ emissions that ethanol plants actually emit is a drop in the bucket compared to emissions from other sources. Is it worth damaging land, using up water and creating a safety risk to residents? Pg. 10 –Climate Change - The project would have a net beneficial effect on climate change as it would capture and store CO ₂ emissions from the ethanol plant. This should not be included as a reason to grant a permit because it hasn't been proven that it will have any real effect on climate change. Previous/current CO ₂ pipeline projects haven't met expectations.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use. Section 5.7.2 has been revised to note that the project would contribute to a net beneficial effect on climate change as it would capture and store CO ₂ emissions from the ethanol plant.	20243-204403-01
	Jensen, Pan	2024-02-14	Drought conditions might require a contingency water source. Minnesota and surrounding states are currently in drought conditions. The construction and operational phases will require twice as much water as the ethanol plants currently use. Farmers in our area are having to drill new wells already and they're having difficulty finding water.	Additional information has been added to Section 5.7.8.2 to address the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Jensen, Pan	2024-02-14	Pg. 42 – 2.6 – The applicant indicates that the project would meet or exceed State and Federal Safety Regulations and, at a minimum would be operated and maintained in accordance with PHMSA's regulations in 49 CFR Part 195. How can this be included since the updated PHMSA regulations haven't even been implemented yet? The current pipeline safety regulations are outdated and don't apply to Hazardous CO ₂ Pipelines. Summit is trying to get their permits quickly before the updated regulations are in place so that the rules won't apply to them. Who/How will Summit Carbon Solutions be held accountable to follow regulations? I read an article about the damage left behind from a gas pipeline. The company (SPIRE) disputes any damage claims. Government regulators failed to hold the company accountable. An affected farmer said, "The rules and regulations are there, but that's just for looks." I'm concerned that the same type of thing will happen with Summit Carbon Solutions.	Thank you for your comment. PHMSA regulations (that is, their appropriateness) and related standards for CO ₂ pipelines are outside the scope of the EIS (Appendix A). The EIS discusses current PHMSA regulations that apply to the project (Chapter 3 and Appendix G). The applicant has stated its proposed CO ₂ pipeline would be designed, constructed, and operated to meet PHMSA regulations, including any operational changes to PHMSA regulations that may occur in the future.	20243-204403-01
	Jensen, Pan	2024-02-14	Pg. 43 - 2.6.2 - Abnormal Operations - First responders require special equipment, including non-internal combustion engines, to respond to a CO ₂ disaster. The DEIS does not consider the burdens this will put on local EMS and health providers in the case of a pipeline rupture or accident or an assessment of how they should be prepared to respond given the unique needs. *A warning system needs to be included to inform residents in the surrounding area (up to 4 miles?) of any leak or rupture.	Section 8.3 describes the effect on humans and the environment of an accidental release of CO ₂ . As noted in Section 8.5, the applicant has committed to provide CO ₂ air monitoring equipment to first responders and to pay all costs associated with CO ₂ response training and air monitoring equipment.	20243-204403-01

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			The PUC should take into consideration the negative impacts that the CO ₂ pipeline would have on people’s safety and well-being, land, wildlife and water resources. It's very important to protect our state's resources and the health and safety of the residents that live here.		
	Jeppesen, Kim	2024-02-23	<p>I am a lifelong Minnesotan who grew up in southwestern Minnesota. After graduating from college, I lived and worked in the metro for eighteen years before taking a position in SW Minnesota. I have enjoyed living in rural Cottonwood County on the family farm, which I now own with my husband. We love our farm property’s natural beauty and environment, including the lands along Dutch Charley Creek that bisects the farm.</p> <p>I spent the last part of my career with the Minnesota Department of Health and was involved with Emergency preparedness for man-made or natural biological events. I understand that living in rural Cottonwood County, unlike in the urban core, emergency response will be local volunteers until professionally trained teams can be deployed. Since CO₂ pipelines operate at very high pressure (much higher than a natural gas pipeline), any type of breach can be catastrophic since, without warning, this colorless, odorless, heavier-than-air cloud of asphyxiant gas can bring death to all mammalian life downwind of the leak. Humans exposed to high concentrations of CO₂ may die before they are even aware of the danger. As a rural Minnesota resident, I find the potential risk to my health and safety of the rural residents of the proposed CO₂ pipeline that Summit Carbon Solutions is presenting for construction across our rural community.</p>	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended special permit conditions as described in Section 8.5.3.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<p>I am also concerned about the enormous quantities of groundwater that will be needed to test and capture the CO₂. I rely on a private well for drinking water, so I am very concerned about impacts on the water supply, whether from private wells or rural water systems’ wells. Another concern is the potential damage to vital cropland, which is of finite supply. In the past, pipelines have been demonstrated to cause long-lasting damage to cropland, with crop yield reductions lasting decades.</p>	<p>Additional information has been added to Section 5.7.8.2 to address the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.</p> <p>As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term.</p>	20243-204403-01
	Jeppesen, Kim	2024-02-23	<p>As a rural Minnesota farm property resident, I am VERY concerned about the health, life, and safety risks this unnecessary pipeline poses to residents, first responders, farm animals, and wildlife. CO₂ is a hazardous material in high concentrations. The DEIS consistently underplays the known and unknown risks of transporting large amounts of CO₂ at high pressures through a pipeline. • CO₂ Rupture Impact Zone: According to the analysis in the DEIS, the potential impact radius for levels of CO₂ that would be “immediately dangerous to life or health” is 617 feet. This expands to 910 feet for lower concentrations that cause dizziness, drowsiness, severe muscle twitching, and unconsciousness within a few minutes. Although Summit indicates that it will take 25 minutes for the system to shut off the relevant valves in the event of “abnormal operation,” the DEIS does not mention any meaningful safety measures for a rupture and instead suggests that it is “reasonable” for Summit to simply supply indoor CO₂ detectors for residences within 1,000 feet of the project. But the rupture report in Appendix G states that “a full rupture results in impact distances too quickly for an early warning device, such as an oxygen detector, to be effective.” This pipeline should not be approved without a clear understanding of the risks to human health and meaningful measures to ensure the safety of people and animals in the area.</p>	Section 8.3 describes the effect on humans and the environment of an accidental release of CO ₂ . As noted in Section 8.5, the applicant has committed to provide CO ₂ air monitoring equipment to first responders and to pay all costs associated with CO ₂ response training and air monitoring equipment. Section 8.5.3 describes steps that would be taken to reduce the risk and impacts of a potential rupture.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<p>• First responders and health professionals: CO₂ pipelines pose unique problems for first responders and health care providers. Because CO₂ is colorless and odorless, both victims and first responders have no way of knowing what is causing the health problems. In addition, first responders require special equipment, including non-internal combustion engines, to respond to a CO₂ disaster. The DEIS does not consider the burdens this will put on local EMS and health providers in the case of a pipeline rupture or accident or an assessment of how they should be prepared to respond given the unique needs. The DEIS includes Summit’s September 2022</p>	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public	20243-204403-01

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			Emergency Response Plan (Appendix N). This plan is not only outdated but also unclear as to how local EMS and first responders will interact with the applicant in the event of a leak or rupture. Though the plan talks of multiple company personnel as playing roles in an emergency response, it ignores the fact that the applicant only plans on having one full-time employee at the capture facility. Local first responders deserve more clarity about how they will be expected to respond to an emergency situation and what the applicant will do to ensure they are adequately equipped and informed for such an event.	on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none">• Compliance with PHMSA Rules: The DEIS accepts Summit’s assurances that it will “comply with federal emergency response requirements,” but as noted in a Pipeline Safety Trust report and by the Pipeline Hazardous Material Safety Administration (PHMSA) itself, the current emergency response requirements are dangerously outdated.	Thank you for your comment. PHMSA regulations (that is, their appropriateness) and related standards for CO ₂ pipelines are outside the scope of the EIS (Appendix A). Additionally, the applicant has stated its proposed CO ₂ pipeline would be designed, constructed, and operated to meet PHMSA regulations, including any operational changes to PHMSA regulations that may occur in the future. To the extent applicable and in response to this and similar comments, Section 3.6 and Appendix G of the EIS have been updated to include this information.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none">• Setbacks: The DEIS states that the PUC “cannot set safety standards” for Summit’s proposed pipeline. PHMSA has expressly said in public letters to CO₂ pipeline companies like Summit that state and local authorities can exercise their powers to regulate land use—including setback distances—and that “nothing in the federal pipeline safety law impinges on these traditional prerogatives of local—or state—government.” The PUC must consider where the pipeline is placed and what is the safest option for Minnesotans, which means the PUC can and should determine what routing, setback, and depth requirements are necessary to adequately protect Minnesotans. <p>Minnesota’s recent experience with pipeline construction demonstrates the serious harms that it causes on water resources as well as a tendency by state agencies to under-account for those impacts.</p>	Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none">• Dangers to water and waterbodies: The proposed route for Summit’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO₂ disperses in water and what risks a CO₂ pipeline leak or rupture poses to Minnesota’s precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none">• Water use: Much of southern Minnesota is suffering from the consequences of drought and overcommitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit “anticipates” an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impacts of those appropriations on water resources. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent about its actual water resource demands?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none">• Aquifer Damage: Summit’s preferred route, RA-South, crosses a surficial beach ridge aquifer in Otter Tail County. The DNR has said that the area is “prone to significant groundwater discharge,” the applicant’s initial groundwater investigation confirmed that “artesian groundwater conditions are present” along that beach ridge system. In early feedback on the DEIS, the DNR noted that “Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer and that “breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.” This, along with our state’s first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers more seriously.	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has	20243-204403-01

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				agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none"> • HDD Drilling: The DEIS also states that “drilling mud mixed with additives that are not on the MDH approved additive list and/or do not meet [drinking water quality certification standards] would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA.” The DEIS does not discuss the risks of applying drilling mud to the land, especially with additives not approved by MDH. <p>The DEIS says that “drilling fluids and additives for the HDD would be non-toxic to the aquatic environment and humans;” however, even supposedly “non-toxic” drilling fluid is chemical waste that is harmful to plant and animal species. Summit’s preferred and alternative routes, RA-Hybrid, would cross three rivers (Pelican River, Otter Tail River, and Bois de Sioux River) via the HDD mention.</p>	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none"> • Wetlands: Table 5-40 on p. 5-98 of the DEIS states that “the loss of wetlands would be less than 0.01 acre.” However, Table 5-4 on p. 5-24 says that for Summit’s preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres. Which is it?? 	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover, and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none"> • Impacts of a Leak or Rupture on Animals: According to the DEIS, CO₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would unlikely impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence. <p>Though the DEIS does note some harm may come to animals in the event of a rupture, it relies heavily on the assumption that animals will move out of the rupture area to avoid the release. The reason for this assumption is not provided. This is contradicted by information in the rupture report in Appendix G, which suggests the impacts of a rupture would be nearly immediate.</p>	CO ₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to local vegetation or wildlife. Potential impacts on wildlife from a CO ₂ rupture could result first from the physical force of a rupture and secondarily from localized short-term high levels of CO ₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO ₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most mobile wildlife species would follow their natural instincts and attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO ₂ , which could be toxic for species unable to leave the area of the release.	20243-204403-01

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	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none"> • Critical Habitats: Summit’s preferred route would cross over or near several waterfowl protection areas, including the Orwell 9 Unit and Ridgeway WPA in Otter Tail County. The DEIS notes that some of these areas will be avoided during construction but fails to consider the impacts of these features in the event of a leak or rupture. The DEIS consistently fails to properly account for the project’s actual CO₂ emission and climate impacts. 	Operation of the proposed pipeline would include integrated systems for detecting leaks, as well as protocols for addressing leaks promptly. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to waterfowl and other wildlife within the Orwell 9 Unit or Ridgeway WPAs. As the comment notes, the pipeline route would avoid these areas. As a result, there would be negligible risk of impacts on these areas due to a pipeline rupture. The potential impacts of a pipeline rupture would be highly localized and outside of the WPA boundaries.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none"> • Lifetime of Project: The applicant states that the anticipated lifetime of this project is 25 years. This means at the end of its life; the project could stop capturing the CO₂ from the ethanol plant. Unless the ethanol plant will also cease operations at that point in time, it will continue to emit CO₂ unabated into the future. 	Section 2.7 describes project decommissioning. If the ethanol plant continues to operate beyond the life of the proposed project, its CO ₂ emissions would not be captured.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none"> • 100% CO₂ Capture Rate: Summit states that the capture facility “is designed to capture 100% of the CO₂ produced by the ethanol plant.” No carbon capture facility in the world, ethanol or otherwise, captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party. Additionally, the DEIS should emphasize that any CO₂ capture is solely associated with emissions from the ethanol fermentation process and provides zero reductions on the significant emissions from the facility’s electricity use 	Section 2.1 has been revised to clarify that the captured CO ₂ is produced by the ethanol plant as part of its fermentation process, the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none"> • Added CO₂ from electricity use: Carbon capture technologies are highly energy intensive and will significantly increase the carbon emissions at the facility from electricity use. The DEIS uses the Midwest Reliability Organization West Region average to calculate these emissions, which is unnecessarily inaccurate given the availability of the actual emissions factor from Great River Energy. 	Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 gCO ₂ e/MWh. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 g CO ₂ e/kWh), which was used in the draft EIS, calculated electricity emissions have decreased.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none"> • CO₂ Storage: The DEIS assumes that 100% of captured CO₂ is permanently underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols to ensure it. 	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
	Jeppesen, Kim	2024-02-23	<ul style="list-style-type: none"> • Enhanced Oil Recovery: The DEIS fails to explain whether the applicant can sell any of its captured CO₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. The DEIS incorrectly states, “Oil production through EOR would not depend on the availability of CO₂ produced by the ethanol plant.” Countless public statements from public officials in North Dakota and oil industry representatives contradict this claim. 	The text questioned by the commenter in Section 5.7.2.3 was prefaced with the following: "if all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO ₂ , other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Jeppesen, Kim	2024-02-23	Thank you for taking my concerns and comments into thoughtful consideration.	Thank you for your comment.	20243-204403-01
	Jones, Barbara	2024-02-22	<p>I am a resident of Ely MN concerned about our climate.</p> <p>In principle capturing CO₂ and sequestering it sounds like a smart thing to do, but in practice it is misleading and dangerous. Almost all the captured CO₂ goes to enhanced oil recovery from failing oil and gas wells. Capturing CO₂ from coal or gas power plants is expensive and unproven technology. Transport of CO₂ through pipelines is DANGEROUS.</p>	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR. The proposed project would not capture CO ₂ from a coal or gas power plant. Chapter 8 describes the potential for an unanticipated release of CO ₂ from the capture facility or pipeline, the	20243-204403-01

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				potential for adverse human and environmental impacts of an unanticipated release of CO ₂ , and describes prevention, preparedness, and response measures that could prevent or reduce the impacts of a release.	
	Jones, Barbara	2024-02-22	A break in an oil pipeline makes a bad mess and can be a local environmental disaster, but a break in a CO ₂ pipeline KILLS people, animals, and birds. CO ₂ is an asphyxiant which displaces the air we breathe. You cannot escape in your car or truck because an internal combustion engine also needs oxygen. First responders cannot help those impacted if they have no transportation.	Risks of a potential CO ₂ release and potential impacts are described in Chapter 8 of the EIS. Chapter 8 also describes the steps that would be taken in the event of an accidental release and the steps that would be taken to prevent an accidental release.	20243-204403-01
	Jones, Barbara	2024-02-22	It is much preferable to leave the fossil fuels in the ground than to dig them up just to use their energy to put them back again. It is better to use the acreage now used to grow corn to make ethanol for agri-solar projects. The space between solar panels can be used to grow food. The panels generate many times more energy than can ever be retrieved from corn ethanol since solar panels are up to 100 times more efficient than photosynthesis.	The EIS analyzes the proposed project, including alternatives that lower the CI score of the ethanol produced at the ethanol plant. An alternative that does not include ethanol production was not studied in the EIS because it would not meet the purpose of the project.	20243-204403-01
	Knaeble, Barnadette	2024-02-23	I am writing in reference to Docket No 22-42, Otter Tail to Wilkin Carbon Dioxide Pipeline Project. I am a medical professional residing in Minnesota. I oppose this pipeline project in its entirety for many reasons. I will speak to two of them. 1. Land and water degrading pipelines always damage ecosystems far more than any DEIS addresses. Where in the document is there any data on projected cost to the environment and therefore cultural communities from other pipelines? Once again Industry writes the DEIS and feels free to forecast minimal degradation. It is full of industry spin. Example: Take a look at the results of HDD drilling Enbridge used to lay Line 3/39? Frack outs of drilling mud, invasive species spread, clear cutting shrubs and trees, soil erosion and water body disruption are all visible along the Line 3/93 corridor. Please go take a look. What agencies are monitoring that damage and reporting it to the public? Did that destruction inform this DEIS?	Thank you for your comment. Chapter 5 discusses the potential environmental impacts of construction and operation of the project. Multiple sections in Chapter 5 describe potential environmental impacts associated with HDD.	20243-204403-01
	Knaeble, Barnadette	2024-02-23	Instead of acknowledging the potential ecological damage, Summit Carbon Solutions Construction "would use horizontal direction drill (HDD) and boring techniques at road crossings to limit impacts on local traffic" This quote is from the Environmental Justice section of the DEIS. What type of environmental justice does this address? None.	Thank you for your comment.	20243-204403-01
	Knaeble, Barnadette	2024-02-23	2. Moving compressed CO ₂ is extremely dangerous. The DEIS does not mention any meaningful safety measures for a rupture and instead suggests that it is ? reasonable? for Summit to simply supply indoor CO ₂ detectors for residences within 1,000 feet of the project. But the rupture report in Appendix G states that ?a full rupture results in impact distances too quickly for an early warning device, such as an oxygen detector, to be effective.?	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-01
	Knaeble, Barnadette	2024-02-23	This pipeline should not be approved without a clear understanding of the risks to human health and meaningful measures to ensure the safety of people and animals in the area. I urge denial of permits to the Otter Tail to Wilkin Carbon Dioxide Pipeline Project.	Thank you for your comment.	20243-204403-01
	Kopel, Carol	2024-02-23	My name is Carol Kopel. I live in Tyler, MN in SW Minnesota. My husband and I are landowners near Lamberton, MN in Redwood County. We have been following the proposed Summit pipeline news, because we have been contacted about signing an easement for the proposed southern route of the pipeline. Our farmland is directly north of the ethanol plant in Lamberton. I am commenting on the EIS for the Otter Tail to Wilkin because I feel the decisions made for that proposed project will ultimately determine decisions for the proposed southern route that Summit has planned. I am concerned about the potential impacts this pipeline would have on people along the proposed pipeline routes, but also to people adjacent to the routes.	See responses to specific comment topics below.	20243-204403-01

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	Kopel, Carol	2024-02-23	Safety is of the utmost importance. CO ₂ is a hazardous material in high concentrations. The DEIS consistently underplays the known and unknown risks of transporting large amounts of CO ₂ at high pressures through a pipeline. The proposed pipeline will run close to many small communities and farms. In the event of a rupture. Summit indicates that it will take 25 minutes for the system to shut off the relevant valves in the event of “abnormal operation,” the DEIS does not mention any meaningful safety measures for a rupture and instead suggests that it is “reasonable” for Summit to simply supply indoor CO ₂ detectors for residences within 1,000 feet of the project. But the rupture report in Appendix G states that “a full rupture results in impact distances too quickly for an early warning device, such as an oxygen detector, to be effective.” This pipeline should not be approved without a clear understanding of the risks to human health and meaningful measures to ensure the safety of people and animals in the area.	Text in Section 4.5 on valve closure time has been corrected from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-01
	Kopel, Carol	2024-02-23	Impact to the farmland this proposed pipeline would affect is also of concern to me. The DEIS discounts the direct and long-term impacts of pipeline construction on land and soil integrity in spite of the significant evidence of likely harm. Land degradation: This project is going to cut through roads, ditches, tile lines, and prime farmland. There is a growing body of anecdotal evidence and peer-reviewed research that shows that pipeline projects in the Midwest have caused yield reduction and damage to land years after project completion and “restoration”. The DEIS does acknowledge that the reduced productivity from construction “typically would extend for 2 to 3 years, but could take up to 5 years, depending on impacts on soils from the construction disturbance,” but fails to identify any measures the applicant should take to avoid these damages or repair them.	As indicated by the definitions found on Page 5-1 of the draft EIS, “long-term impacts extend beyond the end of construction and are generally associated with operation of the project.” Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term.	20243-204403-01
	Kopel, Carol	2024-02-23	Another concern is the impact on our water sources. Water use: Much of southern Minnesota is suffering from the consequences of drought and over-commitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit “anticipates” an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impact of those appropriations on water resources. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent with its true demands for water resources?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Kopel, Carol	2024-02-23	Wetlands: In Table 5-40 on p. 5-98 of the DEIS it states that “the loss of wetlands would be less than 0.01 acre.” However, Table 5-4 on p. 5-24 says that for Summit’s preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. And Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres. Which is it?? Wetlands: In Table 5-40 on p. 5-98 of the DEIS it states that “the loss of wetlands would be less than 0.01 acre.” However, Table 5-4 on p. 5-24 says that for Summit’s preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. And Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres. Which is it??	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover, and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.	20243-204403-01
	Kopel, Carol	2024-02-23	Complete Network Impacts: Summit has applied for permits for the 28 miles of pipeline for the OtterTail to Wilkin project. As a landowner in Redwood County, we have been contacted to sign easements as well as many individuals along the proposed southern route, so we assume this project will eventually affect our area. In Summit’s application, the DEIS does not account for the indirect and cumulative impacts of Summit’s entire project in Minnesota. This is despite Summit’s clear and public plans for a much larger buildout in Minnesota. This allows Summit to artificially segment permitting requests for multiple concurrent projects on one pipeline and will prevent a thorough review of the cumulative impacts and potential environmental and climate damages of the project.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01

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	Kopel, Carol	2024-02-23	Decommissioning: Summit appears to indicate that once the pipeline is decommissioned, it will no longer monitor or maintain the pipeline. This is despite the DEIS acknowledging that pipeline segments left in place “would degrade over time and could serve as potential conduits for groundwater or cause minor subsidence when they collapse.” There is no information about who would be responsible for any damage caused by the deteriorating pipeline [see pg. 2-15 of the DEIS]. The DEIS references the Decommissioning Plan, but it is not included as an Appendix to the DEIS, nor was it included as an Appendix to the EAW. Without a detailed discussion of decommissioning, the public and state agencies cannot know what human and environmental impacts the plan will have into the future.	Section 2.7 describes project decommissioning. This section was revised to describe the financial assurances to be provided by the applicant for costs associated with decommissioning.	20243-204403-01
	Kramer, Anthony	2024-02-22	My name is Anthony Kramer. My wife Julie and I live, own and operate farmland in Redwood County, Mn where the proposed CO ₂ pipeline would cross very close to our home. I have several concerns regarding this proposed pipeline, not the least of which are health in safety concerns. While I very much appreciate our small volunteer fire departments, they not only lack the adequate equipment and training to respond to a leak or rupture but with many unmanned volunteer departments in rural Minnesota would be unable to respond quick enough to ensure the health and safety of those close to the pipeline.	Sections 8.4 and 8.5 describe the steps that would be taken in the event of an accidental release of CO ₂ , including the training and provisioning of equipment to local emergency responders. Additionally, the applicant’s draft Emergency Response Plan is included in Appendix N of the EIS.	20243-204403-01
	Kramer, Anthony	2024-02-22	also am concerned how a leak could potentially contaminate our ground water and or get into the aquifers contaminating our wells. Carbonic acid is formed when carbon dioxide reacts with water.	Section 8.3.4.1 describes the effects of a CO ₂ leak on water resources. Any CO ₂ leakage from the pipeline would be insufficient to measurably alter water quality in either shallow or deep aquifers. Any formation of carbonic acid from reaction between CO ₂ and water would be insufficient to contaminate groundwater and would be buffered and neutralized by the local soils/geology.	20243-204403-01
	Kramer, Anthony	2024-02-22	Summit also has said they plan on installing the pipeline at a depth of 6 feet which they believe would be below the frost line and therefore would not be damaged from frost heaves. I do not believe a depth of 6 feet without snow cover would be deep enough on extremely cold winters. "How much does a frost heave move?" "The expansion of soil from the formation of ice lenses varies over a wide range, but vertical movements of 4 to 8 in. are not unusual and as much as 24 in. has been reported. Heaving pressures also vary over quite wide limits and depend mainly on the type of soil and its moisture content."	Information regarding frost depth has been added to Section 5.7.6.1. EERA staff have been unable to find published data to support comments that the pipeline would be shallower than the frost depth, and no commenter has provided such data. Additional text regarding the potential for frost heave has been added to Section 5.7.6.2.	20243-204403-01
	Kramer, Anthony	2024-02-22	I do not feel we have adequate water supply that will be used by the ethanol plants during the process to turn the CO ₂ into a liquid that would be pumped up to North Dakota. Water already comes via a pipeline to Southwest Minnesota from the Missouri River watershed. I would suspect the same can be said in Iowa. Even some of the small ethanol plants have admitted they will use around 50,000 gallons of water a day. Do we want to be using our valuable groundwater supplies for this project? Will it jeopardize our water supply? What effect could that have on our waterways we use to transport grain and fertilizer on dry years? We have already experienced years where the depth of the Mississippi River is not adequate to transport goods.	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Kramer, Anthony	2024-02-22	I am concerned of the potential damage done to thousands of drainage tile lines which will be crossed installing this pipeline. Not only do I believe they will not know when they cross every drainage tile line I feel it is very unlikely every repaired tile line will be properly repaired. Some of the damage may not be realized until several years later. How quickly will Summit come to repair the damage? Will any drainage tile contractors and installers want to work anywhere near the pipeline after it is installed? Will they be allowed to?	Section 2.4.6 states that any drain tiles damaged during pipeline construction would be repaired before backfilling the trench. Section 6.7 of the applicant's APP (Appendix E) specifies the procedures and timelines for repair of drain tiles disturbed during construction. The APP notes that tile disturbed or damaged by pipeline construction would be repaired to its original or better condition, and that permanent repairs would be completed within 21 days after the pipeline is installed in accordance with the applicant's Minnesota ECP (Appendix D). Section 5.5.1.3 has been revised to include a reference to this mitigation measure.	20243-204403-01

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	Kramer, Anthony	2024-02-22	Another question I ask is how much CO ₂ will be released as Summit constructs the pipeline, processes CO ₂ into a liquid form, and monitors the pipeline daily with CO ₂ emitting vehicles and airplanes. I believe further studies are needed to see what if any net gain we will actually see of CO ₂ captured in this venture.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent.	20243-204403-01
	Kramer, Terese	2024-02-22	Dear Mr. Levi, As a fourth-generation landowner in Redwood County, my seven siblings and I hold a deep connection to the land, considering ourselves stewards entrusted with its care. However, our 130+ year old family farm faces an imminent threat: a planned CO ₂ pipeline intends to cut across 240 acres of the family farm. My objections to the pipeline are rooted in environmental concerns and health and safety matters. The pipeline’s impact remains shrouded in uncertainty, including unknown water requirements, the loss of tillable land, the potential for ruptures and the life-threatening consequences such ruptures may pose. As a guardian of this land, I stand resolute in my opposition. This Draft Environmental Impact Study (DEIS) is a crucial step in raising these fundamental issues regarding CO ₂ pipelines and Minnesota land. My major concerns with the DEIS are focused on the risks to water & land resources as well as public health and safety.	Thank you for your comment.	20243-204403-01
	Kramer, Terese	2024-02-22	Water and natural resource risk Minnesota’s recent experience with non-CO ₂ pipeline construction demonstrates the serious harms that it causes on water resources as well as a tendency by state agencies to underestimate those impacts. Dangers to water and water bodies: The proposed route for Summit Carbon Solutions (“Summit”)’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota’s waters and the fish, amphibians, reptiles, waterfowl, birds, and insects as well as Minnesota’s residents, that rely on it to survive.	An independent study that analyzes how CO ₂ disperses in water is outside the scope of the EIS and would not aid the Commission's decision on a route permit as all alternatives cross waterbodies. Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4.	20243-204403-01
	Kramer, Terese	2024-02-22	Water use: Much of southern Minnesota is suffering from the consequences of drought and over-commitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit “anticipates” an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is disturbingly ambiguous. There must be a careful and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or the volume of water needed for construction, so it is impossible to know the full impacts of those appropriations on water resources. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when Summit has not been transparent with its true demands for water resources?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Kramer, Terese	2024-02-22	Aquifer Damage: Summit’s preferred route, RA-South, crosses a surficial beach ridge aquifer in Otter Tail County. The DNR has said that the area is “prone to significant groundwater discharge,” and the applicant’s initial groundwater investigation confirmed that “artesian groundwater conditions are present” along that beach ridge system. In early feedback on the DEIS, the DNR noted that “Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer and that “breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.” This, along with our state’s first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers more seriously.	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline	20243-204403-01

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				construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	
	Kramer, Terese	2024-02-22	<p>HDD Drilling: The DEIS also states that “drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet [drinking water quality certification standards] would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA.” The DEIS does not discuss the risks of applying drilling mud, especially with additives not approved by MDH, to the land.</p> <p>The DEIS says that “drilling fluids and additives for the HDD would be non-toxic to the aquatic environment and humans,” however, even supposedly “non-toxic” drilling fluid is chemical waste that has been found to be harmful to plant and animal species. Summit’s preferred route and alternative route, RA-Hybrid, would cross three rivers (Pelican River, Otter Tail River, and Bois de Sioux River) via the HDD mention.</p>	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	20243-204403-01
	Kramer, Terese	2024-02-22	Wetlands: Table 5-40 on p. 5-98 of the DEIS states that “the loss of wetlands would be less than 0.01 acre.” However, Table 5-4 on p. 5-24 says that for Summit’s preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. And Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres. Clarification is required.	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.	20243-204403-01
	Kramer, Terese	2024-02-22	Critical Habitats: Summit’s preferred route would cross over or near several waterfowl protection areas, including the Orwell 9 Unit and Ridgeway WPA in Otter Tail County. The DEIS notes that some of these areas will be avoided during construction but fails to consider the impacts to these features in the event of a pipeline leak or rupture.	Operation of the proposed pipeline would include integrated systems for detecting leakages, as well as protocols for addressing leaks promptly. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to waterfowl and other wildlife within the Orwell 9 Unit or Ridgeway WPAs. As the comment notes, the pipeline route would avoid these areas. As a result, there would be negligible risk of impacts on these areas due to a pipeline rupture.	20243-204403-01
	Kramer, Terese	2024-02-22	<p>Agriculture and Land Impact</p> <p>The DEIS discounts the direct and long-term impacts of pipeline construction on land and soil integrity in spite of the significant evidence of likely harm.</p> <p>Land degradation: Summit plans to cut through roads, ditches, tile lines, and prime farmland including my family’s farmland. Under cumulative effects or impact theory – it is suggested that multiple activities on the environment may have an additive, synergistic or antagonistic effect on one another and with natural processes. It is my understanding that the emergence of cumulative effects in environmental regulations began in the 1970s and has since been increasingly seen as a consideration in environmental impact assessments and land management. Because of this cumulative effects consideration and Summit’s stated plans to expand in southern Minnesota (Highwater Ethanol plant in Lamberton, MN is already a committed plant), I believe all of this DEIS will be used to govern environmental issues throughout Minnesota. There is a growing body of anecdotal evidence and peer-reviewed research that shows that pipeline projects in the Midwest have caused yield reduction and damage to land years after project completion and “restoration”. The DEIS does acknowledge that the reduced productivity from construction “typically would extend for 2 to 3 years, but could take up to 5 years, depending on impacts on soils from the construction disturbance,” but fails to identify any measures the applicant should take to avoid these damages or repair them.</p> <p>Prime Farmland and Farmland of Statewide Importance: All three of the proposed routes would impact both Prime Farmland and Farmland of Statewide Importance, but Summit’s preferred route would impact significantly more acres of both across both the construction footprint and the operation footprint of the proposed project than the proposed alternatives.</p>	Measures that the applicant would take to minimize impacts on soils and agricultural land are described in the Minnesota ECP in Appendix D and Minnesota APP in Appendix E. Text in Chapter 5 has been revised to indicate that impacts on crop production would be long term due to impacts on soils from construction disturbance. Impacts on prime farmland and farmland of statewide importance are shown in Table 5-21 for each alternative. RA-Hybrid would impact the most acres of prime farmland. The amount of farmland of statewide importance that would be impacted by construction is relatively small for all three routes, ranging from 17.8 acres for RA-South to 15.7 acres for RA-Hybrid.	20243-204403-01

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	Kramer, Terese	2024-02-22	Impact of Leaks or Ruptures on Vegetation: The DEIS concludes a leak of CO ₂ “would slow plant growth” and that the rupture of the pipeline would instantly freeze the surrounding soil and “instantly kill all herbaceous ground vegetation” but provides no measures to avoid these impacts, nor does it discuss the long-term impacts of such damage on the soils and vegetation. Instead, the DEIS states, without proof, that “local soil microbes, mycorrhizae, and soil animals such as worms, arachnids, and insects...would re-colonize after the area is restored.”	Chapter 2 of the draft EIS discusses engineering and design elements incorporated into the project to reduce the likelihood of pipeline leaks or failure. Chapter 8 discusses potential impacts on vegetation and wildlife from slow leaks of CO ₂ and from a larger rupture. In the event of a pipeline rupture and large release, impacts on vegetation and soils would be highly localized to the area above the rupture. Re-colonization of the impact area would result from ecological succession processes that are well documented in areas that have experienced disturbance events of similar source, duration, and effect on other projects of a similar scale.	20243-204403-01
	Kramer, Terese	2024-02-22	Soil Compaction: The DEIS acknowledges that “soil compaction would be unavoidable in unpaved areas of equipment and vehicle operation” and that even if soils were decompacted, “some compacted soils could remain.” Soil compaction can have serious consequences in terms of water infiltration and drainage and should not be dismissed as an insignificant impact.	Section 5.7.8.2 indicates that groundwater recharge could be impacted by soil compaction. Section 5.7.6 explains that the applicant would comply with required permits and implement its Minnesota ECP and Minnesota APP, which would minimize impacts on soils. The text in Section 5.7.6 has been revised to indicate that, while most impacts on soils during construction would be minimal and temporary, some impacts could be long term.	20243-204403-01
	Kramer, Terese	2024-02-22	Geologic Hazards: The DEIS does not address whether the applicant has conducted geologic hazard surveys pursuant to the PHMSA Bulletin: https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2022-06/2022-11791.pdf	Geologic hazards are addressed in Sections 5.7.3 and 5.7.6. Text regarding geohazard assessments that would comply with the recommendations in PHMSA Advisory Bulletin 2022-01 has been added to both sections.	20243-204403-01
	Kramer, Terese	2024-02-22	In my view, the DEIS consistently underplays the known and unknown risks of transporting large amounts of CO ₂ at high pressures through a pipeline. CO ₂ Rupture Impact Zone: · According to the analysis in the DEIS, the potential impact radius for levels of CO ₂ that would be “immediately dangerous to life or health” is 617 feet. This expands to 910 feet for lower concentrations that cause dizziness, drowsiness, severe muscle twitching, and unconsciousness within a few minutes. Although Summit indicates that it will take 25 minutes for the system to shut off the relevant valves in the event of “abnormal operation,”the DEIS does not mention any meaningful safety measures for a rupture and instead suggests that it is “reasonable” for Summit to simply supply indoor CO ₂ detectors for residences within 1,000 feet of the project. · But the rupture report in Appendix G states that “a full rupture results in impact distances too quickly for an early warning device, such as an oxygen detector, to be effective.” Impacts of a Leak or Rupture on Animals: According to the DEIS, CO ₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would be unlikely to impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence. Though the DEIS does note some harm may come to animals in the event of a rupture, it relies heavily on the assumption that animals will simply move out of the rupture area to avoid the release. The reason for this assumption is not provided and is contradicted by information in the rupture report in Appendix G which suggests the impacts of a rupture would be nearly immediate. · Bottom line: This pipeline should not be approved without a clear understanding of the risks to human health and meaningful measures to ensure the safety of people and animals in pipeline area.	Text in Section 4.5 on valve closure time has been corrected from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3. CO ₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration (the conversion of sugars to usable energy). Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to these organisms. Potential impacts on wildlife from a CO ₂ rupture could result first from the physical force of a rupture and secondarily from localized short-term high levels of CO ₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO ₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most mobile wildlife species would follow	20243-204403-01

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				their natural instincts and attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO ₂ , which could be toxic for species unable to leave the area of the release.	
	Kramer, Terese	2024-02-22	<p>First responders and health professionals:</p> <ul style="list-style-type: none"> · CO₂ pipelines pose unique problems for first responders and health care providers. Because CO₂ is colorless and odorless, both victims and first responders have no way of knowing what is causing the health problems. · In addition, first responders require special equipment, including non-internal combustion engines, to respond to a CO₂ disaster. · The DEIS does not consider the burdens this will put on local EMS and health providers in the case of a pipeline rupture or accident or an assessment of how they should be prepared to respond given the unique needs. The DEIS includes Summit’s September 2022 Emergency Response Plan (Appendix N). This plan is not only outdated but also unclear as to how local EMS and first responder will interact with the applicant in the event of a leak or rupture. Though the plan talks of multiple company personnel as playing roles in an emergency response, it ignores the fact that the applicant only plans on having one full-time employee at the capture facility. Local first responders deserve more clarity about how they will be expected to respond to an emergency situation and what the applicant will do to ensure they are adequately equipped and informed for such an event. 	<p>Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved.</p> <p>Additionally, EERA staff recommended that a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.</p>	20243-204403-01
	Kramer, Terese	2024-02-22	<p>Compliance with PHMSA Rules: The DEIS accepts Summit’s assurances that it will “comply with federal emergency response requirements,” but as noted in a Pipeline Safety Trust report and by the Pipeline Hazardous Material Safety Administration (PHMSA) itself, the current emergency response requirements are dangerously outdated.</p> <p>According to the DEIS, the Minnesota Public Utilities Commission (PUC) faces a critical decision regarding Summit’s proposed CO₂ pipeline.</p> <p>Safety Standards and Local Authority:</p> <ul style="list-style-type: none"> · The DEIS acknowledges that the PUC cannot directly set safety standards for the pipeline. · However, the Pipeline and Hazardous Materials Safety Administration (PHMSA) has clarified that state and local authorities retain the power to regulate land use, including setback distances. · PHMSA emphasizes that federal pipeline safety law does not infringe on local or state prerogatives in this regard. <p>PUC’s Responsibility: The DEIS should clarify the role and authority of the PUC to carefully consider the pipeline’s placement and safety implications, and make clear that it has the authority to determine:</p> <ul style="list-style-type: none"> · Routing: The optimal path for the pipeline. · Setback Requirements: How far the pipeline should be from sensitive areas (e.g., homes, schools). · Depth specifications: the optimal depth to ensure adequate protection for humans, animals and the environment. 	<p>Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements. Section 3 .4 of the EIS has been revised with this information.</p>	20243-204403-01
	Kramer, Terese	2024-02-22	<p>In addition to the concerns and issues stated above, I am alarmed that the DEIS falls short in accurately assessing its true CO₂ emissions and climate impact over its lifetime.</p> <p>Key concerns:</p> <ul style="list-style-type: none"> · Project longevity: The DEIS assumes a 25-year lifespan, but fails to address the continued CO₂ emissions from the ethanol plant after capture stops. This presents a significant unaccounted-for impact. 	<p>Section 2.7 describes project decommissioning. If the ethanol plant continues to operate beyond the life of the proposed project, its CO₂ emissions would not be captured.</p>	20243-204403-01
	Kramer, Terese	2024-02-22	<ul style="list-style-type: none"> · Unrealistic capture claims: The claim of 100% CO₂ capture from the ethanol plant lacks supporting data, independent verification, and transparency. No existing carbon capture facility achieves this rate. 	<p>Section 2.1 has been revised to clarify that the amount of CO₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture</p>	20243-204403-01

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				facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent.	
	Kramer, Terese	2024-02-22	· Electricity usage ignored: The DEIS overlooks the increased emissions from electricity needed for carbon capture. Using regional averages instead of the specific, higher emission factor from the local utility (Great River Energy) underestimates the true impact.	Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 gCO ₂ e/MWh. This was calculated from LREC’s energy resource mix in which nearly half comes from clean energy sources. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 g CO ₂ e/kWh), which was used in the draft EIS, calculated electricity emissions have decreased.	20243-204403-01
	Kramer, Terese	2024-02-22	· Uncertain storage: The assumption of 100% permanent underground storage for captured CO ₂ lacks guarantees and details on monitoring and verification protocols.	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
	Kramer, Terese	2024-02-22	· EOR ambiguity: The DEIS offers no clarity on whether captured CO ₂ could be sold for alternative uses (besides permanent storage) and the associated consequences. Additionally, the claim that oil production isn't dependent on the project's CO ₂ contradicts public statements from North Dakota officials and industry representatives. In conclusion, the DEIS must be amended and improved to comprehensively and accurately reflect the project's actual and long-term CO ₂ emissions and climate impact.	Section 5.7.2.3 stated: "if all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO ₂ , other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Kramer, Terese	2024-02-22	Summary of concerns regarding the proposed CO ₂ pipeline project and need to be adequately addressed in the DEIS: Environmental impacts: · Water: Potential for contamination through leaks, disruption of aquifers, and increased water usage. · Land: Loss of productive farmland, soil compaction, and disruption of critical habitats. · Vegetation: Damage to plants from leaks and ruptures, limited understanding of long-term impacts. Health and safety risks: · Leak and rupture: Large impact zone with potential for serious harm to humans and animals. Unclear response plan and inadequate safety measures. · First responders: Lack of training and equipment for CO ₂ emergencies. · Outdated regulations: Concerns about the adequacy of current safety standards. Additional concerns: · Limited scope of DEIS: Failure to properly assess long-term emissions, uncertainties surrounding CO ₂ storage, and lack of transparency on capture efficiency. · Route selection: PUC should have the authority to determine the optimal path, setbacks, and depth of the pipeline. Conclusion: The DEIS requires significant improvement to address these critical concerns before the project can be considered safe and responsible.	See responses to the detailed comments above.	20243-204403-01
	Lagaard, Scott	2024-02-22	The CO ₂ pipeline is a great concern of mine, for several reasons: 1) The rules for CO ₂ pipelines are not yet finalized. This must happen first, BEFORE construction begins. 2) This project will extend the life of fossil fuels - used as justification for more ETOH production, which use a food to make fuel, and fracking to get more oil from the ground.	Thank you for your comments. PHMSA regulations (that is, their appropriateness) and related standards for CO ₂ pipelines are outside the scope of the EIS (Appendix A). Section 3.6 acknowledges that PHMSA is currently conducting rulemaking proceedings on proposed amendments to its pipeline safety rules. Section 3.6 also notes that the Commission has indicated that it would be prudent for EERA staff and the applicant to take any updated mitigation strategies or safety guidelines into account, even if the updates have not been finalized. Appendix G of the EIS further summarizes the extensive and detailed PHMSA CO ₂ pipeline	20243-204403-01

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				regulations applicable to the construction, operation, and maintenance of such pipelines, and the status of pending PHMSA changes to such. EERA staff has been following PHMSA CO ₂ pipeline rulemaking proceedings before and since issuance of the draft EIS. As of July 5, 2024, PHMSA has not published the Notice of Proposed Rulemaking that will describe the scope of new and amended regulations; thus, there are currently no changes to existing PHMSA rules and regulations. Accordingly, discussion in the EIS of “mitigation strategies and measures to ensure public safety including, but not limited to, measures consistent with the proposed and final federal rules to the extent available” is based on existing PHMSA rules and regulations (Commission. September 26, 2023. Order Approving Scope of Environmental Review and Denying Stay. eDockets No. 20239-199149-01). To the extent applicable, Section 3.6 and Appendix G of the EIS have been updated with the above information.	
	Lagaard, Scott	2024-02-22	3) The pipeline is not safe. The CO ₂ makes acid with even the most tiny moisture, which is unavoidable, and can weaken the metal. 4) When the pipe ruptures (as has already happened in the U.S.), pressurized CO ₂ jets out, making a cloud of asphyxiating gas, heavier than air, that kills people and animals. Vehicles cannot start or run in this cloud, inhibiting escape or rescue. At the very least, O ₂ masks and cylinders should be mandated, to be delivered and deployed in each home or building for every person - and extras for visitors - for each possible habitable structure within one mile on either side of the entire pipeline.	Thank you for your comment.	20243-204403-01
	Lagaard, Scott	2024-02-22	5) There is no proof that CO ₂ can be retained perpetually in storage, and projects of this type so far have a very poor success rate. Hold construction AT LEAST until all questions are researched and proven by university scientists.	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
	Leussler, Marcy	2024-02-23	The DEIS consistently fails to properly account for the real CO ₂ emission and climate impacts of the project. Lifetime of Project: The applicant states that the anticipated lifetime of this project is 25 years. This means at the end of its life, the project could stop capturing the CO ₂ from the ethanol plant.	Thank you for your comment. If the ethanol plant continues to operate beyond the life of the proposed project, its CO ₂ emissions would not be captured.	20243-204403-01
	Leussler, Marcy	2024-02-23	Unless the ethanol plant will also cease operations at that point in time, it will continue to emit CO ₂ unabated into the future. 100% CO ₂ Capture Rate: Summit states that the capture facility “is designed to capture 100% of the CO ₂ produced by the ethanol plant.” There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party. Additionally, the DEIS should emphasize that any CO ₂ capture is solely associated with emissions from the ethanol fermentation process and provides zero reductions on the significant emissions from the facility’s electricity use.	Section 2.1 has been revised to clarify that the captured CO ₂ is produced by the ethanol plant as part of its fermentation process, the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.	20243-204403-01
	Lind, Kat	2024-02-18	re: Docket no 22-422 draft EIS comment period: Dear State, Public Utilities Commissioner & Dept. of Commerce, Based on Minnesota Rules and the formal practice and execution of the State's Environmental Review / Protection Act, this draft EIS appears inadequate. It may be fair to involve the EQB and EQB Board due to the project involving complex issues with multijurisdictional effects [Minn.R.4410.2800]. More needs to be disclosed and considered with this "project" in relation to connected actions of the project. What is currently disclosed fails to present the project as a whole. It is in the best interest of the State to be a leader in establishing safe, sound, and practicable decisions that influence Minnesotan environment, resources, and its people. The draft EIS shall be prepared consistent with parts 4410.0200 thru 4410.6500. For the Final EIS, please consider and add additional required information:	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01

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	Lind, Kat	2024-02-18	4410.0200, subp. 65 - it appears that this EIS was 'scoped' limitedly and more so in line with permitting which goes against Minn. Rules as, "Project" means a governmental action, the results of which would cause physical manipulation of the environment, directly or indirectly. The determination of whether a project requires environmental documents shall be made by reference to the physical activity to be undertaken and not to the governmental process of approving the project.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Lind, Kat	2024-02-18	4410.0200, subp. 9c - this segment of pipeline presented in this draft EIS is not operational in and of itself, the carbon sequestration location/s is part of this pipeline project as its intent and destination. Greater amounts of detail and solid-science information about the carbon sequestration location/activities should be publicly disclosed and discussed in a wholistic and meaningful way as, Connected actions. Two projects are "connected actions" if a responsible governmental unit determines they are related in any of the following ways: A. one project would directly induce the other; B. one project is a prerequisite for the other and the prerequisite project is not justified by itself; or C. neither project is justified by itself.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS. Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
	Lind, Kat	2024-02-18	4410.0200, subp 11 and 11a - because of the connected actions associated with this pipeline route [e.g., long-term carbon sequestration in geologic substrate] the cumulative effects contexts of the project as currently disclosed are substantially inadequate. "Cumulative impact" means the impact on the environment that results from incremental effects of the project in addition to other past, present, and reasonably foreseeable future projects regardless of what person undertakes the other projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. "Cumulative potential effects" means the effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects. Significant cumulative potential effects can result from individually minor projects taking place over a period of time. In analyzing the contributions of past projects to cumulative potential effects, it is sufficient to consider the current aggregate effects of past actions. It is not required to list or analyze the impacts of individual past actions, unless such information is necessary to describe the cumulative potential effects. In determining if a basis of expectation has been laid for a project, an RGU must determine whether a project is reasonably likely to occur and, if so, whether sufficiently detailed information is available about the project to contribute to the understanding of cumulative potential effects. In making these determinations, the RGU must consider: whether any applications for permits have been filed with any units of government; whether detailed plans and specifications have been prepared for the project; whether future development is indicated by adopted comprehensive plans or zoning or other ordinances; whether future development is indicated by historic or forecasted trends; and any other factors determined to be relevant by the RGU.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Lind, Kat	2024-02-18	Controversy - the project is controversial in North Dakota, which is the destination location with sequestration storage; North Dakota denied this project approvals. This project also has pipeline in neighboring states where the project is controversial. The State / the Dept. needs to be a leader in environmental protection by considering the objective, wholistic view of projects, its impacts, including what could be controversial, esp. when involving decisions associated with connected actions of our permitting/project across state boundaries. MN, its resources and people need to feel secure and safe into our future; making blind narrow-focused 'decisions' is not in the best interest of the state when these actions are controversial elsewhere. Why would the State permit a pipeline with destination and connected actions across state borders, when the destination of this pipeline that requires a pipeline permit, has been denied? What about the portion of the project that is anticipated in southern/south-central MN (Section 2.1 / Figure 2.1)? What is that connected action? Status? Timeline? Details?	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS. The applicant has indicated that, should a permit for the North Dakota portion of the Midwest Carbon Express project not be issued, it will not construct the Otter Tail to Wilkin portion of the project.	20243-204403-01
	Lind, Kat	2024-02-18	Due to the potential for significant environmental effects associated with the connected actions (e.g., pipeline, carbon sequestration in geological substrate across state borders, others?), it is reasonable to include that the project [including the carbon sequestration and other pipeline routes outside of MN] are controversial. The project on whole is controversial and it is not discussed in this EIS those controversial sticking points have not been disclosed. This is concerning in that there is not full public disclosure and the scope of the State Dept. is narrow on that for what is being permitted in one portion of the state. Is there another portion of pipeline potentially in the southern portion of the state? Minding, some public news feeds has this "project" spanning a larger distance and impact in southern/south-central MN. The "project" also has pipeline and destinations in Iowa, Nebraska, South Dakota, and North Dakota with the carbon sequestration storage site north of Bismark, North Dakota. Here is an example of where the public can find a full map of "the project"	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS. The Midwest Carbon Express project is discussed in Section 2.1 of the EIS. A map showing the proposed Midwest Carbon Express project in North Dakota, South Dakota, Nebraska, Minnesota, and Iowa is shown on Page 2-2. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01

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			https://www.desmoinesregister.com/story/money/business/2023/08/31/iowa-basedsummit-wins-bid-for-carbon-pipeline-environmental-review-inminnesota/70731887007/ https://iowacapitaldispatch.com/2023/08/04/north-dakota-denies-summit-carbon-apipeline-permit/ It appears that this project is 'getting political' and as a concerned citizen in MN, it is suggested that this EIS document reflects objectively, the project as a whole, and its full span of effects of all components of "the project". The whole picture is not presented in this EIS. This is concerning for the overall health and well-being of our State (its citizens and environment); Minnesota should be showing we're a leader especially when dealing with contentious/controversial environmental activities, esp. when we're building out connected actions to controversial activities across state lines. These connections are not made or disclosed in this draft EIS with its narrow scope of pipeline in MN.		
	Lind, Kat	2024-02-18	It feels wild to note, but the State, the PUC/Dept., and its project EIS should consider things associated with the proposed carbon sequestration storage site including things like long-term effects, potential for migration, effects of migration, or other time oriented effects or geological-oriented effects of storing the carbon in the geologic substrate. Is there potential for earthquakes, land shifts/sinkholes, implications with the Yellowstone Caldera, etc./others? What are the unforeseen consequences or carbon storage in this manner? What are the alternatives? What is the payoff of doing this environmental activity that has long-term effects [of connected actions, not addressed in this EIS] in relation to invisible/intangible carbon credits? Is it worth it?	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
	Lind, Kat	2024-02-18	It is overly sweeping [arbitrary and capricious] to state, "The project would have a net beneficial effect on climate change as it would capture and store CO ₂ emissions from the ethanol plant." (Exec Summary, pg. 8) Where is the proof of this? What in the global climate change systems and cycles will be transitioned off of its current course? It's highly unlikely this project actually has a "net beneficial effect on [global] climate change". The statement is said without addressing the storage of CO ₂ in the draft EIS and how the effects of that weigh in the balance of storing the carbon in this infrastructure-heavy project. What if the geologic storage in North Dakota fails? What kind of effect would this have? Furthermore the roll of food, starvation, increasing population, agriculture, soil health, water usage and pollution from conventional ag practices, human health, poverty, and food for fuel are not being disclosed and considered in balanced proportions. Corn is a very nutrient and water intensive crop. It strips topsoil of nutrients, there's often plowing involved resulting in water quality issues. There's a whole universe of impacts related to growing corn then using that as fuel which is not being considered here. Are there other potential plant based fuel sources? All these thing directly effect Minnesota, our resiliency and wellbeing now and into the future. Furthermore, the draft EIS does not cover the carbon sequestration storage, its location, actions, and short and long-term impacts of that. This is concerning the State of MN would make a limited view pipeline approval on a controversial and multijurisdictional project and not cover the pipeline destination to a newer technology of geologic carbon sequestration. Please validate that this statement is true with factual evidence and provide vetted proof in the final EIS or make decision-based action moving forward.... like taking a pause or moratorium on geologic carbon sequestration related projects including any of the pipelines that would be leading to it until more is known for certain. It is concerning this environmental review has been handled with such narrow (seemingly, permitting oriented view) scope of what the project, its controversy, and long-term connected actions are involved.	Section 5.7.2 has been revised to note that the project would contribute to a net beneficial effect on climate change as it would capture and store CO ₂ emissions from the ethanol plant. Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
	Lind, Kat	2024-02-18	I do apologize for missing the comment period for the Scoping EAW. It is concerning this environmental review has proceeded with such narrow and seemingly permitting oriented view when there is controversy over the project across state boundaries and associated with the long-term connected actions of long-term geologic storage of CO ₂ . Kind request for the State, the PUC/Dept. to consider the comments provided in this letter and the potential for significant environmental effects of the full project, including the sequestration site that serves this MN pipeline alignment, the larger connection of pipelines associated with the project [cross-state infrastructure under the same project] and that these connected actions and wholistic breadth of "the project" be explored and publicly disclosed in the Final EIS and future decisions associated with this project. Regards, Concerned MN citizen.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Ludington, Mary	2024-02-23	The DEIS consistently fails to properly account for the real CO ₂ emission and climate impacts of the project. Lifetime of Project: The applicant states that the anticipated lifetime of this project is 25 years. This means at the end of its life; the project could stop capturing the CO ₂ from the ethanol plant. Unless the ethanol plant ceases operations at that point in time, it will continue to emit CO ₂ unabated into the future.	Thank you for your comment. Section 2.7 describes project decommissioning. If the ethanol plant continues to operate beyond the life of the proposed project, its CO ₂ emissions would not be captured.	20243-204403-01

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	Ludington, Mary	2024-02-23	100% CO ₂ Capture Rate: Summit states that the capture facility “is designed to capture 100% of the CO ₂ produced by the ethanol plant.” There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party. Additionally, the DEIS should emphasize that any CO ₂ capture is solely associated with emissions from the ethanol fermentation process and provides zero reductions on the significant emissions from the facility’s electricity use	Section 2.1 has been revised to clarify that the captured CO ₂ is produced by the ethanol plant as part of its fermentation process, the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.	20243-204403-01
	Ludington, Mary	2024-02-23	Added CO ₂ from electricity use: Carbon capture technologies are highly energy intensive and will significantly increase the carbon emissions at the facility from electricity use. The DEIS uses the Midwest Reliability Organization West Region average to calculate these emissions, which is unnecessarily inaccurate given the availability of the actual emissions factor from Great River Energy.	Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 gCO ₂ e/MWh. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 g CO ₂ e/kWh), which was used in the draft EIS, calculated electricity emissions have decreased.	20243-204403-01
	Ludington, Mary	2024-02-23	CO ₂ Storage: The DEIS assumes 100% of captured CO ₂ is being permanently stored underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols that would ensure it. Enhanced Oil Recovery: The DEIS fails to explain whether the applicant can sell any of its captured CO ₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. The DEIS incorrectly states that “Production of oil through EOR would not be dependent on the availability of CO ₂ produced by the ethanol plant.” This claim is contradicted by countless public statements from public officials in North Dakota and oil industry representatives.	The text questioned by the commenter in Section 5.7.2.3 was prefaced with the following: "if all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO ₂ , other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Lutz, Dale R.	2024-02-13	This key goal, as stated on page 1-1 of the Draft EIS, is to: “reduce the carbon-intensity score of ethanol produced at the Green Plains ethanol plant and enhance its marketability in low-carbon fuel standard markets.” The Minnesota legislature is currently setting state fuel carbon-intensity targets with the input of the February 1, 2024, report from their Clean Transportation Standard (CTS) Work Group. The ignored alternative technology is described on page 179 of the Addendum to this 2023-2024 Clean Transportation Standard Work Group Report, which is copied below. ... There are several existing technological approaches for converting CO ₂ and hydrogen (H ₂) to ethanol (or other alcohols). An industrial reverse water-gas shift reactor can convert most of the (CO ₂ + H ₂) to (CO + H ₂ O), yielding a mixture called synthesis gas or syngas. The syngas can then be converted to ethanol, as demonstrated by LanzaTech, for example. The company Twelve uses a CO ₂ electrolyze to split the CO ₂ into CO (for syngas) and O ₂ . When the CO is combined with “green hydrogen”, the resulting syngas will then be further processed into jet fuel, in their recently announced E-Jet® plant at Moses Lake, Washington.	Thank you for your comment. Ethanol gasification would fundamentally alter the ethanol plant—its construction and operation, staff, business continuity, supply chain, and co-products. This would yield far reaching economic and social impacts. Therefore, conversion of the ethanol plant from a dry milling corn grain feedstock process to gasification does not meet the project's purpose. As such, this alternative technology is considered outside the scope of the EIS.	20243-204403-01
	Lutz, Dale R.	2024-02-13	concerns about potential pipeline ruptures or aquifer breaches, make me very concerned that resistance to pipeline construction will delay CO ₂ emission reduction efforts longer than we can afford. The construction funds would be better spent to build the localized CO ₂ capture and conversion infrastructure described above, rather than pipelines. The proposed Summit Carbon Solutions pipeline ends near the Bakken oil field in North Dakota. While the project may claim to sequester the CO ₂ in saline aquifers, I strongly suspect that at some point, perhaps after the tax credits expire, the pipeline CO ₂ will be used for enhanced oil recovery to produce more fossil fuel, making our climate crisis worse.	Thank you for your comment. Section 5.7.2.3 addresses the potential for the captured CO ₂ to be used for EOR.	20243-204403-01
	Mackenzie, Colin	2024-02-21	The ethanol industry contributes billions of dollars to Minnesota’s GDP and ensures that farmers have a consistent market for their corn. Ensuring that our state and our farmers continue to benefit from the ethanol industry is paramount, and Summit’s carbon capture project will do just that. Not only will it protect an already existing industry, but it will create both short-term and permanent local jobs. Furthermore, when the pipeline is operational, Summit will pay additional property taxes to support local priorities in communities across the state. This project promises to bring economic benefits to our state, and for that reason, I am happy to support Summit Carbon Solutions and hope the Minnesota PUC will issue the company a permit.	Thank you for your comment.	20243-204403-01

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	Manning Christie	2024-04-23	<p>To MN Department of Commerce,</p> <p>I'm writing to state my deep concern about the Draft EIS for the Otter Tail to Wilkin CO₂ pipeline project. I am a resident of Minnesota, and a social scientist who studies the impacts of environmental degradation on mental health.</p> <p>This pipeline project is worrying for many reasons:</p> <p>The DEIS was not adequate.</p> <p>It's climate numbers that don't add up, it did not give enough attention to pipeline construction risks such as aquifer breaches and it does not seriously enough consider the health or safety impacts a pipeline rupture would have on the community.</p>	Thank you for your comment.	20243-204403-01
	Mathiowetz, Wade	2024-02-09	<p>I am seriously concerned about the proposed Summit Carbon Solutions CO₂ pipeline set to traverse through 13 Minnesota Counties. The DEIS does not acknowledge meaningful safety measures for a rupture, instead suggests Summit supply CO₂ detectors for residents within 1000 feet. I feel there needs to be a healthier safety protocol. A rupture that occurs, and 25 minutes goes by, before valves are closed, an extreme amount of CO₂ has released is very frightening, as emergency personal will have extra burden, immobilized vehicles from loss of oxygen. Mostly all of local EMS in rural Minnesota is under equipped and inexperienced with CO₂. More cost to the EMS for CO₂ related incidences, as the local EMS are ill supplied with funds.</p>	<p>Text in Section 4.5 on valve closure time has been corrected from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Potential impacts associated with a CO₂ release are described in Chapter 8 of the EIS. Emergency response is also discussed in Chapter 8. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.</p>	20243-204403-01
	Mathiowetz, Wade	2024-02-09	<p>CO₂ capture at ethanal plants require double the amount of water from what is required already to operate. This will impose grim consequences on aquifers, as southern Minnesota has gone through 3 years of drought. This will deplete already constrained aquifers. The residents will lose their drinking water supply.</p>	<p>Additional information has been added to Section 5.7.8.2 to address the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.</p>	20243-204403-01
	Mathiowetz, Wade	2024-02-09	<p>Summit states the capture facility is designed to capture 100% CO₂ produced from ethanal plants. There is no carbon capture facility in the world that would capture 100% CO₂. This claim does not have any info or verified by a third party. Furthermore, this entire project will not capture enough CO₂ to offset what it will produce. This is not going to benefit the public people at all, it will just create economic hardship and safety hazards. If you drink water, you are involved. This statement involves all Minnesotans. I cannot express the need to let all Minnesotans know all the facts about this proposed Summits Carbon pipeline.</p>	<p>Section 2.1 has been revised to clarify that the amount of CO₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios for 100 percent, 70 percent, 40 percent, and 10 percent.</p>	20243-204403-01
	Mehmel, Gretchen	2024-02-23	<p>I am commenting on the Ottertail to Wilken Co2 pipeline project's draft EIS. My primary concern is the section on rare, threatened, and endangered species. That entire section is so general it becomes meaningless. More specifics regarding species actually present along the corridor of disturbance needs to be added which should include a survey of the area during the same time of year in which the disturbance would occur.</p>	<p>Section 5.7.5 discusses rare and unique species, including lists of all federal and state-listed species known to be potentially present within each of the route alternatives. Presence of and potential impacts on these species, as well as eagles and migratory bird species, are also discussed. Mitigation proposed by the applicant and stipulated by DNR includes pre-construction surveys of the selected route for listed species</p>	20243-204403-01

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			A more robust discussion of possible threats to those species habitats should also be included. Both direct and indirect impacts should be evaluated for each threatened, endangered, and special concern species along the route. Thank you for taking these comments.	prior to construction. Nesting bird surveys would also be conducted to ensure that the Project is in compliance with the MBTA.	
	Menzel, Mike	2024-02-22	I am a physician and cofounder of health professionals for a healthy climate. There are many reasons why this pipeline should not go forward, and I am submitting one of them. The DEIS consistently fails to properly account for the real CO ₂ emission and climate impacts of the project. Lifetime of Project: The applicant states that the anticipated lifetime of this project is 25 years. This means at the end of its life; the project could stop capturing the CO ₂ from the ethanol plant. Unless the ethanol plant ceases operations at that point in time, it will continue to emit CO ₂ unabated into the future.	Thank you for your comment. Section 2.7 describes project decommissioning. If the ethanol plant continues to operate beyond the life of the proposed project, its CO ₂ emissions would not be captured.	20243-204403-01
	Menzel, Mike	2024-02-22	100% CO ₂ Capture Rate: Summit states that the capture facility “is designed to capture 100% of the CO ₂ produced by the ethanol plant.” There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party. Additionally, the DEIS should emphasize that any CO ₂ capture is solely associated with emissions from the ethanol fermentation process and provides zero reductions on the significant emissions from the facility’s electricity use.	Section 2.1 has been revised to clarify that the captured CO ₂ is produced by the ethanol plant as part of its fermentation process and the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.	20243-204403-01
	Menzel, Mike	2024-02-22	Added CO ₂ from electricity use: Carbon capture technologies are highly energy intensive and will significantly increase the carbon emissions at the facility from electricity use. The DEIS uses the Midwest Reliability Organization West Region average to calculate these emissions, which is unnecessarily inaccurate given the availability of the actual emissions factor from Great River Energy.	Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 gCO ₂ e/MWh. This was calculated from LREC’s energy resource mix in which nearly half comes from clean energy sources. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 g CO ₂ e/kWh), which was used in the draft EIS, calculated electricity emissions have decreased.	20243-204403-01
	Menzel, Mike	2024-02-22	CO ₂ Storage: The DEIS assumes 100% of captured CO ₂ is being permanently stored underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols that would ensure it.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent.	20243-204403-01
	Menzel, Mike	2024-02-22	Enhanced Oil Recovery: The DEIS fails to explain whether the applicant can sell any of its captured CO ₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. The DEIS incorrectly states that “Production of oil through EOR would not be dependent on the availability of CO ₂ produced by the ethanol plant.” This claim is contradicted by countless public statements from public officials in North Dakota and oil industry representatives.	The text questioned by the commenter in Section 5.7.2.3 was prefaced with the following: "if all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO ₂ , other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Miersch, Janell	2024-02-22	I have read that these types of pipelines fail and are not as stable as purported. I think this is a poor "solution" and should be abandoned.	Thank you for your comment.	20243-204403-01
	Miller, Janet	2024-04-23	My name is Janet Miller, and I am a resident of Iowa, a state that shares concerns with Minnesota regarding the operations of Summit Carbon Solutions and their proposed CO ₂ pipeline and Carbon Capture project. While I may not reside in Minnesota, the decisions made by the Minnesota Public Utilities Commission regarding this project have significant implications for me and my community. As	Thank you for your comment.	20243-204403-01

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
			an Iowan, I am deeply concerned about the potential environmental, economic, and social impacts of the CO ₂ pipeline that extend beyond state borders. The environmental consequences of the project, such as air and water quality, land use, and climate change mitigation efforts, are issues that resonate with me as a resident of the region.		
	Miller, Janet	2024-04-23	Further, the economic repercussions of the project, including job creation, energy costs, and market dynamics, could have ripple effects on neighboring states like Iowa. Understanding how this project may influence the regional economy is a valid concern that I share with many others in the area.	Thank you for your comment. A full, independent, regional, economic analysis is outside the scope of this EIS.	20243-204403-01
	Miller, Janet	2024-04-23	I am also mindful of the community well-being aspects of the project, such as safety concerns, land use conflicts, and impacts on local communities. Ensuring the protection and well-being of communities in the region, regardless of state boundaries, is a shared responsibility that I take seriously.	Thank you for your comment.	20243-204403-01
	Miller, Janet	2024-04-23	I urge the authorities to consider the interconnected nature of these issues and conduct a thorough and transparent Environmental Impact Statement that addresses the concerns of residents in both Minnesota and Iowa. It is crucial that the interests of all individuals affected by these pipelines are taken into account in the decision-making process. Thank you for considering my perspective and concerns on this critical issue that impacts our shared region.	Thank you for your comment.	20243-204403-01
	Montgomery, JI	2024-04-23	I oppose any pipelines as this will cause more harm to our communities and our children health I am truly upset and concerned about this CO ₂ pipeline project this will cause more health problems to all living near this project it will cause countless cancers to all.	Thank you for your comment.	20243-204403-01
	Moss, Paul	2024-02-12	I am particularly concerned with the water related impacts of the proposed pipeline project. Minnesota's recent experience with pipeline construction demonstrates the serious harms that it causes on water resources as well as a tendency by state agencies to under-account for those impacts. Risks include: Dangers to water and waterbodies: The proposed route for Summit's pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota's precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive.	Potential impacts on surface water and aquatic resources from a possible CO ₂ release are addressed in Section 8.3. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Moss, Paul	2024-02-12	Water use: Much of southern Minnesota is suffering from the consequences of drought and over-commitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit "anticipates" an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impacts of those appropriations on water resources. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent with its true demands for water resources?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Moss, Paul	2024-02-12	Aquifer Damage: Summit's preferred route, RA-South, crosses a surficial beach ridge aquifer in Otter Tail County. The DNR has said that the area is "prone to significant groundwater discharge," and the applicant's initial groundwater investigation confirmed that "artesian groundwater conditions are present" along that beach ridge system. In early feedback on the DEIS, the DNR noted that "Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer and that "breaching shallow confined aquifers could have significant long-term impacts to groundwater resources." This, along with our state's first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers more seriously.	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on	20243-204403-01

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				construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	
	Moss, Paul	2024-02-12	<p>HDD Drilling: The DEIS also states that “drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet [drinking water quality certification standards] would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA.” The DEIS does not discuss the risks of applying drilling mud, especially with additives not approved by MDH, to the land.</p> <p>The DEIS says that “drilling fluids and additives for the HDD would be non-toxic to the aquatic environment and humans,” however, even supposedly “non-toxic” drilling fluid is chemical waste that has been found to be harmful to plant and animal species. Summit’s preferred route and alternative route, RA-Hybrid, would both cross three rivers (Pelican River, Otter Tail River, and Bois de Sioux River) via the HDD mention.</p>	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	20243-204403-01
	Moss, Paul	2024-02-12	Wetlands: In Table 5-40 on p. 5-98 of the DEIS it states that “the loss of wetlands would be less than 0.01 acre.” However, Table 5-4 on p. 5-24 says that for Summit’s preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. And Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres. Which is it??	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover, and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.	20243-204403-01
	Moss, Paul	2024-02-12	<p>Impacts of a Leak or Rupture on Animals: According to the DEIS, CO₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would be unlikely to impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence. Though the DEIS does note some harm may come to animals in the event of a rupture, it relies heavily on the assumption that animals will simply move out of the rupture area to avoid the release. The reason for this assumption is not provided and is contradicted by information in the rupture report in Appendix G which suggests the impacts of a rupture would be nearly immediate.</p> <p>Critical Habitats: Summit’s preferred route would cross over or near several waterfowl protection areas, including the Orwell 9 Unit and Ridgeway WPA in Otter Tail County. The DEIS notes that some of these areas will be avoided during construction but fails to consider the impacts to these features in the event of a leak or rupture.</p>	CO ₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to local vegetation or wildlife. Potential impacts on wildlife from a CO ₂ rupture could result first from the physical force of a rupture and secondarily from localized short-term high levels of CO ₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO ₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most mobile wildlife species would follow their natural instincts and attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO ₂ , which could be toxic for species unable to leave the area of the release.	20243-204403-01
	Multiple	Multiple	I ask that the Public Utilities Commission and Department of Commerce take these issues into account in order to ensure that the Environmental Impact Statement (EIS) for the Otter Tail to Wilkin CO ₂ Pipeline Project in Otter Tail and Wilkin Counties (Docket Number: 22-422) is a factual and thorough account of the project impacts. Minnesotans need a robust environmental review, and we need transparency, accountability, and regulatory oversight to ensure the greater public good and interests of communities impacted by these pipelines and all Minnesotans are respected and protected.	Thank you for your comment.	Multiple

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	Nauerth III, John	2024-02-22	Good afternoon, my name is John Nauerth III, I live in Jackson County, Mn., I am 82 years old (don't know how that happened!) and have done dirt work and drainage for many years, fixed lots of drain tiles. Looking at the DEIS for Otter tail, to Wilken CO ₂ pipeline, I do not feel comfortable with Summit mediation of soil property's, Enbridge petroleum suffered a huge spill in Kansas, upon investigation by NTSB, cause was determined the soil settled under the line causing a welded joint to crack apart. The good thing is the line was not a CO ₂ line with 1800 lbs. pressure transporting an odorless asphyxiant product. Any time soil is moved, shrinkage becomes a problem especially during dry weather conditions. I just don't want to see our citizens exposed to this danger.	Potential impacts associated with expansion and shrinkage of soils are described in Section 5.7.6.2.	20243-204403-01
	Nauerth III, John	2024-02-22	Bloomberg financials reports Poet has agreed to ship CO ₂ from 17 of their plants using Summit pipeline making the total of 51 ethanol plants in this project, water usage will be problematic, Summit has not properly addressed this water issue. in the Otter Tail DEIS.	Thank you for your comment. Detailed analysis of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Norrgard, Lois	2024-02-23	I have lived in Minnesota my entire life, presently in Bloomington. For over 35 years now I have participated in numerous comment periods, commenting to our state agencies about numerous issues regarding new polluting industries and how our public lands, air and water are being industrialized. Air pollutants, water pollution, dumping chemicals into our soil - all have been historically overlooked by MN regulatory agencies year after year, decade after decade. We are in a state of decline, reaching major tipping points. I request all state agency staff who are in the positions of rubber stamping the permits that come across your desks review and understand this, (which now has an “official” name “Shifting Baselines Syndrome”): https://oceana.org/blog/daniel-paully-and-george-monbiot-conversation-about-shifting-baselines-syndrome/ I am extremely frustrated with the lack of oversight and regulation from Minnesota’s governmental agencies. I am so tired of the Regulatory Capture of our state agencies - agencies that we citizens are supposed to count on to protect our health and environment! Enough is enough! For decades, under pressure from polluting industries—including mining, coal, corporate agriculture—and now pipelines, the citizens of Minnesota have watched the deterioration of our wild places, waters, air, and soils – and importantly our own public health. From nitrates in our drinking water to PFAS to methane and the increasing climate crisis disrupting our seasons and weather patterns it is far past time those in our state agencies who rubber-stamp every permit that crosses their desks start to take notice.	Thank you for your comment.	20243-204403-01
	Norrgard, Lois	2024-02-23	In this new threat – CO ₂ pipelines - I am asking that true impacts to our environment be taken seriously. The DEIS consistently fails to properly account for the real CO ₂ emission and climate impacts of the project. This must be addressed. Carbon capture and storage is another industry green-washing that really is not – and should not be – considered a “climate solution.” <ul style="list-style-type: none"> • 100% CO₂ Capture Rate: Summit states that the capture facility “is designed to capture 100% of the CO₂ produced by the ethanol plant.” There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party. Additionally, the DEIS should emphasize that any CO₂ capture is solely associated with emissions from the ethanol fermentation process and provides zero reductions on the significant emissions from the facility’s electricity use 	Section 2.1 has been revised to clarify that the captured CO ₂ is produced by the ethanol plant as part of its fermentation process, the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.	20243-204403-01
	Norrgard, Lois	2024-02-23	<ul style="list-style-type: none"> • Added CO₂ from electricity use: Carbon capture technologies are highly energy intensive and will significantly increase the carbon emissions at the facility. The DEIS uses the Midwest Reliability Organization West Region average to calculate these emissions, which is unnecessarily inaccurate given the availability of the actual emissions factor from Great River Energy. 	Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 gCO ₂ e/MWh. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 g CO ₂ e/kWh), which was used in the draft EIS, calculated electricity emissions have decreased.	20243-204403-01
	Norrgard, Lois	2024-02-23	<ul style="list-style-type: none"> • CO₂ Storage: The DEIS assumes 100% of captured CO₂ is being permanently stored underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols that would ensure it. 	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
	Norrgard, Lois	2024-02-23	<ul style="list-style-type: none"> • Enhanced Oil Recovery: The greatest threat and true intended goal of Summit - The DEIS fails to explain whether the applicant can sell any of its captured CO₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. The DEIS incorrectly states that “Production of oil through EOR would not be dependent on the availability of CO₂ produced by the ethanol plant.” This claim is contradicted by countless public statements from public officials in North Dakota and oil industry representatives. 	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01

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	Norrgard, Lois	2024-02-23	<p>Minnesota’s recent experience with pipeline construction demonstrates the serious harms that it causes on water resources as well as a tendency by state agencies to under-account for those impacts.</p> <ul style="list-style-type: none"> • Dangers to water and waterbodies: The proposed route for Summit’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO₂ disperses in water and what risks a CO₂ pipeline leak or rupture poses to Minnesota’s precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive. 	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Norrgard, Lois	2024-02-23	<ul style="list-style-type: none"> • Water use and Minnesota’s drought conditions! Much of southern Minnesota is suffering from the consequences of drought and over-commitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit “anticipates” an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impact of those appropriations on water resources. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent with its true demands for water resources? Again, I request our state agencies see through industry green washing. 	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Norrgard, Lois	2024-02-23	<p>Aquifer Damage: Summit’s preferred route, RA-South, crosses a surficial beach ridge aquifer in Otter Tail County. The DNR has said that the area is “prone to significant groundwater discharge,” and the applicant’s initial groundwater investigation confirmed that “artesian groundwater conditions are present” along that beach ridge system. In early feedback on the DEIS, the DNR noted that “Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer and that “breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.” This, along with our state’s first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers extremely seriously.</p>	<p>Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used.</p> <p>The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.</p>	20243-204403-01
	Norrgard, Lois	2024-02-23	<ul style="list-style-type: none"> • HDD Drilling: The DEIS also states that “drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet [drinking water quality certification standards] would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA.” The DEIS does not discuss the risks of applying drilling mud, especially with additives not approved by MDH, to the land. <p>The DEIS says that “drilling fluids and additives for the HDD would be non-toxic to the aquatic environment and humans,” however, even supposedly “non-toxic” drilling fluid is chemical waste that has been found to be harmful to plant and animal species. Summit’s preferred route and alternative route, RA-Hybrid, would both cross three rivers (Pelican River, Otter Tail River, and Bois de Sioux River) via the HDD mention. Even for a “lay-person” public citizen it is clear that creating these drilling fluids and additives – then discharging into our lands (and waters) is adding a toxic load to our plant and animal species.</p>	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	20243-204403-01

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
	Norrgard, Lois	2024-02-23	<ul style="list-style-type: none">Impacts of a Leak or Rupture on Animals: According to the DEIS, CO₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would be unlikely to impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence. Though the DEIS does note some harm may come to animals in the event of a rupture, it relies heavily on the assumption that animals will simply move out of the rupture area to avoid the release. THIS IS ABSURD! The reason for this assumption is not provided and is contradicted by information in the rupture report in Appendix G which suggests the impacts of a rupture would be nearly immediate.Critical Habitats: Summit’s preferred route would cross over or near several waterfowl protection areas, including the Orwell 9 Unit and Ridgeway WPA in Otter Tail County. The DEIS notes that some of these areas will be avoided during construction but fails to consider the impacts to these features in the event of a leak or rupture.	<p>CO₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO₂ from operation of the proposed pipeline would not elevate ambient CO₂ to a level that is detrimental to local vegetation or wildlife. Potential impacts on wildlife from a CO₂ rupture could result first from the physical force of a rupture and secondarily from localized short-term high levels of CO₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most mobile wildlife species would follow their natural instincts and attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO₂, which could be toxic for species unable to leave the area of the release.</p> <p>Operation of the proposed pipeline would include integrated systems for detecting leakages, as well as protocols for addressing leaks promptly. Minor leaks of CO₂ from operation of the proposed pipeline would not elevate ambient CO₂ to a level that is detrimental to waterfowl and other wildlife within the Orwell 9 Unit or Ridgeway WPAs. As the comment notes, the pipeline route would avoid these areas. As a result, there would be negligible risk of impacts on these areas due to a pipeline rupture, because the potential impacts of a pipeline rupture would be highly localized and outside of the WPA boundaries.</p>	20243-204403-01
	Norrgard, Lois	2024-02-23	<p>Cumulative Impacts must be clearly evaluated – it is arbitrary and capricious to do otherwise.</p> <ul style="list-style-type: none">Complete Network Impacts: In addition to the direct impacts of the 28 miles of pipeline included in Summit’s application, the DEIS does not account for the indirect and cumulative impacts of Summit’s entire project in Minnesota. This is despite Summit’s clear and public plans for a much larger buildout in Minnesota and recent statements that they will be applying for permits for additional parts of the network imminently. Allowing Summit to artificially segment permitting requests for multiple concurrent projects on one pipeline will prevent a thorough review of the cumulative impacts and potential environmental and climate damages of the project.	<p>Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.</p>	20243-204403-01
	Norrgard, Lois	2024-02-23	<p>In conclusion: As I have laid out in my introduction there is great frustration in Minnesota with the actions of our state agencies – I am just one of multitudes – I hope that the DOC is listening. There are many excellent, experienced and knowledgeable people commenting on this DEIS. I am asking that you give greater credence to those that are doing this from the place of fear, concern, care for our environment, etc. than those that are economically benefitting from this new (false climate solution) industrialization of Minnesota.</p>	<p>Thank you for your comment.</p>	20243-204403-01
	Olness, Rita Flaig	2024-02-20	<p>I am writing in opposition to the construction of the proposed Summit Carbon Recapture Pipeline in Redwood County. As a current landowner of a piece of property which has been in our family for over 150 years and is in the area near the proposed pipeline, I have concerns regarding this proposed project including the safety, gains, and long-term effects of the project.</p>	<p>Thank you for your comment. The commenter references an area in Redwood County. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.</p>	20243-204403-01
	Olness, Rita Flaig	2024-02-20	<p>First, there are short-term and long-term safety concerns. The pipeline is projected to go near land that has multiple water sources including the Redwood River, Coalmine Creek (which crosses my land) and the Cottonwood River.</p>	<p>Thank you for your comment. The commenter references an area in Redwood County. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.</p>	20243-204403-01

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	Olness, Rita Flaig	2024-02-20	The pipeline would use technology that has not been proven to be totally safe and effective. A leak (from corrosion, improper installation, or land shifting) anywhere and at any time along the line at a minimum would be detrimental and hazardous to the residents in the area and generate additional costs for multiple players, including landowners and residents. In a worst-case leakage scenario, the health and lives of individuals would be at risk. A long-term or major leak could actually release more carbon in the air from the pressurized pipeline; thus, not alleviating the issue. It would also impact the land and waterways, changing the ph balance.	Risks of a potential CO ₂ release and potential impacts are described in Chapter 8 of the EIS.	20243-204403-01
	Olness, Rita Flaig	2024-02-20	This project crosses prime farmland and waterways which we need to be protecting in the best possible way, not opening them up for potential damage.	Potential impacts on and mitigations for prime farmland are discussed in section 5.5. Potential impacts on and mitigations for water resources and wetlands are discussed in sections 5.7.8 and 5.7.9.	20243-204403-01
	Olness, Rita Flaig	2024-02-20	Second, the gains of the project are questionable. Although proponents tout economic gains for the project, the main benefit would be to ethanol producers and oil companies who then in turn propose to use the carbon credits to create more carbon pollution. Economic gains to farmers and adjacent landowners would be limited. The carbon capture process generates high energy, thus affecting the overall net gain. This process does not create any less dependence on fossil fuel; in fact, it may produce more dependence depending on the implementation of the process. There are safer ways to remove CO ₂ from the atmosphere such as planting trees and/or planting carbon removing plants between row crop plants just to name a few. We need to explore more of these in the breadbasket area of the country.	The EIS analyzes the proposed project, including alternatives that lower the CI score of the ethanol produced at the ethanol plant. An alternative that does not include ethanol production was not studied in the EIS because it would not meet the purpose of the project. As stated in the final scoping decision, the appropriateness of federal and state policies regarding carbon capture and ethanol, including tax credits and other incentives, is also outside the scope of the EIS.	20243-204403-01
	Olness, Rita Flaig	2024-02-20	Third, the long-term effects of the project are not proven and are uncertain. Instead of solving a climate problem, we may be adding to it. It's too uncertain. With added regulations, costs, and the number of players involved, this process would be difficult to reverse if deemed ineffective or unsustainable. I understand that society's slow response in addressing carbon emissions has created a sense of urgency to handle the concern in the fastest way possible; however, please do not rush to implement a solution that gives economic gain to a few but ultimately jeopardizes the precious land and water resources as well as the health and welfare of citizens of Redwood County and surrounding areas. We will not have gained in that process. In simpler terms, we cannot "sweep the dirt under the rug," but rather look for ways to eliminate the dirt in the first place.	Thank you for your comment.	20243-204403-01
	Olness, Rita Flaig	2024-02-20	We have a duty to future generations to act judiciously and wisely now. The short-term and long-term potential hazards, inability to reduce long term dependence on fossil fuels, and uncertainty of the long-term environmental impact from the transfer and storage of the pressurized carbon dioxide are all imperative reasons for voting "no" to the Summit Carbon Recapture project in Redwood County. Thank you for your time and consideration. Rita Flaig Olness Redwood County Landowner	Thank you for your comment.	20243-204403-01
	OMeara, Colleen & Joe	2024-02-11	We ask that the Public Utilities Commission and Department of Commerce take these issues into account in order to ensure that the Environmental Impact Statement (EIS) for the Otter Tail to Wilkin CO ₂ Pipeline Project in Otter Tail and Wilkin Counties (Docket Number: 22-422) is a factual and thorough account of the project impacts. Minnesotans need a robust environmental review, and we need transparency, accountability, and regulatory oversight to ensure the greater public good and interests of communities impacted by these pipelines and all Minnesotans are respected and protected.	Thank you for your comment.	20243-204403-01
	Ostrove, Joan	2024-02-23	I am a resident of Saint Paul who is very concerned about the climate crisis. I'm writing to offer a few comments about the Draft Environmental Impact Statement for the Summit Carbon Solutions' proposed CO ₂ pipeline and carbon capture project. I am concerned that the claims in the DEIS that this pipeline will have a "minimal impact" across the board are unsupported by existing evidence about carbon pipelines and pipeline construction (and I note that neither Minnesota's state agencies nor Summit has any experience building, operating, or overseeing CO ₂ pipelines or carbon capture projects). Among many issues/concerns, the DEIS does not sufficiently address the known and unknown risks of transporting large amounts of CO ₂ at high pressures through a pipeline. It is vague on the actual impacts on the community (even as it acknowledges that the project will directly intersect a defined environmental justice community).	Thank you for your comment. Chapter 8 of the EIS describes risks of an unplanned release of CO ₂ from the project. Chapter 8 has been revised to include a new section (8.3.1.2) describing effects on environmental justice populations in the event of an accidental release of CO ₂ . Environmental justice is also analyzed in Section 5.4.3, and the analysis concludes that impacts from construction and operation of the project would not result in disproportionate adverse impacts for Environmental Justice areas of concern within the ROI.	20242-203795-01
	Ostrove, Joan	2024-02-23	And the DEIS says that Summit "anticipates" an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is problematically ambiguous. There must be a careful and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources.	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to	20242-203795-01

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				include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	
	Otsea, Bob and Betty	2024-02-22	<p>My name is Betty Otsea; my husband Robert (Bob) Otsea and I live in Eden Prairie, Minnesota. We own farmland in Redwood County Minnesota that has been in our family since the late 1800's. This land has been rented to the same family for 50 years or more -- people who also care about the future of the land. We are all concerned that a project like this with unverifiable benefits and risks will permanently damage the qualify and usefulness of our land. Although we don't live in Otter Tail County where this tiny project is seeking approval, action taken on Docket #22-422 will influence the much larger project planned to go through our property in Redwood County and a larger area of the state. Neighboring states will also look to our actions on this pipeline issue.</p> <p>This Project will impact large amounts of agricultural land in this country to a great extent. The damage to the land will affect future generations. Yet the capture of carbon from ethanol plants may soon become a mote item because the shift of energy usage from fossil fuels to electric power seems to be the direction our nation is taking. In addition to the direction of the automotive industry, Minnesota Governor Walz has signed HF7/SF4 which mandates Minnesota utilities transition to carbon free energy by 2040.</p>	Thank you for your comment.	20243-204403-01
	Otsea, Bob and Betty	2024-02-22	<p>Although lucrative for Summit Carbon, this unprecedented project of carbon capture and storage would come at high cost of the American taxpayers with questionable benefits that are only limited and short-term. And what about our water resources, our aquifers? The construction and then the regular pipeline operation requires a tremendous amount of water.</p>	<p>Thank you for your comment. The appropriateness of federal and state policies regarding carbon capture and ethanol, including tax credits and other incentives, is outside the scope of the EIS.</p> <p>Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has also been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.</p>	20243-204403-01
	Otsea, Bob and Betty	2024-02-22	DECOMMISSIONING — What happens when the pipeline fails or is no longer useful? Who finances the REMOVAL of the pipeline? Of course, even if it were removed, the irreparable damage to the land has been done.	Section 2.7 describes project decommissioning. This section was revised to describe the financial assurances to be provided by the applicant for costs associated with decommissioning.	20243-204403-01
	Overby, Gary	2024-02-23	We don't need more pipelines; we need to manage our resources as if they were actually limited.	Thank you for your comment.	20243-204403-01
	Overland, Carol	2024-02-23	<p>I'm filing these comments as an individual, and not on behalf of any client.</p> <p>I'm concerned about this proposed CO₂ pipeline as Minnesota and Iowa have been selected as guinea pigs in an area without regulatory or operational experience. CO₂ capture and a pipeline, only to the plant gate, was proposed for the Mesaba Project, but it was nothing more than a stab at tossing out the words "CO₂ capture" for traction in that boondoggle of a project. Despite that, participants in that docket did learn much about CO₂ capture, particularly about feasibility, efficiency loss, and cost.</p>	Thank you for your comment.	20242-203790-01
	Overland, Carol	2024-02-23	<p>CONSTRUCTION AND LAYDOWN YARDS</p> <p>The EIS states, "The applicant is not proposing to use any construction or staging yards for the project." EIS, p. 2-3. This is absurd. Where will the materials be stored and staged? On trucks at some other location, with "on-time" delivery? That's simply not workable. The EIS must address the need for and impacts of storage and laydown yards, and the cost of such easements, which, even if temporary, and be significant. Return of these areas to prior condition must also be addressed.</p>	Section 2.2 has been updated to describe the applicant's plans for contractor yards.	20242-203790-01

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	Overland, Carol	2024-02-23	<p>NOISE & NOISE STANDARDS – MINN. R. 7030.0040</p> <p>The EIS is inadequate in addressing impacts of noise, noise of construction, noise of operation, and noise of potential ruptures. For example, the EIS shows the cumulative numbers of “sensitive receptors” in the chart label, but the description is “Number of Residences and Businesses,” and which is NOT the number of “noise sensitive receptors.” <i>(included photo of Figure 5-6)</i></p> <p>This is misleading. The chart should be changed to show the “Number of Noise Sensitive Receptors” by taking the average number of people in a household and multiplying by the numbers shown in the X axis. The edge of the right-of-way numbers should also be displayed on Y axis, labeled as “250 – Edge of RoW” so that it can be easily determined the impacts on those outside of Right of Way.”</p> <p>From this chart, assuming there are additional impacts for those within 250 feet of centerline on each side of the RoW, it appears that there are more than 15 residences and businesses (and how many residents? Workers?). This is a serious flaw in the noise impact analysis. The EIS is inadequate as it does not address numbers of individual “receptors” in residences and businesses, and thus grossly understates impacts.</p> <p>The EIS also states, “The ROI for noise is the local vicinity (area within 1,600 feet of the route width).” The terminology is unclear – is that 1,600 feet of the centerline, or 1,600 feet on each side of the centerline, or 1,600 feet of the Right of Way edge? With the ROI extending so far beyond the Right of Way, the EIS must also address the impacts beyond the Right-of-Way to 1,600 feet.</p> <p>Noise does have a cumulative impact, and the EIS must address this. Instead, the EIS states: “Noise from the operation of the capture facility is not expected to result in a perceptible increase in the sound levels experienced at NSRs near the capture facility and would not be distinguishable from the noise already produced at the ethanol plant. Operation of the pipeline facilities would not have a noticeable impact on ambient sound levels.” P. 5-28. Cumulative impact of noise has been an issue in wind projects, and EERA staff and Summit attorney who has worked on wind projects should be well aware.</p>	<p>Section 5.4.5 has been updated to clarify the definitions of noise receptors. Noise standards are not based on the presence of an individual; rather, standards are based on noise area classifications, which are land use designations.</p> <p>As defined in Section 2.2 and Section 5.1.2, the route width is 500 feet centered on the centerline with exceptions where more width would be needed for construction. The route width for RA-South is wider in some areas, as described in Section 2.2. The route width is illustrated on the detailed route maps in Appendix B.</p> <p>Chapter 5 considers the impact of noise from the capture facility coupled with the ethanol plant. Cumulative impacts are discussed in Chapter 10.</p>	20242-203790-01
	Overland, Carol	2024-02-23	<p>The EIS is incorrect and inadequate in that it minimizes noise. There is no disclosure of ambient noise testing, and understatement of noise levels by discussing when changes in noise levels are noticeable,” but 5.4.5.1 does NOT state the fact that a 3 dB(A) increase in noise is a DOUBLING of sound pressure levels. This is a material diminishment of noise impacts. The EIS should state the various potential dB(A) of blowdown, and in the event of a rupture, the noise level of “sonic speed.” See e.g. 5-35; 8-2.</p>	<p>Thank you for your comment. Humans perceive sound pressure on a logarithmic basis, not a linear basis. For example, a 10-dB difference, which is perceived as a doubling in loudness, is a difference of a factor of 10 in actual sound pressure, while a 20-dB difference, which is perceived as a quadrupling, would be a 100x change to the sound pressure.</p>	20242-203790-01
	Overland, Carol	2024-02-23	<p>Another example of the inadequacy of the EIS is found after Table 5.5 on p. 5-29, which states: <i>(Photo of text that reads: "Noise associated with heavy equipment can range between 80 and 90 dBA at full power 50 feet from the source. Heavy equipment generally runs at full power up to 50 percent of the time. Point source sounds decrease by 6 dBA at each doubling of distance; therefore, a 90 dBA sound at 50 feet is perceived as a 72 dBA sound at 400 feet and a 60 dBA sound at 1,600 feet.)</i></p> <p>Following the table showing Minnesota Noise Standards, this paragraph should note that 90, 72, and 60 dBA are all above nighttime noise standards in a residential area. This is why the charts showing residents affected must be corrected, and show anticipated daytime and nighttime expected noise levels at various distances, RoW edge and beyond within the ROI.</p>	<p>This paragraph provides an example of how the sound pressure level changes over distance. It is not tied to a specific impact. Therefore, stating such a noise violates state noise standards is not necessary. The charts discussed in the comment are intended to show noise receptors within 1,600 feet of the route width; as such, they do not need to be corrected.</p>	20242-203790-01
	Overland, Carol	2024-02-23	<p>The EIS is inadequate as it does not address that with winter construction noise travels further due to hardpacked snow and frozen ground, a ground factor of 0.0, and that noise will not lessen as fast as it would with summertime ground cover of grasses and trees.</p>	<p>Construction impacts are expected to occur outside of winter conditions, as described in Section 2.9. of the EIS.</p> <p>As noted in Section 5.4.5.3, "The sample routing permit (Appendix H) includes the following mitigation for noise: the Permittee shall comply with noise standards established under Minnesota Rules 7030.0100 to 7030.0080, at all times at all appropriate locations during operation of the facility. Construction and maintenance activities shall be limited to daytime working hours to the extent practicable to ensure nighttime noise level standards will not be exceeded.”</p> <p>Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations.”</p>	20242-203790-01

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	Overland, Carol	2024-02-23	The EIS is inadequate because Tables 5.6, 5.7. and 5.8 do not list modeled (projected) noise for each of the residences shown.	Thank you for your comment. Noise modeling studies at each receptor are outside the scope of the EIS.	20242-203790-01
	Overland, Carol	2024-02-23	The EIS is inadequate as it allows for mitigation based on landowner assertion rather than applicant compliance with noise standards – see EIS, p. 5-35: The applicant has stated that it would coordinate with nearby landowners prior to starting HDDs and determine the need for noise mitigation and noise monitoring based on feedback received from landowners during construction.	As noted in Section 5.4.5.3, "The sample routing permit (Appendix H) includes the following mitigation for noise: the Permittee shall comply with noise standards established under Minnesota Rules 7030.0100 to 7030.0080, at all times at all appropriate locations during operation of the facility. Construction and maintenance activities shall be limited to daytime working hours to the extent practicable to ensure nighttime noise level standards will not be exceeded." Additionally, the sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of those permits unless those permits conflict with or are preempted by federal or state permits and regulations.”	20242-203790-01
	Overland, Carol	2024-02-23	Increased Use of Coal Generated Electricity The CO ₂ capture and transport process will increase electricity use at the ethanol plants. If the idea is to capture CO ₂ to lessen CO ₂ in atmosphere, the increased use of fossil fuel to power the operation must be balanced with the level of CO ₂ captured and transported. <i>(Included photo of Figure 6-6 from the DEIS)</i> EIS is missing much information. When working on the Mesaba Project (PUC Dockets E-6472/GS-06-668; E-6472/M-05-1933), I learned that CO ₂ capture was expected to be less than 1/3 of CO ₂ generated from that project, generally the achievable rate of capture, and that roughly 1/3 capture would result in a marked decrease in plant efficiency. Capture of more than that is very difficult to do technically, and is very costly. I do not see information on various measures of CO ₂ capture and efficiency of that process in the EIS. The percentages of CO ₂ that can be, are feasible to be, captured is determinative of whether this project should be permitted – if there’s nominal CO ₂ capture, and a major efficiency loss, what's the point of all this cost and impact? The EIS must disclose and analyze the following information: •Annual total tons of CO ₂ produced at each ethanol plant proposed to be connected to this project. •Annual percentage of CO ₂ captured from each plant. •Annual tons of CO ₂ captured from each plant. •Ethanol plant efficiency loss expected with carbon capture for each plant. •Cost of loss of efficiency for each plant. •Quantification of production to compensate for loss of efficiency. •MW load for capture of CO ₂ at each plant. •MW parasitic load for pressurization into pipeline. •Transmission and transformer upgrades required at each plant. •Total MW parasitic load (itemized by location of pressurization facility) for pressurization from collection source to point of delivery. •MW of energy losses for each plant’s ethanol production and CO ₂ capture processes.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20242-203790-01
	Overland, Carol	2024-02-23	The EIS is inadequate because it does not address the potential harms to those many residents, businesses, and workers within the ROI. The EIS is inadequate because it does not address the increased cost of insurance for those households, farms, and businesses living with in the 1,600 ROI.	Section 5.4.8 and Chapter 8 discuss public health and safety concerns. Staff cannot predict the cost of insurance costs for individual parcels; however, should insurance rates increase, these increases could be mitigated though negotiated easement agreements. These agreements are outside the scope of the EIS. Section 5.4.7.2 has been revised to address the availability and cost of property insurance.	20242-203790-01
	Overland, Carol	2024-02-23	The EIS is inadequate as the operational psi is unclear. There is a range, but the likelihood of leak or rupture can be dependent on psi. The EIS should clearly state whether the operational is expected to be 1,320, and why, if the design is for 2,183 psi, and under what occasions the psi could be greater than the expected operational psi. See p. 4-4.	EERA staff agrees that the likelihood of leak or rupture can be dependent on pressure; therefore, the impact at the maximum (design) pressure was modeled. Chapter 4 discusses alternatives to the proposed pipeline, including different diameters. A 6-inch-diameter pipeline would operate	20242-203790-01

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				at a different pressure than the proposed 4-inch-diameter pipeline. The proposed pipeline design pressure is for 2,183 psi, which includes a safety factor. The 1,320 psi referenced in Chapter 4 is for the 6-inch-diameter alternative. EERA staff concluded that an alternative pipeline diameter would not result in a significant environmental benefit over the proposed project, and diameters smaller than 4 inches would pose challenges for pipeline inspection. Therefore, this alternative is not analyzed further in the EIS. The EIS is not inadequate as the psi for the proposed project is described in Chapter 2.	
	Overland, Carol	2024-02-23	The EIS is misleading, inadequate, as it refers to leaks and ruptures as “accidents,” which are too common to be “accidents.” Language should be changed and these should be labeled as incidents, or specifically labeled as leaks, ruptures, etc. The EIS states that: However, for CO ₂ pipelines, between 2010 and 2021, 66 CO ₂ pipeline accidents were reported to PHMSA. Of these 66 accidents, 56 were leaks, 2 were ruptures, and 8 were classified as “other.” ⁸ The analysis showed that leaks are the leading form of accident and rupture is the most uncommon form of accident for CO ₂ pipelines. EIS p. 8-1. Acknowledgement of 66 “accidents,” including 56 leaks, of which 2 were ruptures and 8 “other,” means that some leaks, ruptures and “other” can be expected, and are not reasonably characterized as “accidents.” Please correct that linguistic mischaracterization.	Accident is not a term developed for this EIS, but is instead terminology defined and used by PHMSA. PHMSA defines "accident" as a failure occurring in liquid pipeline systems for which the pipeline operator must make a report to the Office of Pipeline Safety (https://primis.phmsa.dot.gov/comm/glossary/index.htm#Accident). Leaks and ruptures are classified as types of accidents by PHMSA.	20242-203790-01
	Overland, Carol	2024-02-23	The EIS is deficient because the noise expected in a leak or rupture is not addressed.	Section 8.3.1.5 describes anticipated noise during a leak or rupture.	20242-203790-01
	Overland, Carol	2024-02-23	The EIS is inadequate as there is no wind rose provided. There should be a simple wind rose for the two ethanol plants, at the very least, and if the wind rose is different for other areas of this project, to include that. Commerce filed wind roses for sites across Minnesota decades ago that could be updated now.	Emissions from the ethanol plant are covered in the Title V Permit for the ethanol plant. The nearest automated weather observation station to the ethanol plant is located at the Fergus Falls Municipal Airport (46.28439, -96.15669). The wind rose has been added to Section 5.7.1.2. Other wind roses were evaluated in the vicinity of the project and found similar wind patterns. The wind rose was created using Iowa Environmental Mesonet (https://mesonet.agron.iastate.edu/sites/site.php?station=FFM&network=MN_ASOS).	20242-203790-01
	Overland, Carol	2024-02-23	The EIS is deficient because the word “evacuate” is not in the plan, and there is no characterization of the area to be evacuated in various scenarios of leak and rupture. The evacuation zone should be clarified, and be set at distances identified in dispersion modeling with additional distance for safety beyond the potential “toxic impact” distance of 910 feet. <i>(Includes a photo of text from the DEIS that reads: The dispersion modeling conducted by Allied calculated the maximum distance at which CO₂ concentrations from a pipeline rupture could reach toxic levels. The toxic impact distance at which CO₂ concentrations could reach 40,000 ppm (the immediately dangerous to life and health level) at -22°F and a humidity level of 74.3 percent was calculated at 617 feet, as shown in Table 4 in the Aerial and Thermal Dispersion Report (AD Report) in Appendix G. The toxic impact distance at which CO₂ concentrations could reach 30,000 ppm (the National Institute for Occupational Safety and Health Short Term Exposure Limit, which is the maximum time-weighted average concentration to which a person could be exposed over a 15-minute period without injury) would be 701 feet. The toxic impact distance at which CO₂ concentrations could reach 15,000 ppm would be 910 feet.)</i>	As stated in the EIS, the term "evacuation" is not used because the effects of a pipeline rupture would be brief and dissipate quickly. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. EERA staff recommended special permit conditions to avoid impacts of a potential CO ₂ release, including information on a public education plan, as described in Section 8.5.3.	20242-203790-01
	Overland, Carol	2024-02-23	RECOMMENDED SPECIAL CONDITIONS AND EDITS Special conditions are necessary IF this project is permitted. Regarding those recommended by staff, here are comments and edits are in track changes: EERA staff believes that applicant-provided indoor CO ₂ detectors for residences within 1,600 feet of the project is a reasonable mitigation measure. This distance was chosen based on the most impactful scenario as described in Appendix G <u>ROI (and it depends</u>	Thank you for your comment. Staff agrees that special conditions are only required if a permit is issued for a project. EERA is neutral concerning the proposed edits and will retain its original recommendations, except that staff concurs with the idea of defining "neighboring landowners." Staff believes this distance should be, at minimum, 1,000 feet, and the text in Section 8.5.3 has been modified.	20242-203790-01

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			<p><u>on how that is defined, conservatively the greatest distance should be used. Is that 1,600 feet of ROI 1,600 feet of centerline? 1,600 feet of Right of Way? 1,600 feet centered on centerline – 800 feet on either side? .</u></p> <p>EERA staff believes that a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission is reasonable, <u>and should be filed with the Commission via eDockets prior to any permit approval and open for public comment.</u></p> <p>EERA staff believes that a special permit condition requiring the applicant to provide an accidental release plan, developed in coordination with local emergency responders, for Commission review 30 days prior to submittal of the Plan and Profile is reasonable. The accidental release plan could include the specific equipment, training, and reimbursement that could be provided to emergency managers. The plan could also list the names of the emergency responders and a provision to update contact information as needed. The plan could discuss the feasibility of a “reverse 911” notice that goes out to landowners’ telephones in the event of an emergency shutdown or rupture. The release plan could identify how the applicant would pay for costs of any repair to public infrastructure or private property (including crops and livestock) that might occur during an accidental release. <u>The plan must be filed with the Commission via eDockets and a link and phone number be included in mailing to all landowners, residents, farms, businesses within one-half mile of the centerline.</u></p> <p>EERA staff believes a special permit condition requiring the applicant to identify locations of fracture arrestors and any locations of thicker-walled pipe on the Plan and Profile filed with the Commission is reasonable.</p> <p>EERA staff believes a special permit condition requiring the applicant to provide its public education plan for Commission review 30 days prior to submittal of the Plan and Profile is reasonable. The public education plan could include specific safety information for neighboring landowners within one-half mile (one mile?), including what to do in case of a rupture.</p>		
	Overland, Carol	2024-02-23	<p>WHERE’S THE COST/BENEFIT ANALYSIS?</p> <p>The EIS is inadequate because there is no cost/benefit analysis for this project. Perhaps I’ve missed it in my quick skim, but ??? It should be front and center, addressing the claimed “benefits” in light of costs, mindful that costs are more than just the literal costs of physical pieces of the project, construction, labor, etc., and include those more difficult but quantifiable environmental, socio-economic, and human costs.</p> <p>This project is the test run for the larger part of Summit Carbon Solutions CO₂ pipeline dreams. It’s very important to get this right and to look at all aspects of this project. Further, state and federal CO₂ policy is NOT need.</p>	Impacts on resources, both negative and positive, are addressed in Chapter 5. Impacts on the natural environment are discussed in section 5.7, impacts on human settlement overall are discussed in section 5.4, and socioeconomics are addressed specifically in section 5.4.11. Financial costs of the project are discussed in section 2.8. A certificate of need is not required for the project.	20242-203790-01
	Pabst, Roger	2024-02-22	<p>I am concerned about the cost of the proposed CO₂ pipeline by Summit. First we all know structures fail with time. Also who will bared the cost to support and train all the EMS personal to react to a issue with the pipeline??</p>	<p>Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that would be revised as required by PHMSA, if the project is approved.</p> <p>Additionally, EERA staff recommended that a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.</p>	20243-204403-01
	Pabst, Roger	2024-02-22	<p>How many years will Summit pay for damaged land production? Who insures the pipeline if issues arise? Who owns the easement and what else can be put in that area??</p>	Thank you for your comment. Landowner agreements are outside the scope of the EIS. Section 5.4.7.2 has been revised to address the availability and cost of property insurance.	20243-204403-01
	Pabst, Roger	2024-02-22	<p>How much extra water will it use and where will it come form--the same aquifers our farm wells are using?? Who provides us with water if our wells go dry?? Where will the extra electricity come from--we were just told during a recent cold spell to cut our usage due to shortages???</p>	Impacts on water resources are discussed in section 5.7.8. Impacts on public services and infrastructure, including electricity, are discussed in section 5.4.9.	20243-204403-01

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	Pabst, Roger	2024-02-22	When the pipeline is decommissioned in 25 years what happens to it and what about the CO ₂ at that point? Let's not do things without answers to issues that might arise!!!!	Section 2.7 describes decommissioning of the project. This section was revised to describe the financial assurances to be provided by the applicant for costs associated with decommissioning.	20243-204403-01
	Pearson, Andy	2024-04-23	I am writing to comment on the DEIS for the Otter Tail Wilkin CO ₂ Pipeline. The DEIS needs improvement. The climate section in particular needs to have some of its premises reexamined, including the assumption of a 100% CO ₂ capture rate and 100% permanent storage underground as well as excluding consideration of Enhanced Oil Recovery as a potential use for the captured CO ₂ .	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and that commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Pearson, Andy	2024-04-23	In addition, recent pipeline experience in MN has shown that aquifer damage from construction can be common and widespread. This damage needs to be taken more seriously by the DEIS.	Section 5.7.8.2 addresses potential impacts on groundwater, including aquifers.	20243-204403-01
	Petersen, Irene and Paul	2024-02-18	Thank you Andrew and to your team for being attentive to our recent Environmental Impact Statement (EIS) comments and your diligence to this task of ensuring the final EIS is complete and accurate. Paul, my husband, and I are lifetime residents of Minnesota (MN), a generational family who farm, and stewards of the land as we hold tight to safe soil and water practices in the best interest of the future of MN and her people. Therefore, in regards to the Green Plains Ethanol Plant, which is located near the city of Fergus Falls, and Summit Carbon Solutions LLC proposed construction of a pipeline for the purpose of carbon dioxide (CO ₂) transport to the MN - North Dakota (ND) border and geologic sequestration, we are requesting an extended research and implementation of biologic sequestration of the CO ₂ near and at the Fergus Falls Green Plains ethanol plant.	Thank you for your comment and request to extend research efforts to understand the impacts of biological sequestration of the CO ₂ near and at the Fergus Falls Green Plains ethanol plant. While the proposed Midwest Carbon Express project is considered geologic sequestration, specifically biomass (BECCS) technology, the EIS is an analysis of the project to assist the Commission with making a pipeline routing permit decision. A study of carbon capture technology is outside the scope of the EIS. The biological sequestration of carbon through alternative agricultural strategies is discussed in Section 6.2.3.	20243-204403-01
	Petersen, Irene and Paul	2024-02-18	The United States Global Change Research Program and the MN Board of Water and Soil Resources state that conservation practices, such as, deciduous tree planting, prescribed grazing, cover crops, wetland management, etc., remove CO ₂ from the atmosphere and sequester the CO ₂ in stable forms as biomass and soil organic carbon. The biologic sequestration of CO ₂ are proving to be safe and effective. The Fergus Falls Green Plains Ethanol Plant produced 55 million gallons of ethanol in 2022 . (https://gpreinc.com). In 2023, " A typical 50 million-gallon-per-year ethanol plant releases 14 tons of CO ₂ , a natural by-product of fermentation." (https://energypost.eu/using-wind-power-with-ethanol-production-to-turn-the-co2-by-product-into-efuels/#:~:text=A%20typical%2050%20million%2Dgallon,natural%20by%2Dproduct%20of%20). In 2021, the United States Department of Agriculture (USDA) reported, " In one year, a mature live tree can absorb more than 48 pounds of carbon dioxide, which is permanently stored in its fibers until the tree or wood experiences a physical event that releases it into the atmosphere, like fire or decomposition." (https://www.fs.usda.gov/features/trees-are-climate-change-carbon-storage-heroes) In a very, very simplified scenario, it is estimated 42 mature trees are needed to sequester one ton of CO ₂ .Therefore, on or near a site like Fergus Falls a plot of approximately 642 trees would be needed to help sequester the CO ₂ emissions. Implementing a CO ₂ biologic sequestration plan is very doable and practical. We have learned that CO ₂ transport and geologic sequestration employs highly engineered knowledge and practices which constantly undergo federal and state regulated processes of monitoring, reporting, and verification. Obviously, in this complex technical system, there are a number of things that can go wrong due to human/ technical/ mechanical errors. The federal 2022 Inflation Reduction Act has created a " gold rush" mindset to capture CO ₂ .	A study of carbon capture technology is outside the scope of the EIS. Moreover, an alternative that does not include ethanol production was not studied in the EIS because it would not meet the purpose of the project. The EIS is an analysis of the proposed project to assist the Commission with making a pipeline routing permit decision; as such, relevance of the information to a reasoned choice among alternatives. A study of the alternatives referenced by the commenter would not aid in the Commission's decision. The biological sequestration of carbon through alternative agricultural strategies is discussed in Section 6.2.3.	20243-204403-01
	Petersen, Irene and Paul	2024-02-18	In 2022, the US Department of Energy Research found, " ethanol is likely at least 24 percent more carbon-intensive than gasoline due to emissions resulting from land use changes to grow corn, along with processing and combustion." This has driven more research for alternative energy sources beyond biofuel. There is a pursuit for advanced research in MN, the United States, and the world, to reduce petroleum consumption and CO ₂ emissions. Therefore, if a routing permit is granted to Summit Carbon Solutions LLC to construct a pipeline and transport CO ₂ from the Fergus Falls Green Plains Ethanol Plant to the MN - ND border, the decision will not reflect critical and prudent future planning on the part of the MN Department of Commerce and the MN Public Utilities Commission that serve the people of MN as trusted public resources. In summary, the established scientific research of the biologic sequestration of CO ₂ should be on the forefront in this decision making. Biologic capture and sequestration of CO ₂ increases the safety and secures a healthy ecosystem that includes but not limited to	Where the research remains inconclusive on the average CI score for corn ethanol in the United States due to modeled emissions associated with land use change, the EIS has been revised to incorporate updated uncertainties and contradicting research sources to better represent the state of the science today. Section 6.1.3 has been revised to discuss the debate between Lark et. al. and GREET model authors on this topic. Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and that commenters have questioned the	20243-204403-01

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			surface water, aquifers, wildlife, land and livestock owners, and communities. Thank you again for your time and consideration in this critical decision that will carry a long-term consequential effect.	feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent.	
	Peterson, Paul	2024-02-22	Thank you for taking the time to read my concerns and comments regarding the Summit Carbon Solutions (SCS) proposed pipeline in Otter Tail County (OTC) and the Environmental Impact Statement (EIS). I understand that the MN Department of Natural Resources (DNR) will not permit the SCS pipeline to cross any public wildlife production, wildlife refuge, and property. The concerns voiced by the MN DNR about placing the CO ₂ pipeline are not being disputed. These public lands are protected and deemed untouchable, therefore , I would appreciate the same standards applied to private property and land owners.It raises the question why and what makes the MN DNR property exempt from this proposed CO ₂ pipeline pathway that will transport hazardous materials and the same concerns are not applied to private property owners.	Thank you for your comment.	20243-204403-01
	Peterson, Paul	2024-02-22	My concern also includes safety and the unknown environmental impacts.This region has one of the largest aquifer in our country and the proposed pipeline crosses this area. In case of an accidental CO ₂ leak or rupture, what research guarantees that the ground water and aquatic life will not be adversely affected . Research has shown the technology of fracking oil has caused contamination of ground water. Should we not be concerned about this possibility happening with CO ₂ ?	Impacts on groundwater in event of a rupture or leak are described in Section 8.3.4.1. Impacts on aquatic life in the event of rupture or leak are described in a subheading within Section 8.3.4.2.	20243-204403-01
	Peterson, Paul	2024-02-22	The goal is to reduce CO ₂ atmosphere emissions I question how much CO ₂ will be produced and released with the production of materials used to construct this pipeline, the process to convert the CO ₂ to a supercritical fluid, and the construction site where the CO ₂ will be sequestered, and any future plan that will reuse the sequestered CO ₂ . I support alternative proven methods which require the ethanol facilities to implement planting trees- the "natural air scrubbers". As you know, trees convert CO ₂ to oxygen. Depending on each ethanol facility CO ₂ emissions, implement an environmental plan that each facility plants a sufficient number of trees, shrubs, and plants, with an additional 10 to 20 percent to reach their CO ₂ net neutral target. Without the federal government subsidizing the SCS CO ₂ pipeline, this project would not be the money grab from this company, "which is a multibillion- dollar private investment with support from a wide-range of investors including John Deere, Continental Resources, and ethanol plant partners " at the expense of MN landowners and residents. Thank you again for giving your attention to my concerns and comments. Paul Petersen	An alternative that does not include ethanol production was not studied in the EIS because it would not meet the purpose of the project. As stated in the final scoping decision, the appropriateness of federal and state policies regarding carbon capture and ethanol is also outside the scope of the EIS. This includes tax credits and other incentives.	20243-204403-01
	Petrich, Steve	2024-02-09	I urge you to carefully consider the impact any decisions or actions regarding this issue will have. My name is Steve Petrich and I am a retired physical science teacher, farmer and landowner in the path of this proposed CO ₂ pipeline project by Summit Carbon Solutions (CSC). There are a variety of issues that are of great concern. EMS Response: The DEIS accepts Summit’s assurances that it will “comply with federal emergency response requirements,” but as noted in a Pipeline Safety Trust report and by the Pipeline Hazardous Material Safety Administration (PHMSA) itself, the current emergency response requirements are dangerously outdated. PHMSA is in the process of updating their procedures and as a landowner, I want to be sure that the PUC does not “Grandfather” SCS under older, dangerously outdated requirements. Setbacks: The DEIS states that the PUC “cannot set safety standards” for Summit’s proposed pipeline. PHMSA has expressly said in public letters to CO ₂ pipeline companies like Summit that state and local authorities can exercise their powers to regulate land use—including setback distances—and that “nothing in the federal pipeline safety law impinges on these traditional prerogatives of local—or state—government.” The PUC must consider where the pipeline is placed and what is the safest option for Minnesotans, which means the PUC can and should determine what routing, setback, and depth requirements are necessary to adequately protect Minnesotans. In the event of a rupture, the impact zone would be well over a mile, more depending on weather, season, geography etc – this infrastructure poses serious risks to humans.	Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements.	20243-204403-01
	Petrich, Steve	2024-02-09	According to the DEIS, CO ₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would be unlikely to impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence. Though the DEIS does note some harm may come to animals in the event of a rupture, it relies heavily on the assumption that animals will simply move out of the rupture area to avoid the release. The reason for this assumption is not provided and is contradicted by information in the rupture report in Appendix G which suggests the impacts of a rupture would be nearly immediate.	CO ₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to local vegetation or wildlife. Potential impacts on wildlife from a CO ₂ rupture could result first from the physical force of a rupture and secondarily from localized short-term high levels of CO ₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO ₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that	20243-204403-01

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				wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most mobile wildlife species would follow their natural instincts and attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO ₂ , which could be toxic for species unable to leave the area of the release.	
	Petrich, Steve	2024-02-09	Often time with the construction phase water is release with contaminates and without notice – how can we assure this is not going to damage the ecology of the river? This has happened in Minnesota with other projects when horizontal drilling has occurred and when the company tests the infrastructure with hydrostatic testing. How can the PUC ensure that this will not happen and in the event it does, the public will immediately be notified?	Minnesota law requires that people notify MPCA (through the Minnesota Duty Officer) immediately when more than 5 gallons of petroleum or any amount of any substance under their control is released into the environment that could cause pollution of waters of the state. The sample routing permit states that “the Permittee shall comply with all applicable state rules and statutes.” As described in Section 2.4.7, no chemicals or other contaminants would be added to hydrostatic test water, and the applicant would discharge the test water in accordance with MPCA discharge permits. Drilling mud used for HDDs consists primarily of bentonite, a type of clay. If additives are used in the drilling mud, they would be approved by MDH or meet NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects. The applicant would implement its HDD contingency plan, which would include measures to reduce the risk for an inadvertent return as well as monitoring. Containment, response, and clean-up equipment would be available at both sides of an HDD crossing location prior to beginning the HDD to assure a timely response in the event of an inadvertent release.	20243-204403-01
	Petrich, Steve	2024-02-09	In addition to the direct impacts of the 28 miles of pipeline included in Summit’s application, the DEIS does not account for the indirect and cumulative impacts of Summit’s entire project in Minnesota. This is despite Summit’s clear and public plans for a much larger buildout in Minnesota and recent statements that they will be applying for permits for additional parts of the network imminently. Allowing Summit to artificially segment permitting requests for multiple concurrent projects on one pipeline will prevent a thorough review of the cumulative impacts and potential environmental and climate damages of the project. How can the PUC ignore the fact that this company has purchased easements in 10 counties and has been advertising that this project will cover 240 miles in Minnesota and only look at a 28-mile stretch? This seems like a waste of taxpayer dollars and when SCS applies for the other parts of the route, will the PUC site precedent? – I certainly hope not because the full route was not taken into consideration!	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Petrich, Steve	2024-02-09	As a taxpayer and landowner in the pathway of this proposed project, the PUC needs to put Minnesota landowners over out of state corporate interests who are only after carbon tax credits and 45Q dollars and could care less about the long-term impacts this pilot project will have on our land, water and rural communities.	Thank you for your comment.	20243-204403-01
	Piekavski, Charles and Carol	2024-02-21	We are landowners and retired farmers living along County Road 11 in Carlisle Township, Oter Tail County, Minnesota. We are very unhappy the route chosen for the CO ₂ pipeline. We are also unhappy to have this pipeline near anyone. It is dangerous and very unhealthy for all of us if this should have a leak or burst. One of your representatives at the public meeting in Fergus Falls said if we hear anything sounding like a tornado, we would have three minutes to get indoors. Then we could “have a cup of coffee” and all would be clear to go back outside. For one thing, if we are outside, there is no way to get to the house to safety in three minutes. I guess that tells the story for the rest of our time.	Thank you for your comment. Informal conversations are outside of the public record, and we disagree with how the conversation is characterized in this comment.	20243-204403-02

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	Piekavski, Charles and Carol	2024-02-21	If this pipeline is deemed unsafe for the wildlife, what about humans! We have a man-made dam and slough made possible from the efforts of Ducks Unlimited, U.S. Fish and Wildlife, and other agencies that has proven valuable for wildlife. We enjoy hearing and watching the many pheasants, deer and birds of all kinds that live there. This area should not be included if other wildlife areas are exempt.	Based on examination of aerial photography, the constructed dam and slough appear to be at least 500 feet to 800 feet from the RA-North and RA-Hybrid route alternatives, and much further from the RA-South route alternative. Based on these distances, the potential impact on the property from the construction and operation of the project would be negligible.	20243-204403-02
	Piekavski, Charles and Carol	2024-02-21	We live very close to the proposed site. It should be taken into consideration the heavy semis going in and out of our yard plus the many semis on county road 11 going to the ethanol plant or CHS loaded with corn or soybeans. We have dozens of trucks daily, and during harvest there are even more. We feel the weight of these trucks would cause damage to the pipeline in due time. We have a very high water table and the soil is soft and not as solid as it should be to handle the weight.	As indicated in Chapter 2, the applicant indicates that the project would meet or exceed state and federal safety requirements and, at a minimum, would be operated and maintained in accordance with PHMSA's regulations in 49 CFR Part 195. The pipeline would be constructed of high-strength carbon steel pipe that meets the American Petroleum Institute (API) 5L Pipe Specification.	20243-204403-02
	Piekavski, Charles and Carol	2024-02-21	Please reconsider this pipeline and take people's comments seriously. Why is this even necessary? You will never get permission to cross any of our land!	Thank you for your comment.	20243-204403-02
	Popowski, Christine	2024-02-22	CO ₂ is a hazardous material in high concentrations. The DEIS consistently underplays the known and unknown risks of transporting large amounts of CO ₂ at high pressures through a pipeline.	Risks of a potential CO ₂ release and potential impacts are described in Chapter 8 of the EIS.	20243-204403-01
	Popowski, Christine	2024-02-22	CO ₂ Rupture Impact Zone: According to the analysis in the DEIS, the potential impact radius for levels of CO ₂ that would be "immediately dangerous to life or health" is 617 feet. This expands to 910 feet for lower concentrations that cause dizziness, drowsiness, severe muscle twitching, and unconsciousness within a few minutes. Although Summit indicates that it will take 25 minutes for the system to shut off the relevant valves in the event of "abnormal operation," the DEIS does not mention any meaningful safety measures for a rupture and instead suggests that it is "reasonable" for Summit to simply supply indoor CO ₂ detectors for residences within 1,000 feet of the project. But the rupture report in Appendix G states that "a full rupture results in impact distances too quickly for an early warning device, such as an oxygen detector, to be effective." This pipeline should not be approved without a clear understanding of the risks to human health and meaningful measures to ensure the safety of people and animals in the area.	Text in Section 4.5 on valve closure time has been corrected from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Section 8.5.3 has been revised to note that, while acknowledging that the Commission does not set pipeline safety standards, EERA staff believes it reasonable for the applicant to voluntarily accept a special permit condition requiring the installation of check valves or pressure sensing valves that automatically close when pipeline decompression occurs. These valves could then close more quickly and reduce the impacts of a potential rupture.	20243-204403-01
	Popowski, Christine	2024-02-22	First responders and health professionals: CO ₂ pipelines pose unique problems for first responders and health care providers. Because CO ₂ is colorless and odorless, both victims and first responders have no way of knowing what is causing the health problems. In addition, first responders require special equipment, including non-internal combustion engines, to respond to a CO ₂ disaster. The DEIS does not consider the burdens this will put on local EMS and health providers in the case of a pipeline rupture or accident or an assessment of how they should be prepared to respond given the unique needs. The DEIS includes Summit's September 2022 Emergency Response Plan (Appendix N). This plan is not only outdated but also unclear as to how local EMS and first responders will interact with the applicant in the event of a leak or rupture. Though the plan talks of multiple company personnel as playing roles in emergency response, it ignores the fact that the applicant only plans on having one full-time employee at the capture facility. Local first responders deserve more clarity about how they will be expected to respond to an emergency and what the applicant will do to ensure they are adequately equipped and informed for such an event.	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved.	20243-204403-01
	Popowski, Christine	2024-02-22	Compliance with PHMSA Rules: The DEIS accepts Summit's assurances that it will "comply with federal emergency response requirements," but as noted in a Pipeline Safety Trust report and by the Pipeline Hazardous Material Safety Administration (PHMSA) itself, the current emergency response requirements are dangerously outdated. Setbacks: The DEIS states that the PUC "cannot set safety standards" for Summit's proposed pipeline. PHMSA has expressly said in public letters to CO ₂ pipeline companies like Summit that state and local authorities can exercise their powers to regulate land use—including setback distances—and that "nothing in the federal pipeline safety law impinges on these traditional prerogatives of local—or state—government." The PUC must consider where the pipeline is placed and what is the safest option for Minnesotans, which	Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline's vicinity. The Commission's obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements.	20243-204403-01

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			means the PUC can and should determine what routing, setback, and depth requirements are necessary to adequately protect Minnesotans.		
	Raether, Kathy	2024-02-12	The meeting on Feb. 7th was very informative. We enjoyed talking to Andrew learning more about this project. I object to the northern route, the one straight west of the ethenol plant for two reasons. Number one because there are more people to get easements from and number two - there are at least a dozen homes close to the pipeline if there was a leak it could affect all their homes. Also, when you would get to North Dakota, you would be close to the Sugar Beet Plant. Thank you	Thank you for your comment.	20243-204403-01
	Reisenweber, Doretta	2024-02-22	Hello, I am now a citizen of Duluth, MN, but have lived in the eastern Dakotas and watched with concern Summit's CO ₂ risky pipeline proposal. These pipelines lack a fail-safe history and have no business being placed anywhere. As much as the world needs to capture carbon, please learn the facts and don't swallow the myths we'd all like to believe, as I did until I learned differently.	Thank you for your comment.	20243-204403-01
	Reisenweber, Doretta	2024-02-22	The PUC needs to decide first, IF the pipeline could even be safely placed and routed, yet the DEIS notes a considerable handicapping of the PUC when it says the PUC " cannot set safety standards " for Summit's proposed CO ₂ line. What? That is backwards when the company writing the DEIS tells the government agency charged with regulating and protecting the environment and public, what it may and may not do. The reality is that the PHMSA has written publicly to CO ₂ companies like Summit that "nothing in the federal pipeline safety law impinges on coal or state government. The PUC needs to decide IF the pipeline can be safely placed and routed. If not, then it is the duty of the agencies involved to reject the pipeline company's plan. Thank you for making the time to read the public's comments. It restores my faith in democracy to believe the people can still be heard and listened to.	Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline's vicinity. The Commission's obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements. Section 3.4 of the EIS has been revised with this information.	20243-204403-01
	Reisenweber, Doretta	2024-02-22	Greetings from Duluth, Mn, Having lived half my years in the eastern Dakotas, the CO ₂ lines proposed to run from Iowa and Nebraska up through the Dakotas and meandering into Minnesota, caused me no undue concernfor the land, the water, the people and animals.	Thank you for your comment.	20243-204403-01
	Reisenweber, Doretta	2024-02-22	A look at the decades long failures of the fossil fuel industry's PR plan and tax-funded boondoggle was concerning enough, but I was stunned to learn of the dire health and safety issues in the not unlikely event of a rupture. For example, 25 minutes are needed to shut off the valves of this pipeline carrying toxic, odorless, disabling gas. I see no safety measures such as CO ₂ detectors at the valves or elsewhere along the pipeline. Instead Summit claims it will provide folks living within 1,000 feet of the line indoor CO1 detectors. By the time this toxic gas reaches the homes, it will be too late for folks working outdoors, for animals, for children playing in the yard.... Appendix G clearly acknowledges that "a full rupture results in impact distances too quickly for an early warning device, such as an oxygen detector." The DEIS just pointed out a major health and safety problem.	Text in Section 4.5 on valve closure time has been corrected from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Section 8.5.3 has been revised to note that, while acknowledging that the Commission does not set pipeline safety standards, EERA staff believes it reasonable for the applicant to voluntarily accept a special permit condition requiring the installation of check valves or pressure sensing valves that automatically close when pipeline decompression occurs. These valves could then close more quickly and reduce the impacts of a potential rupture.	20243-204403-01
	Reisenweber, Doretta	2024-02-22	Please do not approve this pipeline with such considerable health and safety risks not only to folks living along the line, but that of the pipeline workers themselves and to the first responders. Given that Summit plans only one full-time worker at the capture facility, the DOC and PUC need to insist that Summit provide clear instructions on the measure first responders must take in a pipeline emergency and how the company (Summit) will make sure the first responders are well-equipped and well-informed when such an emergency arises. Please insist that Summit's line workers be as well- equipped and informed, too.	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that would be revised as required by PHMSA, if the project is approved. The Emergency Response Plan includes steps that workers would take in the event of an incident. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-01

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	Reisenweber, Doretta	2024-02-22	My name is Doretta (Dorie) Reisenweber. I have lived in Duluth for over 15 years and been much concerned with water issues especially the failing Enbridge Line 3/93 and risky copper/nickel mining proposals which would threaten the waters of northeastern Minnesota, namely the Boundary Waters and, even more importantly, Lake Superior which contains one tenth of the world's fresh water supply, in this time when one fourth of the world's people do not have access to safe drinking water.... In a time when over half of Minnesota does not have safe water. This is not fly-over country. No governing nor advisory body dare risk contaminating our precious water no matter the cost/benefit ratio. No price can be put on clean water.	Thank you for your comment.	20243-204403-01
	Reisenweber, Doretta	2024-02-22	Missing from the scope of the DEIS are ramifications to northeastern Minnesota' where CO ₂ might be stored. Yes, that's right. In February of 2022, the DOE announced it was backing Rio Tinto's team to explore carbon storage at the proposed Talon (Rio Tinto major partner) nickel mine near Tamarack. All that to the tune of \$6.2 Million taxpayer dollars. Any contamination from the Talon mine were it to be permitted, would drain into the St. Croix and Mississippi Rivers affecting the drinking water of millions of people in addition to impacting the rich wild rice in area lakes and streams. What would prevent CO ₂ stored there from such leaking? Of course, that has not been addressed. It has not actually been proposed., but it sure has been put out there to consider. Fines would not suffice to restore any negative impact. Speaking of fines. An \$18 Million fine was leaved against global bad actor Rio Tinto recently. Fines are just part of big business. Fines don't stop bad actors. How might Rio Tinto with its notoriously bad reputation be connected to Summit? If so, the DOC or PUC must look beyond the CO ₂ pipeline's pipedream promises toward hard proof and examples of such storage processes ever working for a sustainable length of time in water-rich environments. Fractures in the bedrock of northeastern Minnesota should preclude the consideration of CO ₂ storage. Of course, that has not been addressed in the DEIS nor would it be in the EIS, as it has only been suggested, not officially proposed, Nonetheless, in my experience, what big money wants, big money usually gets. While I recognize the world needs solutions to carbon dioxide emissions, we must not let those needs and unproven storage methods usurp clean water north of Fergus Falls, or Tamarack, or anywhere else in the entire world. Please bear in mind the ramifications of the proposed OtterTail to Wilkin Counties CO ₂ Pipeline Project which could affect water well beyond its proposed route. Say no to this project, before the inch becomes a mile. The camel is already nosing around the edges of the tent. Thank you for listening and looking ahead.	Thank you for your comment. An alternative that does not transport CO ₂ into North Dakota as proposed by the applicant is outside the scope of the EIS.	20243-204403-01
	Roehl, Jonathan	2024-04-23	I feel the pipeline will create more pollution and use more energy than it is trying to solve.	Thank you for your comment.	20243-204403-01
	Rohlik, Gary	2024-02-13	I am Gary Rohlik I live in Vesta township and own and farm land where the co2 pipeline is purposed to go. I am very concerned what this pipeline could do to our roads during installation and how it will make our land go down in value and how it will affect our yields forever.	Road crossings are addressed in Section 5.4.9.2, property values are addressed in Section 5.4.7, and impacts on crop production are addressed in Section 5.5.1.	20243-204403-01
	Rohlik, Gary	2024-02-13	And if the pipeline would ever rupture how it would contaminate our water and air and how many people would be killed or injured before it is repaired.	Risks of a potential CO ₂ release and potential impacts are described in Chapter 8 of the EIS.	20243-204403-01
	Rohlik, Gary	2024-02-13	I am also very worried about the amount of water that is going to be used to cool the co2 to be able to put it in the pipeline that we will run short on water.	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has also been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Rohlik, Monica	2024-02-22	I live in Vesta township and am concerned how a Co2 pipeline would affect our water and air quality. And also what it would do to the value of our land and what construction would do to our roads. With the extra amount of water that would need to be used that we would run short on water also. I don't think it is worth risking so many human lives that could be lost in case of a rupture of a Co2 pipeline.	Thank you for your comment.	20243-204403-01

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	Ross, Jean	2024-02-09	I'm Jean Ross and I live in Minneapolis. I fought the Line 3 "reconstruction" from the beginning to the end because I didn't think Enbridge cared about preserving our pristine woods and waterways in their pursuit of profit. Minnesota's experience with the Line 3 / 93 pipeline construction demonstrates the serious harms that these types of projects cause to water resources and then state agencies don't hold them accountable for those harms.	Thank you for your comment.	20243-204403-01
	Ross, Jean	2024-02-09	The proposed route for Summit's pipeline network will pose dangers to the many water crossings, wetlands, aquifers, and other sensitive water bodies along the route. More research and analysis are needed to understand how a CO ₂ pipeline leak or rupture will impact Minnesota's precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it.	Potential impacts on water resources are described in Section 5.7.8 and potential impacts on wildlife resources and their habitat are described in Section 5.7.10. Potential impacts of a CO ₂ release on water and wildlife resources are discussed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Ross, Jean	2024-02-09	Much of southern Minnesota is suffering from a drought. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit "anticipates" an average water use for the operation of the carbon capture equipment of 13 million gallons per year. There must be a careful, case-specific assessment done of how the installation and operation of carbon capture will exacerbate drought conditions and existing pollution sources. Summit has not been transparent with its true demands for water resources so it is impossible to know the full impacts. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Ross, Jean	2024-02-09	The DEIS says that "drilling fluids and additives for the HDD would be non-toxic to the aquatic environment and humans," however, even supposedly "non-toxic" drilling fluid is chemical waste that has been found to be harmful to plant and animal species. The DEIS also states that "drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet drinking water quality certification standards would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA." The DEIS does not discuss the risks of applying drilling mud, especially with additives not approved by MDH, to the land.	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	20243-204403-01
	Rozek, Ellen	2024-02-22	As a person in her mid-thirties who has spent her whole life under the looming shadow of climate change, I have serious concerns about the long-term efficacy of this project and the risks it poses to the clean water supply all Minnesotans depend on.	Thank you for your comment.	20243-204403-01
	Rozek, Ellen	2024-02-22	For one thing, the DEIS consistently fails to properly account for the real CO ₂ emission and climate impacts of the project. Summit states that the capture facility "is designed to capture 100% of the CO ₂ produced by the ethanol plant." However, there is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. Summit's claim is not supported by any data/information or verified by a third party, which renders it baseless.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent.	20243-204403-01
	Rozek, Ellen	2024-02-22	Carbon capture technologies are also highly energy intensive and will significantly increase the carbon emissions at the facility from electricity use. The DEIS uses the Midwest Reliability Organization West Region average to calculate these emissions, which is unnecessarily inaccurate given the availability of the actual emissions factor from Great River Energy.	Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 gCO ₂ e/MWh. This was calculated from LREC's energy resource mix in which nearly half comes from clean energy sources. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 gCO ₂ e/kWh),	20243-204403-01

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				which was used in the draft EIS, calculated electricity emissions have decreased.	
	Rozek, Ellen	2024-02-22	Finally, the applicant states that the anticipated lifetime of this project is 25 years. This means at the end of its life; the project could stop capturing the CO ₂ from the ethanol plant. Unless the ethanol plant ceases operations at that point in time, it will continue to emit CO ₂ unabated into the future. Given the urgent need to limit the amount of CO ₂ pollution in order to prevent a complete climate collapse, the high likelihood of ongoing CO ₂ pollution is a serious concern.	Section 2.7 describes project decommissioning. If the ethanol plant continues to operate beyond the life of the proposed project, its CO ₂ emissions would not be captured.	20243-204403-01
	Rozek, Ellen	2024-02-22	Since the proposed route for Summit’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies, it is imperative that the risk this pipeline poses to the surrounding water supply be comprehensively understood. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota’s precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Rozek, Ellen	2024-02-22	And because much of southern Minnesota is suffering from the consequences of drought and over-commitment of our fresh drinking water supplies, there must be a careful and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impacts of those appropriations on water resources. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent with its true demands for water resources?	Additional information has been added to Section 5.7.8.2 to address the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	20243-204403-01
	Rufer, Stephen	2024-02-22	I am hopeful that the project gets approval as soon as possible. I believe it is a great step toward slowing/stopping climate change. I have no personal stake in the project except to improve our environment.	Thank you for your comment.	20243-204403-01
	Salfer, Jim	2024-02-23	I am asking that you look at this project very closely, the decition will effect other counties also. Please pay close attention to water usage, safety and future maintenance. Thanks	Thank you for your comment.	20243-204403-01
	Samargia, Jerry	2024-02-21	Summit Carbon Solutions’ proposed carbon capture project is an important part of our state’s and our nation’s climate agenda. Not only will it capture millions of tons of CO ₂ , but it also supports the low-carbon fuel market, which is an important initiative also aimed at lowering our country’s carbon footprint. In addition to lowering emissions in Minnesota, the project will create good-paying jobs while preserving the ethanol industry, an important part of our state’s economy. This project brings us closer to meeting our country’s and our state’s emissions goals and brings strong economic benefits to rural Minnesota. For those reasons, I urge the Public Utilities Commission to grant Summit Carbon Solutions a permit.	Thank you for your comment.	20243-204403-01
	Schaefer, Lee	2024-02-23	I am the Reverend Doctor Lee Schaefer. I am concerned with the impact this new oil pipeline will have on the environment. The potential for an oil leak or causing water to escape into the surrounding soil thus exacerbating our already diminished water resources due to the drought we are experiencing caused in part by climate change.	This EIS is for a CO ₂ pipeline, not an oil pipeline; therefore, there is no potential for an oil leak or other related incidents occurring as a result of this project. Potential impacts of a CO ₂ leak are discussed in Section 8.3.	20242-203795-01
	Schaefer, Lee	2024-02-23	Going forward this project has not taken sufficiently into account the continued disruption of the environment due to the continued reliance on fossil fuels. Thank you for your consideration to stop this hazard to humanity both now and in the future! Rev. Dr. Lee Schaefer	Thank you for your comment.	20242-203795-01
	Schmalle, Verlynn	2024-02-23	The EIS for this project “does not account for land use change.” Nor does it even reference in the footnotes the premier study on GHG life cycle emissions published by the National Academy of Sciences led by Tyler Lark which found that ethanol from corn is likely to increase GHG emissions by at least 24% due to the impacts of land use changes. This is a fatal error. To meaningfully address CO ₂ emissions, the State needs to protect and preserve at least 5 million acres just to reverse the damage caused by the overextension of row crops over the last 30 years. Since 1990, row crops have expanded over 4.2 million acres at the expense of cover crops (-3.4 million acres), CRP (-0.7 million acres), grasslands and pasture (- 0.9 million acres) per USDA reporting.	Section 6.1.3 has been revised to discuss the debate between Lark et. al. and GREET model authors.	20242-203808-01

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			<p>This expansion has destroyed important GHG sinks such as peatlands and tall grass prairies as row crops have expanded from the traditional corn belt in southern Minnesota to more vulnerable ground in the west and north.</p> <p>In 2010, the Legislature directed the MPCA to develop a rule to protect fish and aquatic life in Minnesota from nitrogen and nitrites. The MPCA spent the money studying the issue but declined to propose any rules to the legislature. No rule, no responsibility.</p>		
	Schmalle, Verlynn	2024-02-23	<p>In 2013, Governor Dayton and Commissioner Stine developed a strategic plan for nutrient reduction with goals of a 20% reduction in nitrogen loads in the Mississippi by 2025 and a long-term goal of a 45% reduction as part of the hypoxia task force. No part of the plan has been meaningfully implemented.</p> <p>In 2019, Governor Walz issued executive order 19-35 establishing the Governor’s Council on Biofuels. Despite the language in the order to include environmental and conservation interests, environmental interests were not represented. The Council was composed of Minnesota Corn Growers, the ethanol industry, the biodiesel industry, service stations, the petroleum industry, and the appointed staff from state agencies. Executive Order 19-35 granted the Council extraordinary authority to define policy for the Department of Agriculture, Department of Transportation, Department of Commerce, and the MPCA. This pipeline is just another example of the regulatory capture resulting from Executive Order 19.35.</p>	Section 6.2.3.1 discusses some modeling platforms available to estimate various GHG emissions associated with agricultural systems. One of the alternative agricultural practices discussed in the EIS included reducing synthetic nitrogen-based fertilizers. A rigorous study of nitrogen application rates and their impact on emissions and soil sequestration rates is outside the scope of the EIS.	20242-203808-01
	Schmalle, Verlynn	2024-02-23	<p>Combined, the lack of regulation and the unchecked promotion of ethanol from corn has resulted in devastating adverse impacts on the state’s air, water, and native species. Consequently, the MPCA reported a 4% increase in GHG emissions from agriculture from 2005 to 2020 (excludes Forest land use) and a 62% increase in nitrogen loads in the Mississippi at Red Wing in 2018. The current load on the State's “working lands” is not sustainable and does not provide a path to the state’s greenhouse gas or nitrate reduction targets. There are four reasons for the failure to make meaningful reductions in GHG emissions from agriculture and nitrogen loads in both our state’s groundwater and surface waters.</p> <p>1) Agriculture pollution reduction programs are spread across multiple agencies – MPCA, DNR, BWSR, DOH, DOA, where they are small items and lower priority.</p> <p>2) Programs have been almost entirely voluntary.</p> <p>3) Federal and state promotion of row crops provide an overwhelming financial incentive not to participate.</p> <p>4) Lastly, there has been a lack of executive leadership.</p> <p>To correct, we need to reverse these items:</p> <p>1) We need Executive leadership. We need the Governor to prioritize GHG reduction, soil health, and nitrate reduction as a necessary goal and to designate an agency to lead and coordinate in the effort.</p> <p>2) We need the state to begin to move away from the promotion of row crops in general and begin weaning the state off ethanol from corn in particular. The state needs to acknowledge the science that ethanol from corn is a net GHG contributor and does not provide a path for the state to achieve GHG emissions reductions goals.</p> <p>3) We need to provide a bigger economic incentive to participate in GHG emission reduction, soil health, and nitrate reduction programs in agriculture and move beyond voluntary compliance where it is necessary to achieve the state’s stated goals.</p> <p>4) We need a comprehensive plan with specific programs across all agencies to assure meaningful action is made toward our GHG and nitrate reduction goals. The current Climate Action Framework (CAF) is not that plan.</p>	Thank you for your comment.	20242-203808-01
	Schmalle, Verlynn	2024-02-23	<p>I strongly encourage the PUC, the Governor, and the MPCA to stop advancing the false science that ethanol from corn is a sustainable biofuel and stop covering up the devastating impact on the air, water, and native species that Executive Order 19-35 has had on our state. It should start with the rejection of the Otter Tail to Wilkin Carbon Dioxide Pipeline.</p> <p>Thank you for the opportunity to comment on this important matter.</p>	Thank you for your comment.	20242-203808-01
	Schmalle, Verlynn	2024-02-27	<p>Attached are supporting documents that you may find useful in your write-up to the Commissioners and in your final EIS. I hope you find them useful.</p> <p>Attachments include: Environmental outcomes of the US Renewable Fuel Standard (Lark et al., 2022), USDA Crop Acres 1990-2020, MPCA Ag GHG ex Land Use, 5-Year Progress Report on Minnesota's Nutrient Reduction Strategy (2020), MPCA Aquatic Life Rule, Executive Order 19-35, Report in fulfillment of Executive Order 19-35 establishing the Governor's Council on Biofuels (2020), EPA Letter, Plowing away the prairie, at a price (Marcotty, 2012)</p>	Thank you for your comment.	20243-204403-02

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	Schmidt, Dale	2024-02-26	<p>Summit Carbon Solutions of the State of Minnesota would follow and read Summit Carbon Solutions actions already, pushing, pushing eminent domain powers in Iowa, which would force unwilling landowners to sell them access to their property for the pipeline, which is unconstitutional in the aspect should be a waring along that it should be denied here. My family has lived and owned this farm since 1887 and has no intention of compromising that safety or beauty that is present.</p> <p>At the information meeting, May 3, 2023, and February 7, 2024, in Fergus Falls, Summit Carbon Solutions, said they were a private owned company that was mentioned in the meeting that they could not use eminent domain, so if I was to decline access, I really shouldn't have to work about my family's safety of a pipeline being built or constructed on my property.</p> <p>I am in the process of building a building structure along Highway 116 close to within the 40 foot setback required by Otter Tail County highway department. It will be built on either there or on County Highway 11 on property that is owned by either myself or spouse.</p>	Thank you for your comment. As indicated in Section 3.5, the applicant cannot exercise the power of eminent domain for the project.	20243-204403-02
	Schmidt, Jerry	2024-02-26	I have sold my farmstad on 240th St Fergus Falls and am moving to 24575 CO Hwy 11 soon. One of the proposed routes goes through my property. I do not want a pipeline on my property or even close if I have my say. Summit Carbon Solutions say its safe. But have read it is not. They have pushed for eminit domain of which is unconstituional. A foreign owned company backing projects like this should be stopped.	Thank you for your comment. Section 8.3 addresses effects on human health from an accidental release of CO ₂ . As indicated in Section 3.5, the applicant cannot exercise the power of eminent domain for the project.	20243-204403-02
	Schmidt, Sharlene	2024-02-26	I have attached a portion of an article that I ran across that explains my beliefs and/or position and agree 100% of this. As in the article our 135 plus years property in the family just gets taken away from us, WRONG! We are entitled to have our rights. We currently have bids to construct a building which will be in regulation with Otter Tail County, set back allowances. This stiuctional will be constructed along Highway 116 or County Highway 11, on property that myself of my spouse own. <i>[Attached is an article titled "There is not compromise on private property rights" by Amanda Radke]</i>	Thank you for your comment. As indicated in Section 3.5, the applicant cannot exercise the power of eminent domain for the project.	20243-204403-02
	Schuler, Kathleen	2024-02-22	I am a retired public health professional who is working for a healthy climate for all. I am opposed to putting more pipelines in the ground. We are seeing the adverse effects from the Line 3 project, which has experienced aquifer breaches and frac outs. The proposed summit pipeline has the same potential for harm to our waters, our land and our local economies.	Thank you for your comment.	20243-204403-01
	Schuler, Kathleen	2024-02-22	CO ₂ is a hazardous material in high concentrations. The DEIS consistently underplays the known and unknown risks of transporting large amounts of CO ₂ at high pressures through a pipeline. The DEIS does not consider the burdens this will put on local EMS and health providers in the case of a pipeline rupture or accident or an assessment of how they should be prepared to respond given the unique needs.	<p>Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that would be revised as required by PHMSA, if the project is approved.</p> <p>Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.</p>	20243-204403-01
	Schuler, Kathleen	2024-02-22	The DEIS fails to properly account for the real CO ₂ emission and climate impacts of the project. The estimated rate of capture is highly unlikely, and the project will likely result in increasing carbon emissions from electricity. in addition, there is no guarantee of permanent CO ₂ storage, and it is highly likely that most of the CO ₂ will be used for EOR, thus negating this project as a potential climate solution.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent. Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Schutz, Elizabeth	2024-02-23	My name is Elizabeth Schutz and I oppose this project. We have to stop believing in the "magical" solutions like carbon capture that promise us an easy way out of the climate crisis. We have to do the hard work of moving beyond things like ethanol and oil - that means saying goodbye to their money and empty promises. This really shouldn't be hard - companies could be positioning themselves	Thank you for your comment.	20243-204403-01

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			to capitalize on legitimately clean technology, they're just refusing to do so because they've invested so heavily into existing systems. They have blinders on. These companies are run by people who don't ever think about long term solutions or how their decisions impact people who are not like them.		
	Schutz, Elizabeth	2024-02-23	The DEIS consistently fails to properly account for the real CO ₂ emission and climate impacts of the project and the long term impact of carbon storage. Who's to say this company won't be gone in 25 years? Leaving the people who live here to clean up their messes? This has happened hundreds of times in the past - regular citizens left holding the bag once corporate entities have spoiled water, soil, and air with their toxic activities.	Section 2.7 describes decommissioning of the project. This section was revised to describe the financial assurances to be provided by the applicant for costs associated with decommissioning.	20243-204403-01
	Schutz, Elizabeth	2024-02-23	Please do not put regular people and the planet at further risk. We need to invest in clean energy solutions that actually work; not some oil executive's creative way to greenwash his company's pollution. Do not approve this project. Have some courage and call BS on this.	Thank you for your comment.	20243-204403-01
	Shayne, Al	2024-02-23	for nature, wildlife and the surrounding communities, the impact will be sensational, devastating, deleterious...the only #\$\$%ing "minimal impact" will manifest from the corporate industrial complex, and their benefactors and co-conspirators determined to promote a toxic agenda, a toxic wasteland of no benefit, collectively counterintuitive...	Thank you for your comment.	20243-204403-01
	Slama, Kay	2024-02-14	Dear Environmental Review Manager Andrew Levi, I urge you to carefully consider the impact any decisions or actions regarding this issue will have. there are loads of problems with carbon pipelines The North Dakota Public Service Commission denied Summit's siting permit application for underground sequestration, citing many issues that the company had not addressed adequately. Until ND allows the pipeline, the MN Public Utilities Commission should pause its permitting for the pipeline, since there's no place for the CO ₂ to go. Unfortunately, on August 31, the PUC refused to make that reasonable decision, and we need to let them know that was unwise for Minnesota.	Thank you for your comment.	20243-204403-01
	Slama, Kay	2024-02-14	What about human safety? CO ₂ is an asphyxiant-it keeps our lungs from getting oxygen when we breathe. CO ₂ pipelines must be pressurized at three times the rate of a natural gas pipeline (1,200-2,800 psi). Ruptures can occur for a number of reasons. One cause of ruptures can be shifting ground, whether from flooding or the ground sinking as water is used for irrigation. According to the Pipeline Safety Trust, many chemical impurities can get into the line. Any water molecules in the pipeline react with CO ₂ to form corrosive carbonic acid.	Risks of a potential CO ₂ release and potential impacts are described in Chapter 8. As noted in Chapter 2, the capture facility would include dehydration equipment to remove water from the CO ₂ . The text in Section 5.7.2 has been expanded to clarify that the pipeline would be buried underground with sufficient cover to protect it from flooding.	20243-204403-01
	Slama, Kay	2024-02-14	Ruptures have occurred in carbon pipelines, causing human and animal deaths. Carbon is heavier than air, and its unpredictable flow depends on terrain and changing weather. Without wind, it may just find low spots and sit there for a long time. NPR and other media reported on a pipeline rupture in Mississippi that caused 45 people to be hospitalized. It kept cars and emergency vehicles from working because combustion engines need oxygen. Emergency responders need breathing apparatuses that cost more than \$6,000 apiece, so they have to call in a specialized hazardous materials team, and our closest team is in St. Cloud. The planned carbon pipeline routes run close to homes, towns, and schools, so the CO ₂ plumes could reach them. PMHSA, the agency responsible for CO ₂ pipeline standards, is reviewing them in light of the dangers. These are more reasons construction of carbon pipelines should pause while safety is being worked out.	Thank you for your comment. Risks of a potential CO ₂ release and potential impacts are described in Chapter 8 of the EIS, including the incident in Satartia, Mississippi. As noted in Section 8.5, the applicant has committed to provide CO ₂ air monitoring equipment to first responders and to pay all costs associated with CO ₂ response training and air monitoring equipment.	20243-204403-01
	Slama, Kay	2024-02-14	Land issues need to be considered with carbon pipelines. Installation compacts a wide swath of soil that is almost impossible to loosen so roots can get into it. The pipelines heat land near 90 degrees, and both resulting evaporation and heat make it harder for plants to grow. Restoring soil health and productivity is a long-term struggle both current farmers and future generations will have to bear.	Impacts on soils and mitigation (including for soil compaction) are addressed in Section 5.7.6, and impacts on crops are addressed in Section 5.5.1 and 5.7.7. As indicated by the definitions found on Page 5-1 of the draft EIS, "long-term impacts extend beyond the end of construction and are generally associated with operation of the project." Disturbance to soils and crops from construction can result in impacts that extend beyond the construction phase, and the text in the final EIS has been revised to indicate that impacts can be long term.	20243-204403-01
	Slama, Kay	2024-02-14	There are many stories about Summit bullying landowners and using misinformation to obtain easements across farm property. Easement payments to farmers last 3 years, but the easements are permanent, so landowners are vulnerable to other uses after the 20-25-year life of the pipeline. Pipelines tend to be abandoned in place after they are no longer useable, so they remain a permanent hazard on the property and its underground water flow. Iowa is considering using eminent domain to run CO ₂ pipelines through farmers' lands without their consent. Under the Fifth Amendment, eminent domain must be for a "public use," which traditionally meant projects like roads or bridges, not the enrichment of private corporations.	As indicated in Section 3.5, the applicant cannot exercise the power of eminent domain for the project. Landowner agreements with the applicant are outside the scope of the EIS.	20243-204403-01

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	Slama, Kay	2024-02-14	In the big picture, pipelines encourage growing huge amounts of corn in the US, nearly half of which is used to produce ethanol. This discourages growing alternate crops that may be better for our land, need less fertilizer and irrigation, and send less pollution down our rivers and into our lakes.	Thank you for your comment.	20243-204403-01
	Slama, Kay	2024-02-14	Next are water issues. The buried carbon pipelines cross rivers and wetlands underground, which can puncture aquifers during construction, as we saw with the Enbridge Line 3 pipeline in northern MN.	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	20243-204403-01
	Slama, Kay	2024-02-14	In addition to water used for testing during construction, the pipelines will require 13,000,000 gallons/per facility using the pipeline per year (from Summit's response to inquiry on water usage during Minnesota PUC 5/4/2023 scoping meeting). This constitutes a risk of drawing down our lake and river levels and aquifers.	Additional information has been added to Section 5.7.8.2 to address the volume of water that would be used by the project relative to available resources. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	
	Slama, Kay	2024-02-14	Energy issues: Much energy is needed to mine materials for carbon pipelines, which must be much thicker than any other kind to contain so much pressure. Much fuel is required to put the pipelines in the ground. Energy sources process the gases and condense CO ₂ at its sources, as well as run the pumps and bury the carbon. There is evidence that making ethanol out of corn is a life-cycle process that may use more CO ₂ than it saves. We have alternative land-use programs that encourage natural plants which sequester CO ₂ , as well as encourage more wildlife and pollute less. On top of that, a ND official admitted that pipeline CO ₂ will be used to compress fossil fuels out of the ground, a process known as fracking, which will put more CO ₂ in our atmosphere and cause more of the climate change effects we've been seeing so much lately.	The embodied carbon of CO ₂ pipelines, which includes the emissions associated with the sourcing raw materials, manufacture, and construction, was not discussed in the draft EIS. Such level of analysis is not commensurate with a reasoned choice among alternatives. The EPA's life cycle analysis for the Renewable Fuel Standard (RFS) includes emissions related to feedstock farming production and transportation, fuel production and distribution, and the end use of the finished fuel. This includes energy and material inputs used for handling, processing, and storing the feedstocks, co-products, intermediate products, and resulting fuel. The GHG emissions are calculated using emissions factors for all of the process energy (e.g., natural gas, coal) and electricity used for fuel production operations. These factors include the upstream emissions associated with extraction, transport, and distribution of the energy, and are generally determined on an average basis (e.g., grid average electricity in the United States). The upstream emissions associated with significant material inputs used to produce the renewable fuel, such as methanol for biodiesel production, are also included. The EPA's assessment of fuel production does not include	20243-204403-01

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				activities that are clearly unrelated to the fuel lifecycle (e.g., offset projects) or emissions associated with physical and organizational infrastructure (e.g., facility construction, employees commuting to the facility). Most studies, including this one, include only primary energy inputs in their estimates. Secondary inputs, such as energy required to build ethanol facilities, farm vehicles, and transportation equipment, are extremely difficult to quantify. Moreover, secondary inputs related to the ethanol plant would account for very little energy on a per gallon basis. This is because the energy embodied in fixed inputs, such as the cement used to build the plant, would have to be distributed over total production (including coproducts) during the lifetime of the plant. The life cycle phases of the ethanol being studied in the EIS focus on opportunities at the agriculture stage, as well as at the production stage, to lower the total CI score of the ethanol produced at the ethanol plant. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent. Section 6.1.3. describes the ethanol fuel life cycle analysis used to determine CI score and low-carbon fuel standard regulatory framework. Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	
	Slama, Kay	2024-02-14	<p>So what can we do? We need to think ahead for our climate and our agriculture. We should be spending our “public” money on helping farms move away from growing so much corn. Help farmers feed people rather than make carbon-intensive ethanol, and help them diversify. We need to create markets in MN for their crops. It will take regular input to our lawmakers and state agencies to help them act with this future in mind.</p> <p>We need to do all we can to address the excess carbon that is warming our planet and causing global climate change. Carbon sequestration may indeed be one of the solutions, but not by crisscrossing our land with potentially unsafe pipelines that will threaten our land and waters and almost certainly lead to fracking for more fossil fuels. We need to focus on making our climate better, not worse.</p>	Thank you for your comment. The appropriateness of federal and state policies regarding carbon capture and ethanol is outside the scope of the EIS.	20243-204403-01
	Stamp, Amanda	2024-02-23	<p>As a Minnesota resident with family and friends impacted by multiple carbon dioxide (“CO₂”) pipeline proposals throughout the region, I am submitting the following comments regarding the draft environmental impact statement (“DEIS”) for the application for a Minnesota pipeline route permit (“Route Permit Application” or “Application”) submitted by Summit Carbon Solutions, LLC (“SCS” or “Applicant”).</p> <p>To begin, I don’t think sufficient time was given to the public to review the DEIS. Notification was made on January 23, 2024 with public informational meetings held on February 6, 7 and 8. Given the DEIS was prepared over many months, I don’t think giving the public less than 2 weeks to prepare to ask questions and just a month to review it for comments was sufficient.</p>	Minnesota Rule discusses review periods. Minnesota Rule 4410.2600, Subp. 8 requires that the information meeting must not be less than 15 days after publication of the EIS. Subp. 9 contemplates a comment period extending 10 days beyond the informational meeting.	20243-204403-02
	Stamp, Amanda	2024-02-23	<p>Environmental Impact Statement Preparation Team - I participated in the online public meeting related to the DEIS. I was alarmed by the speaker from Allied Solutions, Inc. (“Allied”) which is noted in the DEIS to be a subcontractor on behalf of the Energy Environmental Review and Analysis (“EERA”). The representative from Allied credentialed himself as someone who works with CO₂ pipelines throughout the United States. Without further disclosure as to Allied’s credentials and the selection process, how can the public know Allied is in fact impartial if its business is based on the need for CO₂ pipelines? The DEIS should clarify the credentials of the contractors relied upon, the companies assessed for hiring, disclose the contract terms and fee arrangements, and disclose why EERA determined a selected contractor is in fact qualified AND impartial.</p> <p>Additionally, the DEIS lists System Insight Engineering, LLC as a preparer, but this business is not referred to in the report making it unclear what external assistance was provided. Further, the HDR, Inc. preparers include a copy editor which indicates a report was provided. Why is that report not attached in its original form as evidence of what was considered in the DEIS?</p>	Chapter 12 has been updated to include the qualifications of the preparers of the EIS, including Allied and System Insight. The role of the copy editor was to correct grammar errors, improve text consistency, and generally improve the readability of the draft EIS for the public. No separate report was generated by this process.	20243-204403-02

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	Stamp, Amanda	2024-02-23	<p>Water Resources - The DEIS water resource summary concludes the Department of Natural Resources (“DNR”) would regulate water supply appropriations, however, considering water usage is one of the most important issues that impacts all Minnesotans, the DEIS should not be deemed complete without consideration. The report includes generalities and no conclusion or analysis to water issues, and the issues noted are concerning given the recent weather in our state.</p> <p>For example, Table 5-40 concludes at underwater resources, “Minimal use of water and discharge of water is planned.” However, the report ignores water usage so there is no basis to include a statement of “minimal use”. Further, under the project design category it states “Drought could affect the project’s ability to appropriate water.” Considering parts of Minnesota are already in a drought, and I am now watering my trees to prevent them from dying, yes, water usage, allocation and the viability of this project is important even if there is a jurisdictional question related to the assessment of water. Further, “Contingency water sources would be required by permits should water not be available due to drought conditions.” It should be stated whether this location is in a drought already or close to being a drought. Isn’t the purpose of the DEIS to make these determinations for the general public rather than leaving open ended questions with significant consequences? Lastly, page 7-10 states it could take 100 to tens of thousands of years to recharge an underground reserve and that underground reserves of freshwater are limited. If we are allowing a private enterprise to use, without charge, a natural resource of the state that could take tens of thousands of years to recharge, would that not merit a complete, robust and publicly disclosed analysis?</p> <p>A complete analysis of the water usage, availability and impact to the general public must be included in the final DEIS. Further, considering the entire footprint of the project is much larger than this permit application component, the overall water usage should be considered prior to finalizing a DEIS.</p>	<p>Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.</p>	20243-204403-02
	Stamp, Amanda	2024-02-23	<p>CO₂ Release Impacts - Page ES-10 denotes a difference between leaks and ruptures and the provided context focuses on leaks. However, there is no consideration given as to the pressure within the pipe (approximately 2,000 psi), which in this case is much higher than other pipelines. As such, it is my understanding any opening in the pipeline likely would result in a rupture given the high pressure. The basis for this discussion is PHMSA data which is weighted towards other pipeline types which are under much less pressure. The report should clarify the basis for the PHMSA data and whether it is actually comparable to the specifications of the pipeline being proposed.</p>	<p>According to PHMSA Pipeline Flagged Incident Files, from 2010 through April of 2024, 136 incidents were recorded on pipelines carrying hazardous liquids (which includes CO₂) with a pressure of over 2,000 psi, across the US. Of those 136 incidents, 116 incidents were leaks, 2 incidents were ruptures, and the remaining 18 incidents were classified as "other." Based on the PHMSA Pipeline Flagged Incident Files, pressures greater than 2,000 psi did not result in more ruptures than leaks. Section 8.2.2 has been revised to include this information.</p>	20243-204403-02
	Stamp, Amanda	2024-02-23	<p>Region of Influence - The Table 5-1 Region of Influence for public health and safety is listed as Otter Tail and Wilkin Counties. However, later in Section 5.4.6, Populated Areas, it states the ROI is the local vicinity which was previously defined as 1,600 feet plus the 250 feet of route width. These 2 data points seem conflicting. The DEIS should disclose how the ROI was determined and why that was concluded to be sufficient. The dispersion modeling summary on page ES-10 states mild respiratory stimulation was calculated at 910 feet, and I presume this is based on the “conservative assumptions” that are not disclosed.</p>	<p>Public health and safety as discussed in Section 5.4.8 analyzes the effects that construction and operation accidents would have on public health services. Since the area of Minnesota that would be crossed by the project is rural, the ROI for public health and safety is defined as Otter Tail and Wilkin Counties to include the nearest hospitals and the range of first responders available to provide emergency response if needed during construction or operation of the project.</p> <p>The conservative assumptions mentioned in the Executive Summary are defined and discussed in Section 8.3.1.2 and Appendix G.</p>	20243-204403-02
	Stamp, Amanda	2024-02-23	<p>For avoidance of doubt, the DEIS should also confirm whether or not the city of Fergus Falls is deemed a high consequence area per PHMSA guidelines. While the ROI used is assistive, it would make most sense to include an assessment using PHMSA rules on whether the close proximity of the capture facility to the populated city of Fergus Falls has further impacts to populated areas. I don’t see how the Minnesota DEIS would be accurate without clearly linking how the proposed siting by SCS aligns with the criteria used by PHMSA to conclude there are no impacts to the health and human safety of populations.</p> <p>Additionally, page 8-14 indicates the Fergus Falls Municipal Airport could be within the toxic impact distance. If this is a PHMSA high consequence area, that designation should be stated clearly and the impacts discussed within this DEIS.</p>	<p>Fergus Falls is a high-consequence area. However, the impact distance (at the 30,000 ppm concentration) would intersect unused fields, but not intersect any of the buildings where people would congregate. Section 8.3.1 has been revised to clarify.</p>	20243-204403-02
	Stamp, Amanda	2024-02-23	<p>Lastly, while the DEIS states the Public Utility Commission (“PUC”) can’t set safety standards, PHMSA has stated publicly that “nothing in the federal pipeline safety law impinges on these traditional prerogatives of local - or state - government.” The PUC should consider whether the pipeline is placed in the most logical location, including safety.</p>	<p>Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to</p>	20243-204403-02

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				identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements. Chapter 3.4 of the EIS has been revised with this information.	
	Stamp, Amanda	2024-02-23	<p>PHMSA Data on Accidents Involving Liquid Pipelines - Section 8.2.2 discusses the criteria of what is deemed an “accident” per PHMSA guidelines. Of note is “personal injury necessitating hospitalization” which differs from personal injury necessitating medical attention. This distinction under-reports the actual accidents and injuries from pipelines. As such, these data points should be qualified in the report to more accurately portray the risks. For example, page 8-3 states, accurately, the CO₂ pipeline rupture in Satartia, Mississippi caused 45 people to be hospitalized and 200 to be evacuated. However, this mass injury event won’t be reported under PHMSA rules denoting how catastrophic the impacts were.</p> <p>Additionally, citation 31 infers PHMSA has declared pipelines to be the safest mode of transportation for carbon dioxide. However, my assessmet of this citation is that there is no conclusion from PHMSA that pipeline transportation for carbon dioxide is indeed safer than other modes of transportation. Given the dangerous attributes of CO₂, in order to make this conclusion there would need to be a scientific assessment of how the CO₂ in a truck or railcar is indeed less safe than having a 20 mile pipeline section of highly pressurized CO₂ escape upon an unknowing person who can’t see or smell it. Where is the science supporting this assertion? As already noted, PHMSA’s subpar standards for determining an “accident” means the widely marketed viewpoint of safety is not what a normal person would deem to be an accident. If someone must seek medical attention, I would consider that an accident.</p>	<p>It is outside the scope of this EIS to redefine the term "accident" since it is a PHMSA term and definition, as noted in this comment.</p> <p>As cited in Section 8.2.2, (General Pipeline FAQs): Question 2 on the PHMSA FAQ page defines pipelines carrying liquefied gases, such as carbon dioxide, as liquid petroleum pipelines. Question 6 states: "The nation's more than 2.6 million miles of pipelines safely deliver trillions of cubic feet of natural gas and hundreds of billions of ton/miles of liquid petroleum products each year. They are essential: the volumes of energy products they move are well beyond the capacity of other forms of transportation. It would take a constant line of tanker trucks, about 750 per day, loading up and moving out every two minutes, 24 hours a day, seven days a week, to move the volume of even a modest pipeline. The railroad-equivalent of this single pipeline would be a train of 225, 28,000 gallon tank cars. <i>Pipeline systems are the safest means to move these products.</i>" (Note that due to new citations being added during the review and revisions to the EIS, this citation is no longer Citation 31).</p>	20243-204403-02
	Stamp, Amanda	2024-02-23	<p>In addition, the DEIS doesn’t consider that PHMSA is currently undergoing a rule making process for CO₂ pipelines which is being undertaken because there is an acknowledgement after the Satartia, Mississippi disaster there is a lack of science and regulations regarding these pipelines. To know PHMSA is currently improving its rules but not requiring compliance, nor acknowledging the impacts in the DEIS, is disappointing. Why is EERA not proposing a permit condition or recommendations requiring compliance with PHMSA’s forthcoming rules? Alternatively, how is the DEIS comfortable with the forthcoming rules and what analysis is provided that informs the DEIS is adequate given its silence on that matter? The DEIS should be qualified to denote further safety considerations as well as conclude on the impact of the forthcoming PHMSA regulations.</p>	<p>Thank you for your comment. The draft EIS discusses PHMSA rules and regulations, and the pending rulemaking process it is undertaking for CO₂ pipelines, and acknowledges pending PHMSA changes to such regulations (see draft EIS, Chapter 3, Chapter 8, and Appendix G). However, PHMSA regulations (that is, their appropriateness) and related standards for CO₂ pipelines are outside the scope of the EIS (Appendix A). PHMSA regulations apply to the project and the applicant is required to comply with these regulations; thus, EERA staff believes there is no need to propose a special permit condition or compliance recommendation.</p> <p>Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements. Section 3.4 of the EIS has been revised with this information.</p> <p>The applicant has stated its proposed CO₂ pipeline would be designed, constructed, and operated to meet current PHMSA regulations, including any operational changes to PHMSA regulations that may occur in the future. To the extent applicable and in response to this and similar comments, Section 3.6 and Appendix G of the EIS have been updated to include this information.</p>	20243-204403-02

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	Stamp, Amanda	2024-02-23	Greenhouse Gas (“GHG”) Emissions - The DEIS should be modified to differentiate, in detail, whether the CO ₂ discussed is biogenic or fossil fuel created. The DEIS doesn’t distinguish between the sources nor the environmental impacts of either. Further, the data presented is not clear as to its meaning. o start, the DEIS should define its meaning of greenhouse gas. The United States Environmental Protection Agency (“EPA”) doesn’t include biogenic CO ₂ in its greenhouse gas reporting as it isn’t considered a greenhouse gas emission. Given the EPA does not believe biogenic CO ₂ is a greenhouse gas, I don’t know how the state of Minnesota can determine this project decreases greenhouse gas emissions. Page 5-93 states the project provides a “net benefit to GHG emissions”, but based upon EPA guidelines, no greenhouse gas emissions are actually being captured by this project.	The project would capture and sequester the biogenic CO ₂ produced by the ethanol fermentation process at the ethanol plant. The analysis in Section 5.7.1 includes both air pollutant and GHG emissions from fossil fuel sources that would be used during construction and operation. Text has been added to the beginning of Section 5.7.1 to clarify.	20243-204403-02
	Stamp, Amanda	2024-02-23	The discussion of the emissions from the ethanol facility focuses on the CO ₂ from the fermentation process, or the biogenic CO ₂ . There is no discussion about the fossil fuel emissions from the natural gas used which undoubtedly are the emissions which are causing climate change. For example, Table 5-36 and its footnotes focus on the CO ₂ conversion from corn. The report doesn’t appear to expressly acknowledge the fossil fuels generated are not being captured nor whether they plan to be captured in the future. The process to capture biogenic CO ₂ varies from the process required to capture fossil fuel CO ₂ . Without the permit application and the DEIS being clear on which components of the emissions are being captured and transported, nothing in the DEIS can be deemed accurate. The varying emissions to be captured require distinct processes and chemicals, and the DEIS analysis and application can not be silent on this distinction as the accuracy of the entire analysis is dependent upon the distinction.	AQ and GHG emissions from the capture facility are addressed in Table 5-38 and compared to the air permit thresholds. This includes potential natural gas usage for space heating. The ethanol plant is under a Title V Permit, which regulates the allowable emissions from the plant. This project will not alter the production of ethanol from the plant. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios for 100 percent, 70 percent, 40 percent, and 10 percent.	20243-204403-02
	Stamp, Amanda	2024-02-23	Enhanced Oil Recovery (“EOR”) - The DEIS states this project does not plan or propose to use the CO ₂ to recover oil which obviously defeats the stated purpose of this project, and while the DEIS acknowledges it can not speculate on EOR use, it provides no analysis or assurances the issue is appropriately considered. For example, it is well documented government officials in the state of North Dakota publicly state the future of the Bakken oil reserves is in EOR. The DEIS page 5-101 states, “If all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO ₂ , other gasses, thermal methods, or chemical methods. Production of oil through EOR would not be dependent on the availability of CO ₂ produced by the ethanol plant.” The issue in this conclusion is “the ethanol plant”, because this proposal is a small component of a much larger and integrated project to aggregate significant volumes of CO ₂ and pipe it to an area of known oil reserves which require EOR. Given this point, none of the EOR discussion is actually valid in the broader context of what is happening and the broader assessment the state of Minnesota is being asked to consider. Had SCS been required to treat the multiple Minnesota pipelines of its project as one total project, this entire discussion in the DEIS would be different. Alternatively, the broader footprint should be considered to determine if the overall purpose, goals and merits of this project, even if one facility is in Minnesota, achieves the same analysis in the DEIS.	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-02
	Stamp, Amanda	2024-02-23	In addition, the DEIS does not apply speculation versus facts equally. Ethanol production can’t be predicted, as stated on page 7-1, “It might fluctuate up and down.” There is an attempt to explain alternatives which root heavily in speculation, but the DEIS can be silent on EOR as it is speculative. However, more importantly, the DEIS ignores the fact the purported business plan is reliant on Federal tax credits that expire, and this is a fact. This is not speculative. Given the business plan, as disclosed, has revenue that will expire much sooner than the useful, operating or design life of the project, then the underpinnings of the project must be examined. How is this a viable business plan? To review this DEIS without that consideration, particularly as to the financial viability of the project and the obvious secondary revenue stream of enhanced oil recovery in North Dakota, the sequestration area, would be a grave disservice to Minnesotans. If the value of this project can’t prove there is revenue that is not speculative after the expiration of Federal tax credits, then it must be assumed the CO ₂ will be sold for EOR in which case the DEIS is missing a complete analysis of the impacts. Imagine if the state of Minnesota permits this project only to have the CO ₂ potentially be used in EOR in 15 years; can you imagine what the public perception of this process would be at that point?	Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-02
	Stamp, Amanda	2024-02-23	Corn Usage - The DEIS should include consideration of how much ethanol by product is consumed by animals and would otherwise be consumed without an ethanol plant. The amount of corn processed by ethanol producers doesn’t translate directly into lost consumption. Further, there is no consideration given to the economics of this proposed project, plus the rest of its footprint, relative to corn prices and impacts to animal producers and food prices. News reports state the sustainable aviation fuel market (which ethanol plants desire to create) could require 60additional ethanol plants in the midwest, and I can not understand how that much corn and water can possibly be grown or allocated without severe societal and economic impacts.	Potential socioeconomic impacts concerning corn crop prices, animal producers, and food prices are addressed in Section 7.2.2.1.	20243-204403-02

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	Stamp, Amanda	2024-02-23	Odorant - DEIS page 8-25 states an odorant can't be included because it would require multiple injection facilities and would introduce additional logistic and design changes needed for the safe storage and overland transport of odorant. While the DEIS states safety standards can't be set, I would ask whether the applicant truly can't odorize this pipeline, and if unwilling or unable whether the siting makes any sense at all. The DEIS should focus more on this point rather than passing the buck to PHMSA.	As indicated in the EIS, CO ₂ is odorless at low concentrations but has a sharp, acidic odor at very high concentrations, such as would occur in the event of a rupture. EERA staff evaluated the addition of an odorant, as described in Section 8.5.2. Adding an odorant would fall under safety standards. The Commission cannot set safety standards for pipeline construction or operation. The Commission's obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements.	20243-204403-02
	Stamp, Amanda	2024-02-23	I'd like to remind the PUC and other government agencies that just because something can be done, doesn't mean it should be done. The citizens of Minnesota are relying on government watch dogs to ensure the safety of our people and our resources regardless of what private businesses, non-government organizations and others think would advance commerce, labor and tax rolls. The size and novelty of this high pressure CO ₂ pipeline with multiple on-takers is truly a new proposal which has not been done before. It is important the State of Minnesota fully considers all aspects of the proposal without prejudice as there are people in rural Minnesota counting on you all to get this right. Thank you for your consideration.	Thank you for your comment.	20243-204403-02
	Steitz, Jim	2024-02-23	Carbon capture and storage is a technological mirage that the industry has dangled before legislators and regulators for decades, promising at an indeterminate future date to clean their carbon mess, while continuing to flood our atmosphere with carbon. Any scientifically literate government official should understand that the creation of carbon dioxide is an innate, inexorable aspect of releasing energy from fossil carbon, and that industry lobbyists who promise to capture their carbon are preying on either the scientific illiteracy or knowing cynicism of government officials. Do not issue pipeline permits to perpetuate the charade that burning carbon will one day be compatible with human survival.	Thank you for your comment.	20243-204403-01
	Steva, Keith	2024-02-22	Hi, my name is Keith Steva. I live in Beatty Township, St. Louis County MN. I have a technical education in engineering and have been studying carbon capture proposals of various types for years. The "solutions" I have seen appear to be false solutions to greenhouse gas emission and CO ₂ release. In fact, I'd be so bold to say these seem like public scams to convince people that continued burning of fossil fuels and indirectly consuming fossil fuel for farm equipment and related support industries including the big consumer of fossil fuel, nitrogen-based fertilizer for agriculture is ok because we are going to "capture" the CO ₂ . This is a very high-risk venture and likely to fail financially and certainly fail environmentally. The developers will take the money and leave the problems to the citizens of Minnesota. Clean water and NO BURNING or use of fossil fuels should be the goal. Not a shell game to deceive the public. The environmental costs are enormous, and risks are not controlled. This is a very bad project. I am adamantly against the pipeline.	Thank you for your comment.	20243-204403-01
	Strand, Jeffrey	2024-02-23	Comments from Jeffrey Strand, rural resident and farmland property owner in Highwater Township, Cottonwood County, MN. I am concerned about proposed CO ₂ "Carbon" Pipelines Otter Tail to Wilkin project because this IS of statewide concern and of great concern as well to rural residents in Southern and Southwest Minnesota. After living in Minneapolis and having a second home on the farm these past 21 years, we are now permanent farm home residents in another proposed project area. CO ₂ Pipelines are destructive and can wreck soil structure, disrupt drain tile systems, along with other serious and long-term impacts on productivity of agricultural lands. Large-scale and multi-state CO ₂ pipeline networks are being proposed by out-of-state corporations from various industrial facilities, but largely benefit the companies, investors and billionaires to reap windfalls from 45Q tax credits (26 USC S 45Q - Credit for carbon oxide sequestration). The economic and environmental burdens, however, are shifted to surrounding rural communities, farmers and taxpayers. There is NO actual cost-benefit for CO ₂ carbon capture pipelines is unproven as an effective way to reduce greenhouse gas emissions to combat global climate change. The proposed CO ₂ pipeline for 11 rural Minnesota counties is an unproved pilot project. Rural communities that rely upon mostly volunteer EMS services are NOT equipped to effectively respond to ruptures or leaks, thus putting rural residents at risk. The proposed CO ₂ pipeline setbacks do NOT adequately protect rural communities. The heavy use of groundwater resources by the CO ₂ pipelines puts scarce rural water resources at risk. Creation of carbonic acid in processes related to the project presents a toxic and corrosive threat to the environment.	See responses to detailed comments on each topic below.	20243-204403-01

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	Strand, Jeffrey	2024-02-23	CO ₂ is a hazardous material in high concentrations. The DEIS consistently underplays the known and unknown risks of transporting large amounts of CO ₂ at high pressures through a pipeline.	Chapter 8 describes the properties of CO ₂ and the impacts of a potential rupture.	20243-204403-01
	Strand, Jeffrey	2024-02-23	CO ₂ Rupture Impact Zone: According to the analysis in the DEIS, the potential impact radius for levels of CO ₂ that would be “immediately dangerous to life or health” is 617 feet. This expands to 910 feet for lower concentrations that cause dizziness, drowsiness, severe muscle twitching, and unconsciousness within a few minutes. Although Summit indicates that it will take 25 minutes for the system to shut off the relevant valves in the event of “abnormal operation,” the DEIS does not mention any meaningful safety measures for a rupture and instead suggests that it is “reasonable” for Summit to simply supply indoor CO ₂ detectors for residences within 1,000 feet of the project. But the rupture report in Appendix G states that “a full rupture results in impact distances too quickly for an early warning device, such as an oxygen detector, to be effective.” This pipeline should not be approved without a clear understanding of the risks to human health and meaningful measures to ensure the safety of people and animals in the area.	Text in Section 4.5 on valve closure time has been corrected from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Section 8.3.1 has been revised to note that, while acknowledging that the Commission does not set pipeline safety standards, EERA staff believes a special permit condition requiring the applicant to consider installing check valves or pressure sensing valves that automatically close when pipeline decompression occurs is reasonable. These valves could then close more quickly and reduce the impacts of a potential rupture.	20243-204403-01
	Strand, Jeffrey	2024-02-23	First responders and health professionals: CO ₂ pipelines pose unique problems for first responders and health care providers. Because CO ₂ is colorless and odorless, both victims and first responders have no way of knowing what is causing the health problems. In addition, first responders require special equipment, including non-internal combustion engines, to respond to a CO ₂ disaster. The DEIS does not consider the burdens this will put on local EMS and health providers in the case of a pipeline rupture or accident or an assessment of how they should be prepared to respond given the unique needs. The DEIS includes Summit’s September 2022 Emergency Response Plan (Appendix N). This plan is not only outdated but also unclear as to how local EMS and first responders will interact with the applicant in the event of a leak or rupture. Though the plan talks of multiple company personnel as playing roles in an emergency response, it ignores the fact that the applicant only plans on having one full-time employee at the capture facility. Local first responders deserve more clarity about how they will be expected to respond to an emergency situation and what the applicant will do to ensure they are adequately equipped and informed for such an event.	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	20243-204403-01
	Strand, Jeffrey	2024-02-23	Compliance with PHMSA Rules: The DEIS accepts Summit’s assurances that it will “comply with federal emergency response requirements,” but as noted in a Pipeline Safety Trust report and by the Pipeline Hazardous Material Safety Administration (PHMSA) itself, the current emergency response requirements are dangerously outdated.	<p>Thank you for your comment. The draft EIS discusses PHMSA rules and regulations, and the pending rulemaking process it is undertaking for CO₂ pipelines, and acknowledges pending PHMSA changes to such regulations (see draft EIS, Chapter 3, Chapter 8, and Appendix G). PHMSA regulations (that is, their appropriateness) and related standards for CO₂ pipelines are outside the scope of the EIS (Appendix A). PHMSA regulations apply to the project, and the applicant is required to comply with these regulations; thus, EERA staff do not believe there is a need to propose a special permit condition or compliance recommendation.</p> <p>Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements. Section 3.4 of the EIS has been revised with this information.</p> <p>Additionally, the Applicant has stated its proposed CO₂ pipeline would be designed, constructed, and operated to meet current PHMSA regulations, including any operational changes to PHMSA regulations that may occur in the future. To the extent applicable, and in response to</p>	20243-204403-01

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				this and similar comments, Section 3.6 and Appendix G of the EIS have been updated with this information.	
	Strand, Jeffrey	2024-02-23	Setbacks: The DEIS states that the PUC “cannot set safety standards” for Summit’s proposed pipeline. PHMSA has expressly said in public letters to CO ₂ pipeline companies like Summit that state and local authorities can exercise their powers to regulate land use—including setback distances—and that “nothing in the federal pipeline safety law impinges on these traditional prerogatives of local—or state—government.” The PUC must consider where the pipeline is placed and what is the safest option for Minnesotans, which means the PUC can and should determine what routing, setback, and depth requirements are necessary to adequately protect Minnesotans. Minnesota’s recent experience with pipeline construction demonstrates the serious harms that it causes on water resources as well as a tendency by state agencies to under-account for those impacts.	Although the Commission cannot set safety standards for pipeline construction or operation, state or local units of government may, to the extent authorized by law, set land use requirements that indirectly contribute to pipeline safety by regulating the activities of third parties located in the pipeline’s vicinity. The Commission’s obligation is to identify a pipeline route consistent with the criteria found in statutes and the applicable administrative rules. Federal law, by contrast, exclusively prescribes pipeline safety requirements.	20243-204403-01
	Strand, Jeffrey	2024-02-23	Dangers to water and waterbodies: The proposed route for Summit’s pipeline network includes many water crossings, wetlands, aquifers, and other sensitive water bodies. More research and analysis are needed to understand how CO ₂ disperses in water and what risks a CO ₂ pipeline leak or rupture poses to Minnesota’s precious waters and the fish, amphibians, reptiles, waterfowl, birds, and insects that rely on it to survive.	Potential impacts of a pipeline rupture on water resources and wildlife are addressed in Section 8.3.4. Stand-alone studies concerning impacts on water resources, wildlife, and wildlife habitat are outside the scope of the EIS.	20243-204403-01
	Strand, Jeffrey	2024-02-23	Water use: Much of southern Minnesota is suffering from the consequences of drought and over-commitment of our fresh drinking water supplies. The DEIS fails to discuss the impacts of an increase in water use on local water supply. The carbon capture process can double water requirements at a facility and increase toxic wastewater discharge. The DEIS states that Summit “anticipates” an average water use for the operation of the carbon capture equipment of 13 million gallons per year, which is concerningly ambiguous. There must be a careful and case-specific assessment done of how the installation and operation of carbon capture will impact current drought conditions and exacerbate existing pollution sources. Moreover, Summit has not finalized its water appropriation sources or volumes needed for construction, so it is impossible to know the full impacts of those appropriations on water resources. Why should Minnesota risk our fresh drinking water supply and commit to an infrastructure when the proposing company has not been transparent with its true demands for water resources?	Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources. Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2. As stated in Section 5.7.8, water supply appropriations would be regulated by DNR-issued permits that would have conditions to minimize impacts on groundwater resources. DNR would review permit applications and would not issue a permit if the amount of water to be withdrawn would adversely affect the aquifer or other users.	20243-204403-01
	Strand, Jeffrey	2024-02-23	Aquifer Damage: Summit’s preferred route, RA-South, crosses a surficial beach ridge aquifer in Otter Tail County. The DNR has said that the area is “prone to significant groundwater discharge,” and the applicant’s initial groundwater investigation confirmed that “artesian groundwater conditions are present” along that beach ridge system. In early feedback on the DEIS, the DNR noted that “Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer and that “breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.” This, along with our state’s first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers more seriously.	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant, long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency	20243-204403-01

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				measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.	
	Strand, Jeffrey	2024-02-23	HDD Drilling: The DEIS also states that “drilling mud mixed with additives that are not on the MDH-approved additive list and/or do not meet [drinking water quality certification standards] would be disposed of as solid waste at an approved facility, or the applicant would obtain a land application permit from MPCA.” The DEIS does not discuss the risks of applying drilling mud, especially with additives not approved by MDH, to the land. The DEIS says that “drilling fluids and additives for the HDD would be non-toxic to the aquatic environment and humans,” however, even supposedly “non-toxic” drilling fluid is chemical waste that has been found to be harmful to plant and animal species. Summit’s preferred route and alternative route, RA-Hybrid, would both cross three rivers (Pelican River, Otter Tail River, and Bois de Sioux River) via the HDD mention.	As described in Section 5.7.8.2, an additive approved by MDH or meeting NSF International/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects, might need to be mixed with the drilling mud for viscosity or lubricating reasons and to reduce the potential for an inadvertent release or failed HDD. The specific additive used would depend on the conditions at the crossing location and would be determined by the HDD contractor. The EIS discloses the potential for an inadvertent release of drilling mud and describes potential impacts in Chapter 5. Land application of drilling mud and potential impacts are addressed in Section 5.7.6.2.	20243-204403-01
	Strand, Jeffrey	2024-02-23	Wetlands: In Table 5-40 on p. 5-98 of the DEIS it states that “the loss of wetlands would be less than 0.01 acre.” However, Table 5-4 on p. 5-24 says that for Summit’s preferred route, operation impacts are expected to be 3.3 acres, and construction impacts are expected to be 4.7 acres. And Table 5-52 on p. 5-143 suggests that the total construction impact on wetlands for RA-South is 2.7 acres.	Discrepancies between Table 5-4 and Table 5-54 result from different datasets and their associated resolutions. Table 5-4 uses NLCD data to analyze land cover, and Table 5-54 uses NWI data to analyze wetlands. Table 5-40 has been edited to be consistent with discussions of impacts on wetlands in Section 5.7.9 and Table 5-53 and Table 5-54.	20243-204403-01
	Strand, Jeffrey	2024-02-23	Impacts of a Leak or Rupture on Animals: According to the DEIS, CO ₂ leaks would not affect mammals, birds, reptiles, amphibians, and insects and would be unlikely to impact fish and freshwater mussels. The DEIS reaches this conclusion without providing any reasoning or supporting evidence. Though the DEIS does note some harm may come to animals in the event of a rupture, it relies heavily on the assumption that animals will simply move out of the rupture area to avoid the release. The reason for this assumption is not provided and is contradicted by information in the rupture report in Appendix G which suggests the impacts of a rupture would be nearly immediate. Critical Habitats: Summit’s preferred route would cross over or near several waterfowl protection areas, including the Orwell 9 Unit and Ridgeway WPA in Otter Tail County. The DEIS notes that some of these areas will be avoided during construction but fails to consider the impacts to these features in the event of a leak or rupture.	CO ₂ is a widespread, naturally occurring gas and is the primary byproduct of respiration—the conversion of sugars to usable energy. Minor leaks of CO ₂ from operation of the proposed pipeline would not elevate ambient CO ₂ to a level that is detrimental to local vegetation or wildlife. Potential impacts on wildlife from a CO ₂ rupture could result first from the physical force of a rupture and secondarily from localized short-term high levels of CO ₂ prior to dispersal and extreme cold temperatures associated with the depressurization of the CO ₂ from a supercritical state to a gas. Chapter 8 of the EIS acknowledges that wildlife in the immediate vicinity of a rupture might be killed or injured by this force; however, it is expected that most mobile wildlife species would follow their natural instincts and attempt to escape the direct effect of a rupture. Chapter 8 of the EIS also acknowledges that less-mobile species in the immediate vicinity of the point of a rupture would be less likely to escape the impacts and might be killed or injured. The data presented in Appendix G describes models of dispersal patterns in the immediate vicinity of a rupture. These models support the statements in Chapter 8 that wildlife in the immediate vicinity of a rupture might be exposed to high levels of CO ₂ , which could be toxic for species unable to leave the area of the release.	20243-204403-01
	Strand, Jeffrey	2024-02-23	The DEIS consistently fails to properly account for the real CO ₂ emission and climate impacts of the project.	Thank you for your comment.	20243-204403-01
	Strand, Jeffrey	2024-02-23	Lifetime of Project: The applicant states that the anticipated lifetime of this project is 25 years. This means at the end of its life; the project could stop capturing the CO ₂ from the ethanol plant. Unless the ethanol plant will also cease operations at that point in time, it will continue to emit CO ₂ unabated into the future.	Section 2.7 describes decommissioning of the project. If the ethanol plant continues to operate beyond the life of the proposed project, its CO ₂ emissions would not be captured.	20243-204403-01
	Strand, Jeffrey	2024-02-23	100% CO ₂ Capture Rate: Summit states that the capture facility “is designed to capture 100% of the CO ₂ produced by the ethanol plant.” There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party.	Section 2.1 has been revised to clarify that the captured CO ₂ is produced by the ethanol plant as part of its fermentation process, the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have	20243-204403-01

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			Additionally, the DEIS should emphasize that any CO ₂ capture is solely associated with emissions from the ethanol fermentation process and provides zero reductions on the significant emissions from the facility's electricity use.	questioned the feasibility of this capture rate given the performance of existing capture facilities. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.	
	Strand, Jeffrey	2024-02-23	Added CO ₂ from electricity use: Carbon capture technologies are highly energy intensive and will significantly increase the carbon emissions at the facility from electricity use. The DEIS uses the Midwest Reliability Organization West Region average to calculate these emissions, which is unnecessarily inaccurate given the availability of the actual emissions factor from Great River Energy.	Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 gCO ₂ e/MWh. This was calculated from LREC's energy resource mix in which nearly half comes from clean energy sources. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 gCO ₂ e/kWh), which was used in the draft EIS, calculated electricity emissions have decreased.	20243-204403-01
	Strand, Jeffrey	2024-02-23	CO ₂ Storage: The DEIS assumes 100% of captured CO ₂ is being permanently stored underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols that would ensure it.	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
	Strand, Jeffrey	2024-02-23	Enhanced Oil Recovery: The DEIS fails to explain whether the applicant can sell any of its captured CO ₂ to others for alternative uses instead of permanent sequestration and what the impacts of that would be. The DEIS incorrectly states that "Production of oil through EOR would not be dependent on the availability of CO ₂ produced by the ethanol plant." This claim is contradicted by countless public statements from public officials in North Dakota and oil industry representatives.	The text questioned by the commenter in Section 5.7.2.3 was prefaced with the following: "if all the CO ₂ produced by the ethanol plant is sequestered as proposed, EOR would likely continue in North Dakota using other sources of CO ₂ , other gases, thermal methods, or chemical methods." Revisions are not necessary. However, Section 5.7.2.3 was revised to reference additional information regarding the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Strand, Jeffrey	2024-02-23	Environmental Justice Communities: The DEIS acknowledges that the project will directly intersect a defined environmental justice community but does not account for the burden of the potential health and safety impacts of a leak or a rupture, not to mention any negative impacts from construction on the ecosystem. The DEIS also fails to assess the cumulative impacts of this project in relation to existing pollution or health disparities in the area.	Chapter 8 has been revised to include a new Section (8.3.1.2) describing effects on environmental justice populations in the event of an accidental release of CO ₂ .	20243-204403-01
	Strand, Jeffrey	2024-02-23	The DEIS states that during operation the proposed project will require about 38,501,733 kilowatt hours per year, and that this amount is "not anticipated to require the addition of power generation capacity." However, the DEIS fails to clearly state how much electricity the ethanol refinery is currently using. For that information, the public must look in Appendix I. The DEIS does not explain how this doubling of the electricity use at the ethanol refinery will impact overall electricity for Lake Region Electric Cooperative. Who is paying for that electricity? Summit or the ethanol facility? And if the latter, will those cost increases be passed on to producers or other member-owners?	Section 5.4.9.2 contains relevant information regarding how LREC would support the project. This section has been updated to indicate that the applicant is solely responsible for necessary infrastructure upgrades (see Appendix I, Supplemental Information Inquiry 13 response and email from LREC).	20243-204403-01
	Strand, Jeffrey	2024-02-23	Complete Network Impacts: In addition to the direct impacts of the 28 miles of pipeline included in Summit's application, the DEIS does not account for the indirect and cumulative impacts of Summit's entire project in Minnesota. This is despite Summit's clear and public plans for a much larger buildout in Minnesota and recent statements that they will be applying for permits for additional parts of the network imminently. Allowing Summit to artificially segment permitting requests for multiple concurrent projects on one pipeline will prevent a thorough review of the cumulative impacts and potential environmental and climate damages of the project.	Thank you for your comment. A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Strand, Jeffrey	2024-02-23	Decommissioning: Summit appears to indicate that once the pipeline is decommissioned, it will no longer monitor or maintain the pipeline. This is despite the DEIS acknowledging that pipeline segments left in place "would degrade over time and could serve as potential conduits for groundwater or cause minor subsidence when they collapse." There is no information about who would be responsible for any damage caused by the deteriorating pipeline [see pg. 2-15 of the DEIS]. The DEIS references the Decommissioning Plan, but it is not included as an Appendix to the DEIS, nor was it included as an Appendix to the EAW. Without a detailed discussion of decommissioning, the public and state agencies cannot know what human and environmental impacts the plan will have into the future.	Section 2.7 describes decommissioning of the project. This section was revised to describe the financial assurances to be provided by the applicant for costs associated with decommissioning.	20243-204403-01

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	Strand, Jeffrey	2024-02-23	In conclusion, we opposed construction of CO ₂ pipelines in Minnesota Rural and Farming Communities, including the Otter Tail Wilkin project as well as other planned elements across the state of Minnesota.	Thank you for your comment.	20243-204403-01
	Striegel, Gerald	2024-02-23	I challenge the DEIS’s assessment which concludes that the Summit Carbon Solutions proposal delivers a net benefit of emissions reduction. I am hopeful that an accurate and all-encompassing evaluation of this proposal will follow.	Thank you for your comment.	20243-204403-01
	Striegel, Gerald	2024-02-23	It is important to view the proposed pipeline network and possible injection site as part of a much larger system. An evaluation must consider: • ethanol plants; • acreage of corn crop destined for ethanol production; • fertilizers and/or manure needed to sustain a corn crop while continuously depleting soil; • petrochemical plants supplying the fertilizers; • concentrated animal feeding operations (CAFOs) supplying the manure; • water needed for crop production; • water required for the ethanol plant process; • water needed for the carbon capture process; • water required for CAFOs; • water contamination resulting from field runoff and CAFOs; • water contamination generated by the processes; • continued addition of and consolidation of farming acreage to enhance efficiency, and last but not least; • energy to drive each leg of this process along—each leg with its own emissions.	A detailed study of the full Midwest Carbon Express project is outside the scope of the EIS.	20243-204403-01
	Striegel, Gerald	2024-02-23	We can see from this list that ethanol is not a sustainable energy solution. Why, then, does ethanol production continue to be greenwashed and blanketed with subsidies? Summit Carbon Solutions suggests that we do not have enough to burn and that this fuel is cleaner. Neither is true, and the industry is chasing an enormous government handout. While this DEIS is being considered, the EPA has approved an even higher ethanol blend, furthering the harm caused. We continue to expand fossil fuel infrastructure and its use to the point of threatening our very existence. As a citizen and a tax payer, I urge the Department of Commerce to truly consider these points in their evaluation.	Thank you for your comment. The appropriateness of federal and state policies regarding carbon capture and ethanol is outside the scope of the EIS.	20243-204403-01
	Theship-Rosales, Alex	2024-02-22	Thank you for taking a minute to read my perspective. Please consider children, youth, adults, and elders 1,000 years from now - will this pipeline be a long-term blessing or curse for them? Water, land, air, and all God has created must be honored and protected for the sake of future generations.	Thank you for your comment.	20243-204403-01
	Thorne, Erika	2024-02-23	I've lived in Minneapolis and St. Paul since 1978. I've witnessed decades of environmental degradation by "public" utilities (including but not limited to Minnegasco, Northern States Power & their successors), aided & abetted by MN lawmakers and bureaucrats. So I applaud the MN PUC deciding to require an Environmental Impact Statement about the proposed Otter Tail CO ₂ Pipeline. Thank you!	Thank you for your comment.	20243-204403-01
	Thorne, Erika	2024-02-23	However, this draft is not adequate. My biggest concerns with it are: A) Neither Minnesota’s state agencies nor Summit has any experience building, operating, or overseeing CO ₂ pipelines. B) The so-called carbon capture aspects of the pipeline are, if you'll excuse my pun, PIPE DREAMS! So are your claims in the DEIS that this pipeline will have “minimal impact” across the board. Such claims are unsupported by the existing evidence about carbon pipelines and pipeline construction generally.	Thank you for your comment.	20243-204403-01
	Thorne, Erika	2024-02-23	Finally, I wish to point out that Minnesota and surrounding states have already been ravaged by pipeline construction. We know they damage the immediate surroundings and directly contradict commonly held goals for climate recovery. We in civil society have demonstrated, in person and through correspondence, our displeasure with each of these pipelines. Your decision to require an EIS at least recognizes that. Yet we need you to produce an Impact Statement that plainly names the high risk today and in our families’, futures posed by this CO ₂ pipeline. We're counting on you.	Thank you for your comment.	20243-204403-01
	Tjepkema, Jim	2024-02-12	My name is Jim Tjepkema. I am a retired person living in Minneapolis. I have a PhD in Agriculture from Purdue University and worked as an agricultural consultant on sustainable agriculture before retiring. I am currently a volunteer at MN350 supporting their work on climate change. It is well known that we must greatly reduce our use of fossil fuels to prevent very destructive changes in our climate that are already under way. Almost all of the ethanol produced by ethanol plants is mixed with gasoline that is burn in vehicles. Instead of investing in capturing CO ₂ from ethanol plants , such as the one involved in the project under consideration here, and sending the captured CO ₂ through pipelines, we should plan on shutting down these plants in the near future. We should do everything we can to stop burning ethanol and gasoline in vehicles. If we don't do this we will be failing to take an important step toward stopping the advance of very destructive changes in our environment. Putting money into capturing CO ₂ from ethanol plants and sending it through pipelines is a waste of money which is needed to fund other projects such as promoting more use of electric vehicles.	Reducing gasoline and ethanol usage would not meet the purpose of the project as defined in the EIS; therefore, it is outside the scope of the EIS.	20243-204403-01

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	Tjepkema, Jim	2024-02-12	<p>A large portion of the corn that is grown in Minnesota and other states is used to make ethanol. This not a good use of agricultural land. We need a reduction in the amount of corn grown to diversify crop production. It will easier to do more cover cropping and follow other practices that increase the sequestering of carbon in the soil under a diversified cropping system where the amount of corn grown is reduced. Increasing the carbon content of agricultural soils is one of the leading ways climate scientists have brought forward for reducing greenhouse gases that cause climate change.</p> <p>Extreme weather, including droughts and floods, due to climate change are already reducing the production of food to feed the world. We should not be using land that could be used to produce food to produce corn used for ethanol production. Due to our failure to deal as quickly as was and is needed to stop the advance of climate change, there will be an increase in droughts and floods that cause even greater reduction in food production. This is not just my opinion. This is what we are being told by climate scientist. We need to start using the land where corn is being grow to use for ethanol production for food production and not use it for growing corn to produce ethanol to burn in vehicles.</p>	Using corn for food instead of ethanol would not meet the purpose of the project; therefore, it is outside the scope of the EIS.	20243-204403-01
	Tokheim, Lucy	2024-04-23	My husband and I have run a business in rural Lac qui Parle County near Dawson for over 50 years. Companies have no credible research that CO carbon Capture pipelines have minimal risk of negative environmental impact. In fact, there is a history of destructive pipeline impact and we trust that the state of Minnesota will organize a thorough assessment of possible risks to public health, and degradation to land, water, animals and to vulnerable ecosystems. I am not convinced that Ethanol itself has been an effective climate protection, and the Carbon Capture Pipeline appears to benefit only investors in these energy intensive and potentially destructive storage systems. In sum, we don't need this. We need more protection from the impact of chemicals and over farming our fragile prairie environments, and the CO 2 pipelines are the wrong direction.	Thank you for your comment.	20243-204403-01
	Ulrich, Wendy	2024-02-23	I am Wendy Ulrich residing in the Twin Cities. I'm extremely concerned about climate change and the rapid evidence of it that has been predicted, happening now in Minnesota. I want to see RIGHT STEPS taken to address it rather than those that hoodwink citizens showing negligible if any positive effects while financially benefiting others and harming MN's natural environment.	Thank you for your comment.	20243-204403-01
	Ulrich, Wendy	2024-02-23	My comments on the DEIS: First, it does not emphasize that the CO ₂ captured is only from the fermentation process in the ethanol plant. This capturing doesn't reduce emissions from the facility's electricity use. This is a highly intensive energy use technology. The statistics used in the DEIS to calculate this CO ₂ emission from the plant's power source are not taken from better data, that from Great River Energy.	<p>As stated in the beginning of the Operations section on Page 5-91 of Section 5.7.1.3, the CO₂ captured is specifically stated to only come from the fermentation process. The CI score developed in Chapter 6 takes into account the energy used for ethanol production. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.</p> <p>Electricity emissions are included in Table 5-39 and have been revised to 5,032 MT CO₂e/year using the carbon intensity from LREC, which provides electricity to the ethanol plant. Because LREC has a lower carbon intensity than the MROW average emission factor used in the draft EIS, the electricity emissions have decreased.</p>	20243-204403-01
	Ulrich, Wendy	2024-02-23	There is no guarantee in the DEIS that all CO ₂ captured will be permanently stored underground., no monitoring. Is it possible it could be sold to use in fracking e.g., creating ugly landscapes at those sites to produce yet more oil to fuel climate crisis?	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir. Section 5.7.2.3 addresses the possibility that the captured CO ₂ transported by the project could be used for EOR.	20243-204403-01
	Ulrich, Wendy	2024-02-23	In exchange for the dubious limits of good will to our environment by the ethanol plants (and possibly the fossil fuels industry behind them), concern blossoms in many directions for risks to southern Minnesota's water and natural resources. Two specific areas are #1, the impact of a pipeline leak on many types of water bodies, including aquifers. The DEIS needs to show more research in understanding the risks to our waters and the animal life that live in or on them to survive. The second specific area to mention here, one the DEIS doesn't address, is the effect of increased water use by pipeline construction on the local supply following recent drought years. More serious attention is needed in the DEIS to the potential to breach aquifers. Shallow confined ones are known in Summit's preferred route according to the DNR.	<p>Potential impacts of a CO₂ release on water resources and wildlife are addressed in Section 8.3.4.</p> <p>Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources.</p> <p>Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement</p>	20243-204403-01

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				that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.	
	van der Leeue, Tracy	2024-02-23	Thank you for your work in serving our state. As a resident of Minnesota who was born here I am writing to express my deep reservations and concerns with the Otter Tail Wilkin CO ₂ Pipeline Project and ask that the PUC take in to account the flaws in the reasoning for the pipeline's need as a climate solution, the extremely high risks for negative impacts in both the construction and operational phases to what are increasingly precious habitats and resources, and prioritize their protection as the highest order.	Thank you for your comment.	20243-204403-01
	van der Leeue, Tracy	2024-02-23	We are rich in water, forests and viably vibrant ecosystems that have far more permanent economic and planetary value that benefits us Minnesotans directly. This is in contrast to the carbon capture strategy and CO ₂ that will pass through our borders with only small temporary benefits during the construction phase but permanent risks to our increasingly valuable environmental resources.	Thank you for your comment.	20243-204403-01
	Van Hee, Bob	2024-02-23	I'm going to make this short: I'm swamped with deadlines. I'm TOTALLY against ANY CO ₂ project--anywhere! This is an attempted takeover by Corps, such as BLACK ROCK, Banking Systems, Big Corps such as JD and others- to control the Food Supply, Quality Farmland, etc. This is Part of the Federal Gov't's "Green Reset"! Other Companies. such as: are Valero Energy Corp, Navigator, Summit Carbon Solutions, etc. Caron Dioxide is NEEDED for the Process of Photosynthesis !! Instead of burning corn and sending CO ₂ thousands of miles away, use crops for food!! What a Great Concept The future of power lies in Nuclear Fusion, NOT shoveling your dinner into the gas tank!! I have much more information available, but do not have the time at this moment to work on this, this afternoon. You can call me this afternoon -- leave a message----questions and your phone # You have my permission to share this with anybody! This is simply a WAR with the Wealthy Oligarchs for Power/Control! do NOT back off!!	Thank you for your comment.	20243-204403-01
	Vogel, Anita	2024-04-22	I hail from southwestern Minnesota, reaching out once more to express my deep-seated apprehensions regarding the Midwest Carbon Express. I implore you to empathize with our plight. As I compose this message, my gaze falls upon the serene waters of the Cottonwood River. Just down the road, bald eagles grace us with their majestic presence, nesting in the very vicinity where the pipeline is slated to traverse. Each species plays a vital role in the delicate balance of our ecosystem. Its construction would not only jeopardize the habitats of these creatures but also imperil the very fabric of our community. We cannot stand idly by as the essence of our home is threatened by shortsighted endeavors and false promises. Our region is bestowed with countless natural wonders, each a testament to the divine hand of creation. Yet, the looming specter of this pipeline threatens to mar and despoil these precious gifts irreparably. The very fabric of our community recoils at the notion of its construction, for we know that its presence will bring naught but harm and devastation. We stand united in our resolve, resolute in our stance against this encroachment upon our land and our way of life. Our voices ring out in unison, pleading for preservation, for the safeguarding of our cherished environment. The Midwest Carbon Express finds no welcome here, for it represents not progress, but regression—a regression towards the degradation of our natural heritage and so many dangers to all (humans, plants, animals, etc.) I beseech you, heed our fervent plea and recognize the gravity of our concerns. Stand with us in defense of our land, our wildlife, and our collective future. Together, let us forge a path towards sustainability and stewardship, ensuring that generations yet unborn may inherit a world unspoiled by the folly of short-sighted pursuits.	Thank you for your comment.	20244-205834-01
	Vogel, Anita	2024-04-22	Please see the attached letter and take some consideration. I know you have a lot on your plate but so do we...our lives... (Attached is an article titled: "'Wake-up call': pipeline leak exposes carbon capture safety gaps, advocates say." by The Guardian from Apr. 18 2024, reporting on the recent Exxon Delhi pipeline leak near Sulphur, Louisiana that ocured on Apr. 3, 2024)	Thank you for your comment. A new section (8.2.1.3) has been added to Chapter 8 that contains information on the recent CO ₂ pipeline leak near Sulphur, Louisiana.	20244-205834-01
	Vogel, Anita	2024-02-22	Thank you sincerely for affording the public the opportunity to provide feedback on the Draft Environmental Impact Statement (DEIS) for the upper branch of Minnesota. As a lifelong resident deeply rooted in Lamberton, MN, alongside my husband and four young children, I feel compelled to express my profound concerns regarding the proposed Midwest Carbon Express project. Living in close proximity to both the proposed pipeline route and our farmland (Summit Carbon Solutions (SCS) has contacted for easement) along	Thank you for your comment.	20243-204403-01

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			the Cottonwood River, the potential impacts of this project weigh heavily on my mind. However, beyond mere proximity, it is the manner in which this project has been presented and the potential consequences that greatly trouble me.		
	Vogel, Anita	2024-02-22	<p>It has become more of a personal matter to me as I firmly believe that my vulnerable parents were taken advantage of in their time of need to secure an easement. My mother, who was the primary caregiver for my late father who was afflicted with dementia, found herself in an incredibly stressful situation. During that time, the SCS agent was relentlessly pursuing her signature (as well as my siblings) for an easement agreement, my father suffered a stroke, resulting in two ambulance rides, two emergency room visits, and a hospital admission and nursing home admission. Despite this turmoil, my mother signed the easement agreement on the very morning my father was discharged from the nursing home. It's clear to me that my mother was under immense duress during that time, overwhelmed by the challenges she was facing. Fortunately, SCS required more than just her signature for the two parcels they were after, sparing us from further exploitation. However, I am acutely aware that not everyone is as fortunate as our family was in this situation.</p> <p>Firstly, I am deeply troubled by the conduct of SCS, particularly their lack of transparency and seemingly targeted outreach efforts. It is disheartening to witness a disregard for the broader community's involvement, with meetings seemingly designed to cater only to select landowners. By failing to adequately inform the public, especially regarding safety concerns, SCS has deprived community members of the opportunity to engage meaningfully in the decision-making process.</p>	Thank you for your comment. Landowner agreements are outside the scope of the EIS.	20243-204403-01
	Vogel, Anita	2024-02-22	Upon reviewing the DEIS, I am struck by the prevalence of conditional language throughout the document. Phrases such as "if" and "could" create a sense of ambiguity and fail to acknowledge the inevitability of certain risks associated with the project. It is imperative that we acknowledge the reality that pipeline ruptures are not a matter of "if" but rather "when," as evidenced by the insufficiently studied impacts highlighted in the DEIS.	The EIS uses conditional language because it is not known if the project will be approved. Additionally, staff cannot predict future events--a potential impact could occur or could not. Staff indicates what is anticipated to be most probable. For example, Chapter 8 indicates a rupture of the pipeline is possible but is unlikely based on safety records maintained by PHMSA. In 2022, there were a total of three incidents (two classified as leaks and one as "other") reported on 5,385 miles of CO ₂ pipeline, or 0.00056 incidents per mile of CO ₂ pipeline in the United States.	20243-204403-01
	Vogel, Anita	2024-02-22	Moreover, the reliance on technology, such as MVL systems and CO ₂ detectors for only those who only apparently warrant the need, to mitigate potential risks is deeply concerning. Depending solely on a control center's notification in the event of a rupture is a false sense of security, potentially endangering lives. The thought of a child being harmed due to such negligence is heartbreaking. Placing the safety of our families and communities in the hands of such systems, particularly in the harsh conditions of a Minnesota winter where the weather is unpredictable and when a rupture happens and those in the question who are outside of the "circle" are not notified but the wind shifts and it is too late for them, is a risk too great to bear. The thought of lives being endangered due to a false sense of security is simply unacceptable.	Thank you for your comment.	20243-204403-01
	Vogel, Anita	2024-02-22	In the section 8.3.4, The limited research on CO ₂ leakage into near-surface environments, particularly from pipelines, underscores a concerning lack of understanding regarding the potential risks involved. While it's acknowledged that low concentrations of CO ₂ usually have minimal effects, the consequences of high concentrations WILL be catastrophic, leading to asphyxiation and death. The density of CO ₂ relative to air means that when a significant release occurs, it will form a dense cloud or fog that settles into lower-lying areas, depriving EVERY BEING of oxygen. In our community, we reside in a lower lying area, a fact shared by many of our neighbors and friends who also dwell along the proposed pipeline route. It begs the question: do our lives, or the lives of anyone/anything situated along this trajectory, hold no significance?	Thank you for your comment.	20243-204403-01
	Vogel, Anita	2024-02-22	Such an event would undoubtedly have profound and varied impacts on natural resources, affecting not only individual life forms but ENTIRE ecosystems. This poses a grave threat to biodiversity and ecological stability. As advocates for the sanctity of all life, it is imperative that we recognize the potential harm posed by pipelines carrying CO ₂ . Every living being, from the smallest insect to the largest mammal, deserves protection from such risks!	Thank you for your comment.	20243-204403-01
	Vogel, Anita	2024-02-22	Moreover, the uncertainty surrounding the long-term effects of slow, persistent leakage further emphasizes the need for caution and thorough investigation before proceeding with such projects. As stewards of the environment, we cannot afford to gamble with the well-being of our planet and its inhabitants.	Risks of a potential CO ₂ release and potential impacts are described in Chapter 8 of the EIS.	20243-204403-01

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	Vogel, Anita	2024-02-22	In conclusion, the potential dangers associated with CO ₂ pipelines cannot be ignored. It is our moral obligation to prioritize the protection of all lives and ecosystems, advocating for sustainable alternatives that do not jeopardize the health and safety of present and future generations. All lives matter, and we must act accordingly to safeguard them.	Thank you for your comment.	20243-204403-01
	Vogel, Anita	2024-02-22	Section 8.3.2.1 Agriculture: The potential consequences of an accidental CO ₂ release on agricultural economies cannot be overstated. While some studies tout the benefits of elevated CO ₂ levels on crop yields, the flip side presents a grim reality. Increased CO ₂ concentrations in the soil spell disaster for root water absorption, chlorophyll levels, starch content, and overall biomass. Consider the chilling aftermath of a rupture: vegetation and soil in the immediate vicinity are ravaged, with roots frozen, soil pH plummeting, and vital soil microbes annihilated. economic fallout is immediate and devastating, with frozen crops leading to immediate losses and acidic soil rendering future cultivation a Herculean task. And let's not forget about the innocent victims caught in the crossfire. Livestock, much like humans, would suffer dire physiological effects, succumbing to a concentrated gas plume if they're unlucky enough to be in the wrong place at the wrong time. The loss of livestock isn't just a tragedy—it's an economic catastrophe!	Impacts of a potential CO ₂ release on agriculture economies are discussed in Section 8.3.2.1. As described in Section 8.5.3, EERA staff recommends as a special permit condition that the applicant provide information on how it would pay for costs of any repair to public infrastructure or private property (including crops and livestock) that could occur during an accidental release	20243-204403-01
	Vogel, Anita	2024-02-22	So, when authorities "recommend" an accidental release plan to cover potential damages, it's not just a bureaucratic formality—it's a vital lifeline for those whose lives and livelihoods hang in the balance, ensuring that those responsible are held fully accountable for the catastrophic aftermath.	Thank you for your comment.	20243-204403-01
	Vogel, Anita	2024-02-22	I implore you to consider the profound impact of this project on the lives and well-being of countless individuals and communities. It is imperative that we prioritize thorough research, transparency, and the safety of all stakeholders involved. The decisions made today WILL resonate for generations to come, and it is our responsibility to ensure that they are made with the utmost care and consideration for the welfare of all.	Thank you for your comment.	20243-204403-01
	W, Tim	2024-02-13	Land owner from Lamberton area u all can shove this pipeline up your ass so far you'll be able to use it for a tail light in laymen's terms I don't want no people trespass on my fuckn land for no reason Ever u have been warned!!	Thank you for your comment.	20243-204403-01
	Walkup, John	2024-02-17	As a farmer agricultural producer, who would have one and a half miles of land adjacent to the proposed pipeline south route, I believe the two alternate technologies of (1) a suite of agricultural practices to be implemented by farmer producers, and (2) a suite of energy use and efficiency changes to be implemented by the ethanol plant, would be by far the right way to go. I think it makes very little sense to take CO ₂ gas, which is non-toxic by itself and used by growing crops, plants, and trees to make oxygen, and compress it into a hazardous liquid that would be put in a hundreds of miles long pipeline that could potentially have the possibility to rupture. The environmental effects of that to people and landscape along the route could be huge. I also don't think the long term effects or results of pumping this CO ₂ into the ground in North Dakota has been fully addressed or will be known for years to come. Thank you for your consideration, John Walkup	Thank you for your comment. As noted in Chapter 6, the Commission cannot select any of these alternative technologies as an alternative; however, the information provided will inform the Commission's decision to issue a pipeline routing permit. The impacts of CO ₂ sequestration are outside the scope of the EIS.	20243-204403-01
	Ward, Jamison	2024-02-23	My name is Jamison, and I'm a University of MN college student who has grown up in MN all my life and greatly values our state's natural and cultural resources. I'm writing to express my concerns about the Draft Environmental Impact Statement (DEIS) on the safety of Summit Carbon Solutions' proposed CO ₂ pipeline.	Thank you for your comment.	20243-204403-01
	Ward, Jamison	2024-02-23	As an Earth Sciences student and aspiring geochemist, I can testify that CO ₂ is a hazardous material in high concentrations. The DEIS consistently underplays the known and unknown risks of transporting large amounts of CO ₂ at high pressures through a pipeline. According to the analysis in the DEIS, the potential impact radius for levels of CO ₂ that would be “immediately dangerous to life or health” is 617 feet. This expands to 910 feet for lower concentrations that cause dizziness, drowsiness, severe muscle twitching, and unconsciousness within a few minutes. Although Summit indicates that it will take 25 minutes for the system to shut off the relevant valves in the event of “abnormal operation,” the DEIS does not mention any meaningful safety measures for a rupture and instead suggests that it is “reasonable” for Summit to simply supply indoor CO ₂ detectors for residences within 1,000 feet of the project. However, the rupture report in Appendix G states that “a full rupture results in impact distances too quickly for an early warning device, such as an oxygen detector, to be effective.” This pipeline should not be approved without a clear understanding of the risks to human health and meaningful measures to ensure the safety of people and animals in the area.	Text in Section 4.5 on valve closure time has been corrected from 25 minutes to 10 minutes. Elsewhere in the EIS, including the rupture analysis, valve closure time is listed/calculated as 10 minutes. Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan	20243-204403-01

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				that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3.	
	Ward, Jamison	2024-02-23	<p>Additionally, as a student who has studied hydrogeology, I am well aware that Minnesota’s recent experience with pipeline construction demonstrates the serious harm that the process incurs on water resources as well as a tendency by state agencies to under-account for those impacts. Summit’s preferred route, RA-South, crosses a surficial beach ridge aquifer in Otter Tail County. The DNR has said that the area is “prone to significant groundwater discharge,” and the applicant’s initial groundwater investigation confirmed that “artesian groundwater conditions are present” along that beach ridge system. In early feedback on the DEIS, the DNR noted that “Project construction has the potential to intersect shallow confined groundwater potentially causing a breach in a confined aquifer and that “breaching shallow confined aquifers could have significant long-term impacts to groundwater resources.” This, along with our state’s first-hand knowledge of how damaging pipelines can be, requires that the DEIS take potential damage to aquifers more seriously.</p>	<p>Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used.</p> <p>The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on construction methodology. Furthermore, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur. This information has been added to Section 5.7.8.2.</p>	20243-204403-01
	Ward, Jamison	2024-02-23	<p>Finally, the DEIS consistently fails to properly account for the real CO₂ emission and climate impacts of the project. Summit states that the capture facility “is designed to capture 100% of the CO₂ produced by the ethanol plant.” There is no carbon capture facility in the world, ethanol or otherwise, that captures carbon at a rate of 100%. This claim is not supported by any data/information or verified by a third party. Additionally, the DEIS should emphasize that any CO₂ capture is solely associated with emissions from the ethanol fermentation process and provides zero reductions on the significant emissions from the facility’s electricity use. Furthermore, the DEIS assumes 100% of captured CO₂ is being permanently stored underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols that would ensure it. I urge a critical review of this project's climate impacts to protect the health of future generations of Minnesotans such as myself.</p>	<p>Section 2.1 has been revised to clarify that the captured CO₂ is produced by the ethanol plant as part of its fermentation process, the amount of CO₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO₂ is contained in the storage reservoir. Section 6.3 describes energy efficiency and energy alternatives that could reduce emissions from the ethanol plant's electricity and process fuel use.</p>	20243-204403-01
	Ward, Jamison	2024-02-23	<p>Furthermore, the DEIS assumes 100% of captured CO₂ is being permanently stored underground. There is no guarantee that this will occur and no explanation of the monitoring and verification protocols that would ensure it. I urge a critical review of this project's climate impacts to protect the health of future generations of Minnesotans such as myself.</p>	<p>Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO₂ is contained in the storage reservoir.</p>	20243-204403-01
	Webb, Sherri	2024-02-23	<p>My name is Sherri Webb and I live in Iowa. Our Grandma's land (in our family for over 124 years) is being threatened by Summit's scam. This is NOT a green project and should be denied since it IS a huge waste of taxpayer dollars. We are NOT covered by liability insurance – CO₂ is considered a pollutant. A rupture on our land would be not only devastating but would bankrupt us. WHO are we supposed to be doing business with? The only answer I heard from Summit’s Jimmy Powell was “private investors”. “PRIVATE”! The COO doesn’t know? We know John Deere, South Korea, Saudi Arabia, and China are also involved.</p>	<p>Thank you for your comment.</p>	20243-204403-01
	Webb, Sherri	2024-02-23	<p>SOIL EROSION is a term that every farmer knows and fears. Soil is a natural resource that may look endless and healthy, but it is a fragile product that has taken thousands of years to form. Soil is not simply dirt, but a combination of living organisms (microbes), nutrients, rock, and other minerals that are an outer layer over the bedrock of the planet. And it's a busy environment, providing habitat for plants and animals while helping regulate the flow of water and temperature. Topsoil contains the essential nutrients for crops and erosion decreases soil fertility and that can, and will, negatively affect crop yields. Soils could potentially sequester enough greenhouse gas emissions in a year to equal about 5 percent of all annual human made GHG emissions. “North America showed the</p>	<p>Thank you for your comment. Impacts on soil, including erosion, are discussed in Section 5.7.6.</p>	20243-204403-01

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			<p>highest potential for total carbon storage, globally, with between 0.17 and 0.35 Pg C (0.60 to 1.22 t/ha) sequestered annually.” Zomer, R.J., Bossio, D.A., Sommer, R. et al. Global Sequestration Potential of Increased Organic Carbon in Cropland Soils. Sci Rep 7, 15554 (2017). https://doi.org/10.1038/s41598-017-15794-8</p> <p>“When the Iowa prairie was first plowed, the settlers found 14 to 16 inches of topsoil. But by 2000, the average thickness was only 6 to 8 inches, and the remaining topsoil had lost 30 to 50 percent of its organic matter. In 1982, the average rate of erosion on cultivated land in Iowa was so high that the erosion map of the United States showed a jarring purple bulls-eye centered on Iowa and northern Missouri. By 2017, the rate had improved considerably, but Iowa still stood out as a vivid orange on the map – it had lost 150 million tons of soil that year.... What’s more, the erosion of our topsoil affects not only those of us living in Iowa, but also populations and ecosystems downstream from our state. Nitrate from runoff and phosphorus attached to the sediment produced by soil erosion are the main culprits contributing to the expansion of the Dead Zone in the Gulf of Mexico that is greatly damaging the ecosystem and the shrimp industry.” (Iowa's Remarkable Soils: the story of our most vital resource and how we can save it. Woida, Kathleen - University of Iowa Press – 2021 – quoted with author’s permission)</p> <p>Summit’s contribution to soil erosion in Iowa will be a hefty one and I have no doubt that Minnesota's soil will also suffer. (The addition of POET plants have not been considered in the following figures since Summit has not released that information.) Nearly 8000 acres!! 7982.86 acres – cultivated crops. A total of 8777.32 acres that includes hay/pasture, wetland, open areas, grasslands, deciduous forest, and others. Once the bulldozers have finished, this land will be ripped apart and the erosion will be inevitable. If you look at the economics of soil erosion, as stated by Farm Progress, the average soil loss rate is 5.8 tons per acre per year. When you’re losing soil, you’re losing yield – to the tune of about 15 bushels per acre per year of lost potential. 46,400 tons per year soil loss with 8000 acres. Stan Buman, head of Land O’ Lakes Sustain program stated in 2017, “Under the best case scenario, soil can only rebuild at a rate of 0.24 tons per acre per year.”</p> <p>https://wcc.efs.iowa.gov/cs/idcplg?IdcService=GET_FILE&allowInterrupt=1&RevisionSelectionMethod=latest&dDocName=2082371&noSaveAs=1 - 2.1 land use https://www.farmprogress.com/soil-health/economics-of-soil-loss</p> <p>Summit “promises” to restore the land. Summit CANNOT restore no-till land. In fact, Summit openly admits that land will be “restored as nearly as possible” – in other words, they won’t be able to restore the land. Summit states, “Approximately 94% of the proposed route is in agricultural lands, a common and generally preferred area for infrastructure.” Over 8000 acres will be left in poor condition and erosion will be the end and continuing result.</p> <p>https://wcc.efs.iowa.gov/cs/idcplg?IdcService=GET_FILE&allowInterrupt=1&RevisionSelectionMethod=latest&dDocName=2082373&noSaveAs=1 5.8 tons/acre, on the average, would be lost every year. Areas with slopes, highly erodible soils, tilled land would lose more than that. 57 billion metric tons of Midwestern topsoil has eroded over the last 160 years. Crowell, Rachel. Science News APRIL 12, 2022</p> <p>“‘Black Gold’ - Iowa’s rich, nutrient-dense topsoil has provided for generations of farmers, but it’s slowly losing its nutrients. Researchers at Iowa State University say Iowa has lost half of its soil richness, due in part to farming practices. Bradley Miller, an agronomist at Iowa State University, says the soil has changed since settlers came and converted the prairie into farmland. ‘Since that time, we have been draining the soil as well as tilling it. And so now that, so it’s a little drier, a little more exposed to oxygen to that tillage practice, that is actually burning off some of that organic matter,’ Miller said. That tilling is one of the main reasons for the loss of nutrients. ‘If the soil is intact, it’s a little bit protected from the air. And when you till it, you are flipping it overexposing it more to the air and the more exposed to the air, the oxygen in the air actually allows for that organic matter to decompose more and be released into the air,’ Miller said. This summer’s (2023) drought is expected to impact crop yields, but Miller says it’s not the same with soil health. ‘This summer we had less rainfall, but overall we’ve seen an increase in the intensity of rainfall events. And so that sets us up for more erosion,’ Miller said.” Hendricks, Connor; Omaha WOW TV, 9/13/23</p>		
	Webb, Sherri	2024-02-23	<p>The more research I do, the more I believe that the proposed hazardous waste supercritical CO₂ pipelines are a HUGE mistake and Iowa and Minnesota will pay the price for it. The fact that almost 80% of Iowans believe that using eminent domain, for a private company for private gain, is wrong should be a red flag. There will be no turning back if this is granted – the landowners will pay the biggest price, but land values will deteriorate, and the threat of eminent domain being used for any boondoggle project will prove to be a Pandora’s Box. The CCS is rapidly becoming an obsolete technology and the huge amounts of water and electricity that is needed does not reflect “green” practices, unless lining their pockets with our taxpayer dollars in tax credits is considered a “climate change” technique. There are numerous reports that CCS is NOT working.</p>	<p>Thank you for your comment. As indicated in Section 3.5, the applicant cannot exercise the power of eminent domain for the project.</p>	20243-204403-01

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	Webb, Sherri	2024-02-23	<p>“But environmentalists are skeptical of funding a technology they say is too expensive and rarely works, as many high-profile carbon capture projects shutter or run into snags. Just this month, reports found that two carbon capture facilities in Canada were underperforming — one power plant was capturing just half the carbon it had advertised, while a facility supposed to be creating clean hydrogen was actually emitting the equivalent of 1.2 million cars. ‘We've got 10 years to solve the climate crisis and we need to spend our money wisely,” said John Noël, senior climate campaigner at Greenpeace. "Putting it in things that we know work makes more sense than funding something that's been promised for 20 years and still is ending up in failed projects.”</p> <p>https://www.cbsnews.com/news/carbon-capture-technology-billions-congressional-funding/?fbclid=IwAR0pMTvCXJKM71W0RZClsgZrAQ_BlYg245mDln385NFRSHXQY1whw4R-l https://www.globalwitness.org/en/campaigns/fossil-gas/shell-hydrogen-true-emissions/ https://www.eenews.net/articles/ccs-red-flag-worlds-sole-coal-project-hits-snag/ https://www.cnbc.com/2022/01/24/shell-ccs-facility-in-canada-emits-more-than-it-captures-study-says.html?fbclid=IwAR0UT4VN-NS_LIMYYQryazA4bq_-ljiZP0Bi9F6VK9NGNx_KIzEZel5fafU https://www.globalenergyworld.com/news/traditional-energy/2021/07/19/chevron-concedes-ccs-failures-at-gorgon-seeks-deal-with-wa-regulators</p>	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and that commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities. The analyses in Section 5.7.1.3 and Chapter 6 have been revised to include capture rate scenarios of 100 percent, 70 percent, 40 percent, and 10 percent.	20243-204403-01
	Webb, Sherri	2024-02-23	<p>Iowa State University -- Soil erosion is a major environmental issue because it can lead to water pollution. But did you know that soil erosion also can seriously impair crop productivity? Most agriculture activities, especially on sloping landscapes, increase the potential for soil erosion. When soil erosion is severe, soil erodes faster than it can be renewed. For most areas of Iowa, the loss of 1 inch per acre of topsoil represents approximately 167 tons per acre and approximately 30 years is required to develop 1 inch of soil with properties of typical topsoil. Therefore, most Iowa soils (those with deep rooting potential, formed in permeable parent materials with favorable soil characteristics) can experience soil removal rates of 2 to 5 tons per acre per year.</p> <p>Even limited soil erosion can be harmful to productivity in other soils. Soils with little rooting depth potential, slowly permeable subsoils, and fragile soils structure, or those that are shallow to bedrock or coarse sands and gravels, definitely are adversely affected by erosion. No amount of management can compensate for the lack of suitable soil material.</p> <p>Al-Kaisi, Mahdi, Hanna, Mark, Miller, Gerald & Tidman, Michael. Soil erosion: effect on soil productivity. Integrated Crop Management News page 163 of the IC-488(20) -- August 19, 2002 issue. https://dr.lib.iastate.edu/server/api/core/bitstreams/fd848c67-d0cb-414e-8c77-7759ce5001ed/content</p>	Thank you for your comment.	20243-204403-01
	Webb, Sherri	2024-02-23	<p>They continue to hide and lie about the safety issues. They refuse to look at more than one "worst case scenario" and it's amazing that they claim a rupture or explosion will only affect a small area - 500+ feet. The Satartia, MS residents would disagree with that. This is not an "if" it will happen. This is a when and where it will happen.</p> <p>PHMSA is issued this updated advisory bulletin to remind owners and operators of gas and hazardous liquid pipelines, including supercritical carbon dioxide pipelines, of the potential for damage to those pipeline facilities caused by earth movement in variable, steep, and rugged terrain and terrain with varied or changing subsurface geological conditions. Additionally, changing weather patterns due to climate change, including increased rainfall and higher temperatures, may impact soil stability in areas that have historically been stable. These phenomena can pose a threat to the integrity of pipeline facilities if those threats are not identified and mitigated. Owners and operators should consider monitoring geological and environmental conditions, including changing weather patterns, in proximity to their facilities.</p> <p>PHMSA is aware of recent earth movement and other geological-related incidents and accidents and safety-related conditions throughout the country. Some of the more notable events, including those discussed in a prior advisory bulletin (ADB-2019-02; 84 FR 18919, 05/02/2019) are briefly described below:</p> <ul style="list-style-type: none"> • On March 11, 2022, a 22-inch hazardous liquid pipeline spilled 3,900 barrels of crude oil adjacent to the Cahokia Creek approximately 15 miles east of St. Louis, Missouri. Preliminary information indicates land movement may have contributed to this failure. The National Transportation Safety Board (NTSB) investigation into the cause continues as of the date of this notice. • On May 30, 2021, a hazardous liquid pipeline spilled 640 barrels of gasoline in Greens Bayou affecting high consequence areas near Houston, Texas. The operator's reported cause indicated earth movement/progressive ground movement over time on a bayou bank. • On February 19, 2021, 22,318 one thousand cubic feet [1] (Mcf) of natural gas was released from a Type A gathering pipeline system in Belmont, Ohio. A third-party subject matter expert determined the proximate cause of this incident was land movement, or slip, that exerted force on the pipe causing a circumferential crack in an area where evidence of stress corrosion cracking and general corrosion were found. • On December 23, 2020, 4,450 Mcf natural gas was released from a gas distribution main line in the City of Newport News, Virginia. 	<p>The text in Section 5.7.2 has been expanded to clarify that the pipeline would be buried underground with sufficient cover to protect it from flooding. The minimum depth of cover would be 54 inches, extended to 60 inches at waterbody crossings, and the depth would be greater at the waterbody crossings installed via HDD. All perennial streams would be crossed by HDD or bore, as shown in Tables 5-48 through 5-50. Other streams that would be crossed are intermittent or ephemeral streams, many of which are drainage ditches, and they would not be at significant risk of flooding-related problems like scour.</p> <p>Text has been added to Section 5.7.3.4 describing geohazard assessments for the project designed to comply with PHMSA Advisory Bulletin 2022-01. As noted in Section 5.7.3.4 and Section 8.1, the applicant has committed to conducting a Phase I Geohazard Assessment to identify areas surrounding the pipeline that may be prone to large earth movement, as recommended by PHMSA in its June 2022 Advisory Bulletin, and EERA staff recommends that the results of the Phase I assessment, and any subsequent assessments, should be provided to the Commission.</p>	20243-204403-01

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
			<p>The operator report indicated that the apparent cause was pipe stress created by ground settlement which caused misalignment of a flange resulting in a pinhole leak on gasket.</p> <ul style="list-style-type: none"> • On November 19, 2020, a pipeline spilled 17.50 barrels of crude oil east of I-5 in Kern, California during routine start-up. A metallurgical analysis determined the root cause to be related to external factors (i.e., historical land movement, terrain, and cyclic weather patterns around this pipeline segment). There is a history of land movement in the area, all of which contributed to unintentional bending of the pipeline causing the circumferential cracking found at the leak site. • On October 4, 2020, an intrastate gas transmission pipeline in Goodrich, Texas released 118,724 Mcf of natural gas below the Trinity River. While no definitive root cause was determined, the operator used the geological, meteorological, site-gathered information and historical data in its computer modeling and identified earth movement of the soil surrounding the pipe as the most plausible cause of the rupture. Circumferential stress corrosion cracking may have been a contributing factor to the failure. • On May 19, 2020, 447 Mcf was released from a gas distribution main pipeline in Edenville Township, Michigan due to heavy rain fall. An investigation confirmed a 4-inch steel pipeline was severed when significant flooding in the area caused a road washout/scouring. • On May 4, 2020, a 30-inch natural gas pipeline ruptured and ignited near Hillsboro, Kentucky. Preliminary information indicates land movement may have contributed to this failure. The NTSB investigation into the cause continues as of the date of this notice. • On February 22, 2020, a carbon dioxide pipeline failed approximately one mile southeast of Satartia, Mississippi, releasing approximately 30,000 barrels of liquid carbon dioxide that immediately began to vaporize at atmospheric conditions. The pipeline failed on a steep embankment which had subsided adjacent to a local highway. Heavy rains are believed to have triggered a landslide, which created axial strain on the pipeline and resulted in a full circumferential girth weld failure. • On January 29, 2019, a pipeline ruptured near the town of Lumberport in Harrison County, West Virginia. The rupture was located at a girth weld of an elbow on the 12-inch interstate pipeline. The root cause investigation concluded that a landslide about 150 yards from the rupture moved the pipeline approximately 10 feet from its original location causing excessive stress on the pipe resulting in the rupture. • On January 21, 2019, a 30-inch natural gas pipeline ruptured and ignited near Summerfield, Ohio. A metallurgical analysis indicates a girth weld failed due to ductile overload from a longitudinal tensile or bending force, likely from land movement. • On June 7, 2018, a 36-inch pipeline ruptured in a rural, mountainous area near Moundsville, West Virginia, resulting in the release of approximately 165,000 Mcf of natural gas. According to a metallurgical analysis, the rupture was caused by earth movement on the right-of-way due to a single overload event. Overloading of the pipeline likely resulted from a series of lateral displacements with accompanying bending. • On April 30, 2018, an 8-inch intrastate pipeline failed in a remote mountainous region of Marshall County, West Virginia resulting in the release of 2,658 barrels of propane. The failure was caused by lateral movement of the pipeline due to earth movement along the right-of-way. • On January 31, 2018, a 24-inch interstate pipeline ruptured near the city of Summerfield, Ohio releasing approximately 23,500 Mcf of natural gas in a rural forested area. A root cause analysis concluded that the girth weld failure was caused by axial stress due to movement of the pipe that exceeded the cross-sectional tensile strength of the net section weld zone surrounding the crack initiation location. • On January 9, 2018, a 22-inch transmission pipeline failed in Montecito, California. The incident resulted in a fire and explosion and the release of an estimated 12,000 Mcf of natural gas. Heavy rains and localized flooding contributed to the pipe failure. • On December 5, 2016, approximately 14,400 barrels of crude oil were spilled into an unnamed tributary to Ash Coulee Creek, Ash Coulee Creek itself, the Little Missouri River, and their adjoining shorelines in Billings County, North Dakota. The metallurgical and root cause failure analysis indicated the failure was caused by compressive and bending forces due to a landslide impacting the pipeline. The landslide was the result of excessive moisture within the hillside creating unstable soil conditions. • On October 21, 2016, a pipeline release of over 1,238 barrels of gasoline spilled into the Loyalsock Creek in Lycoming County, Pennsylvania. The release was caused by extreme localized flooding and soil erosion.” <p>Pipeline Safety: Potential for Damage to Pipeline Facilities Caused by Earth Movement and Other Geological Hazards Federal Register / Vol. 87, No. 106 / Thursday, June 2, 2022 / Notices p 33756-33759 DEPARTMENT OF TRANSPORTATION Pipeline and Hazardous Materials Safety Administration [Docket No. PHMSA–2022–0063]</p>		
	Webb, Sherri	2024-02-23	On June 9th I wrote/filed an objection with the IUB regarding the lack of knowledge about the water that Summit would need.	The applicant indicates it has not requested 13 water well permits (see Supplemental Information Inquiry #13 in Appendix I). Water use impacts, mitigations, and permit requirements are discussed in section 5.7.8.	20243-204403-01

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
			<p>Subsequently we found that 13 permit applications had been requested. Summit Carbon Solutions (SCS) cleverly hid their little individual LLCs using SCS in their request. If they are so proud of their work, why are they trying to hide this from the DNR? These 13 requests total an estimated 478,296,000 gallons/year – without POET plants.</p> <p>IF ethanol plants grow by 25%, as reported by Bruce Rastetter at the American Alliance event on 8/14/23, then an additional 119,574,000 gallons may be needed. Nearly 598,000,000 gallons of water/year!!!</p> <p>Ethanol plants already use 3.5 gallons of water to produce 1 gallon of ethanol. 4.5 billion gallons of ethanol will be produced in Iowa in 2023. 15.75 billion gallons of water used!!</p> <p>I am assuming that Summit is not aware that Iowa and Minnesota are in year 4 of a drought. An Iowa State scientist mentioned that those figures are probably an underestimate of what will actually be needed. There are rural wells drying up, rural water refusing new customers, and serious issues with aquifer levels. How much water are they asking from Minnesota?</p>		
	Webb, Sherri	2024-02-23	Summit is NOT a utility and is NOT a public service. The CO ₂ pipeline companies are NOT utilities, they are private companies and will make billions of dollars in tax credits every year – private gain.	Thank you for your comment.	20243-204403-01
	Wenisch, Gregory	2024-02-13	I am a landowner in SW Mn. This would be a big step back from an environment standpoint. Why would we build thousands of miles of pipeline when ethanol will be extinct in 10 years? Self interest groups have no interest....but their own. Invest these subsidies elsewhere instead of throwing it away.	Thank you for your comment.	20243-204403-01
	Wenisch, Teresa	2024-02-13	I have 20 grandchildren & so far 5 great grandchildren. I won't be around to experience all the devastating effects from all the pollution we have created thru our careless treatment of our environment. I remember when my 7 children were at home & loved to take long showers, I told them not to waste water as some day you may wish you had some of that clean fresh water. Now we have to drill hundreds of feet into the ground to find good clean water. We pipe water for hundreds of miles to different farms & cities so they can have clean water. Please, no more underground or above ground emissions that will cause our future generations to suffer from all our mistakes.	Thank you for your comment.	20243-204403-01
	Wills, Aurelia	2024-02-23	My name is Aurelia Wills. I have lived in Minnesota for 33 years. I am concerned about the degraded environment and concerned about how the proposed Summit Carbon Solutions Pipeline Otter Tail to Wilkin will further that degradation. I am concerned that the recently released EIS is inadequate and downplays the dangers of a carbon pipeline. CO ₂ is a hazardous material in high concentrations. The DEIS consistently underplays the known and unknown risks of transporting large amounts of CO ₂ at high pressures through a pipeline. I am concerned about the hazards and burdens to rural residents near the pipeline and to local first responders. An adequate DEIS would take these risks and dangers, both known and unknown, extremely seriously.	Sections 8.5.1.3 and 8.5.1.5 describe potential mitigation in case of a pipeline rupture, including the applicant's commitment to train and coordinate with first responders and provide them with equipment to safely respond to any ruptures or leaks that may occur. Section 8.5.1.4 also describes the applicant's commitment to education for the public on potential safety risks of a CO ₂ rupture or leak, prevention of third-party damage to the pipeline, and other safety topics. The Emergency Response Plan included as Appendix N is a draft plan that is not outdated but would be revised as required by PHMSA, if the project is approved. Additionally, EERA staff recommended a special permit condition requiring the applicant to file its Emergency Response Plan that is filed with PHMSA with the Commission, and other special permit conditions as described in Section 8.5.3	20243-204403-01
	Wills, Aurelia	2024-02-23	I am concerned about breaches, with unknown consequences, of Minnesota aquifers. As we have seen with the Line 3 pipeline, breaches happen. Given climate change and unregulated farming practices, the water situation in Minnesota is in critical condition. Moreover, the Summit pipeline would use enormous, vaguely specified, amounts of water, and increase toxic discharge. The situation is too serious for dangers relating to aquifers and water usage to be blown off and minimized in a DEIS.	Section 5.7.8.2 acknowledges that damage to aquifers is a serious problem and indicates that an uncontrolled flow of water from a shallow confined aquifer could have a significant long-term impact on groundwater. Section 5.7.8.2 also describes geotechnical investigations that would be done to identify areas where breaching of a shallow confined aquifer could occur, and sheet piling would not be used. The applicant currently has an ongoing groundwater investigation underway to further inform construction practices and is continuing to consult with DNR. As part of its coordination with DNR, the applicant has agreed to use ground penetrating radar to study the depth of the confining layer through the entire beach ridge system area crossed by the pipeline to further define existing conditions and advise on	20243-204403-01

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
				<p>construction methodology. This information has been added to Section 5.7.8.2. Furthermore, as described in Section 5.7.8.2, EERA staff recommends that the applicant develop, in coordination with DNR, a plan for pipeline construction in areas crossing the beach ridge system area. The plan would include, at a minimum, measures to minimize the potential for breaching a shallow confined aquifer during trenching and contingency measures to mitigate the impacts of a breach, should one occur.</p> <p>Additional information has been added to Section 5.7.8.2 to address wastewater discharge from the capture facility and the volume of water that would be used by the project relative to available resources.</p> <p>Information on the Minnesota Statewide Drought Plan has been added to Section 5.7.8.2. In addition, the applicant has recently committed to include a contingency plan as part of its appropriation permit application to identify potential alternate water supply sources and/or a statement that the applicant agrees in advance to a suspension of withdrawals following a DNR request, when necessary. This information has also been added to Section 5.7.8.2.</p>	
	Wills, Aurelia	2024-02-23	Finally, a CO ₂ pipeline is a false, industry-friendly solution. We are in the midst of a climate crisis that is accelerating. As a society, we have to lower our carbon output. I want government officials to look for solutions that actually help society work toward this difficult goal, rather than getting behind expensive, damaging "solutions" such as the CO ₂ pipeline that simply allow the oil industry to carry on. Please have a conscience.	Thank you for your comment.	20243-204403-01
	Workman, Lisa	2024-02-23	<p>As the President of the Fergus Falls Chamber of Commerce, I am happy to support Summit Carbon Solutions' proposed pipeline in Fergus Falls, Minnesota.</p> <p>The construction and operation of Summit's proposed pipeline will stimulate our local economy. As heard at the public meetings in February, Summit plans to hire local workers during both the construction and operational phases of the project. These workers will in turn spend a portion of their incomes at other local businesses in our community.</p> <p>Once the pipeline is operational, economic benefits will continue to pour into Otter Tail County via property taxes, which will be paid by Summit. This new tax revenue can be used to improve infrastructure and fund projects in Otter Tail County.</p> <p>The proposed pipeline will also support the Green Plains ethanol plant and its employees in Fergus Falls. By capturing the emissions from the ethanol plant, Summit will open the low-carbon fuel market for Green Plains' ethanol, ensuring the plant and its employees are secure for decades to come.</p> <p>Summit's proposed pipeline will bring millions of dollars of economic revenue to the Fergus Falls area. I urge the Public Utilities Commission to approve application and I look forward to the pipeline becoming operational in Fergus Falls.</p>	Thank you for your comment.	20243-204403-01
	Wulling, T	2024-02-24	<p>I am opposed to the Otter Tail Wilkin CO₂ pipeline (docket 22-422).</p> <p>Carbon capture and sequestration (CCS) results in the continued use of fossil fuels at a time when meeting climate goals require drastically cutting back on fossil fuels. Carbon capture would involve CO₂ pipelines. So, CO₂ pipelines should not be built.</p> <p>Therefore, I ask the Commissioners to not approve the CO₂ pipeline before the Commission.</p>	Thank you for your comment.	20242-203846-01
	Wyse, Margo	2024-02-12	WHEN WILL HUMANS EVER LEARN!!!!	Thank you for your comment.	20243-204403-01
	Wyse, Margo	2024-02-22	When will you idiots EVER learn.....pipelines ALWAYS leak!!!!	Risks of a potential CO ₂ release and potential impacts are described in Chapter 8 of the EIS.	20243-204403-01

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
	Yaggie, Charles	2024-02-13	The WEB Ex drew my attention to the large amount of water needed for both the ethanol side and the CO ₂ recovery side of this project. I assume that water recycling ponds will be used. Any idea as to how much this will save in total amount of water needed? Assuming that the EIS is established, any idea when the pipeline construction will begin? Thank you.	Water recycling ponds are not proposed for the capture facility. The water would be circulated through a cooling tower. Information has been added to Section 5.7.8.2 regarding this process. Information on the project schedule is provided in Section 2.9 and has been added to the Executive Summary.	20243-204403-01
	Zaudtke, Mary	2024-02-23	My name is Mary Zaudtke and I am very concerned with this approach being suggested as a solution for climate change We should be looking to reduce our fossil fuel emissions not storing them.	Thank you for your comment.	20243-204403-01
	Zaudtke, Mary	2024-02-23	We know how storage goes. It is time limited and then what? Our water, soil and air gets polluted. From what I understand there are plans for a network of this storage. You tell me who wants this on their land? Our money would be better spent on geothermal infrastructure to heat and cool our buildings and electric vehicles that don't require gasoline. This approach is a Band-Aid that will waste our time and energy from working on real solutions and frankly we don't have time for it.	An alternative that does not include ethanol production was not studied in the EIS because it would not meet the purpose of the project. Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20243-204403-01
	Zilverberg, Laura	2024-02-23	I'm very concerned about ensuring that solutions to the climate crisis here in MN are solutions grounded in science and that they avoid damage to our local communities and ecosystems. Carbon capture, while likely to be important in our drawdown scenario, is right now a technology still in its infancy and MN's agencies don't have experience with CO ₂ pipelines or carbon capture projects. Based on past pipeline construction it seems unlikely that this project will have "minimal impact." I have numerous concerns about the proposed project's safety, impacts to communities/land and our water and natural resources.	Impacts on communities, public safety, land, water and natural resources are addressed in Chapter 5. Sections 8.4 and 8.5 describe the steps that would be taken in the event of an accidental release of CO ₂ and to prevent an accidental release. Additionally, the applicant's draft Emergency Response Plan is included in Appendix N of the EIS.	20242-203795-01
	Zilverberg, Laura	2024-02-24	But I'm especially concerned about the false promise of the pipeline. The DEIS hasn't accurately accounted for the real CO ₂ emissions and climate impacts of the project. A few key concerns:	GHG emissions are quantified in Section 5.7.1.3, while Section 5.7.2.2 addresses interactions between the project and climate trends.	20242-203795-01
	Zilverberg, Laura	2024-02-25	The anticipated lifetime of the project is only 25 years. At the end of its life, there will be no more C02 capture from the ethanol plan.	Section 2.7 describes decommissioning of the project. If the ethanol plant continues to operate beyond the life of the proposed project, its CO ₂ emissions would not be captured.	20242-203795-01
	Zilverberg, Laura	2024-02-26	It is unlikely that this facility will truly be able to capture 100% of emitted CO ₂ . No carbon capture technology is achieving that rate (or even close to that rate) and that claim is not supported by any third-party data.	Section 2.1 has been revised to clarify that the amount of CO ₂ that would be captured annually was determined by the applicant based on a capture rate of 100 percent, and that commenters have questioned the feasibility of this capture rate given the performance of existing capture facilities.	20242-203795-01
	Zilverberg, Laura	2024-02-27	This technology is likely to be highly energy intensive and will increase carbon emissions from added electricity use.	Electricity emissions are included in Table 5-39. These numbers have been revised to reflect the electricity emission factor associated with LREC, which would provide electricity to the project. The revised electricity emission factor is 132.2 gCO ₂ e/MWh. This was calculated from LREC's energy resource mix in which nearly half comes from clean energy sources. Because LREC has a lower emission factor than the Midwest Reliability West Region emission factor (684.35 gCO ₂ e/kWh), which was used in the draft EIS, calculated electricity emissions have decreased.	20242-203795-01
	Zilverberg, Laura	2024-02-28	The DEIS assumes captured C02 will be stored permanently underground, but there is no guarantee or protocols to ensure that. The climate crisis is here. It is already impacting Minnesota, our winters and our wilderness. And we need real solutions that reduce emissions rather than smoke and mirrors that promise continued emissions with no impact.	Text has been added to Section 2.1 describing the suitability of the Broom Creek Formation in North Dakota for CO ₂ sequestration, as well as the monitoring and testing that would be done to verify that the CO ₂ is contained in the storage reservoir.	20242-203795-01

Agency or Org	Name	Date	Comment	Response	eDocket Document ID
	Zollner, Allen	2024-02-26	I am a landowner in Redwood County and I am opposed to the pipeline that is proposed. Docket # (22-422). It will be an environmental hazard using taxpayer money to benefit a few. Vote it down.	Thank you for your comment.	20243-204403-02

Appendix O

Comments on the Draft EIS and Responses

Attachment 2 DNR Conservation Planning Reports

Conservation Planning Report: SCS_CO2 Pipeline_RA-Hybrid

This document is intended for planning purposes only for the area of interest defined by the user. The report identifies ecologically significant areas documented within the defined area of interest plus any additional search distance indicated below. These ecologically significant areas can be viewed in the Explore Tab of the Minnesota Conservation Explorer. Please visit [MN Geospatial Commons](#) for downloadable GIS data.

This document does not meet the criteria for a Natural Heritage Review. If a Natural Heritage Review is needed, please define an Area of Interest in the Explore Tab and click on the Natural Heritage Review option.

This document does not include known occurrences of state-listed or federally listed species.

MBS Sites of Biodiversity Significance

Search distance = 330 feet

Minnesota Biological Survey (MBS) Sites of Biodiversity Significance are areas with varying levels of native biodiversity that may contain high quality native plant communities, rare plants, rare animals, and/or animal aggregations. A [Biodiversity Significance Rank](#) is assigned on the basis of the number of rare species, the quality of the native plant communities, size of the site, and context within the landscape. MBS Sites are ranked Outstanding, High, or Moderate. Areas ranked as Below were found to be disturbed and are retained in the layer as negative data. These areas do not meet the minimum biodiversity threshold for statewide significance but may have conservation value at the local level as habitat for native plants and animals, corridors for animal movements, buffers surrounding higher quality natural areas, or as areas with high potential for restoration of native habitat. The DNR recommends avoidance of MBS Sites of Biodiversity Significance ranked High or Outstanding.

Wetlands within MBS Sites of Outstanding or High Biodiversity Significance may be considered Rare Natural Communities under the Wetland Conservation Act. For technical guidance on Rare Natural Communities, please visit [WCA Program Guidance and Information](#).

For more information please visit [MBS Sites of Biodiversity Significance](#).

The following MBS Sites of Biodiversity Significance are within the search area:

MBS Site Name	Biodiversity Significance	Status
Everts 21	Moderate	final
FOXHOME PRAIRIE	High	final

DNR Native Plant Communities

Search distance = 330 feet

A native plant community is a group of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native plant species form recognizable units, such as oak savannas, pine forests, or marshes, that tend to repeat over space and time. Native plant communities are classified and described by considering vegetation, hydrology, landforms, soils, and natural disturbance regimes.

DNR Native Plant Community types and subtypes are given a [Conservation Status Rank](#) that reflects the relative rarity and endangerment of the community type in Minnesota. Conservation Status Ranks range from S1 (critically imperiled) to S5 (secure, common, widespread, and abundant). Native plant communities with a Conservation Status Rank of S1 through S3 are considered rare in the state. The DNR recommends avoidance of rare native plant communities.

Wetland native plant communities with a conservation status rank of S1 through S3 may also be considered Rare Natural Communities under the Wetland Conservation Act. For technical guidance on Rare Natural Communities, please visit [WCA Program Guidance and Information](#).

DNR Native Plant Communities may be given a Condition Rank that reflects the degree of ecological integrity of a specific occurrence of a native plant community. The Condition Rank is based on species composition, vegetation structure, ecological processes and functions, level of human disturbance, presence of exotic species, and other factors. Condition Ranks range from A-rank (excellent ecological integrity) to D-rank (poor ecological integrity). A Condition Rank of NR means Not Ranked and a Condition Rank of MULTI mean multiple ranks are present because the record is a native plant community complex.

For more information please visit [Minnesota's Native Plant Communities](#).

The following DNR Native Plant Communities are within the search area:

MBS Site Name	NPC Code	Native Plant Community Classification	Conservation Status Rank	Number of Communities
Everts 21	WPn53c	Wet Prairie (Northern)	S3	2
FOXHOME PRAIRIE	PWL_CX	Prairie Wetland Complex	(S1, S2, S3)	1
Not Within MBS Site	PWL_CX	Prairie Wetland Complex	(S1, S2, S3)	1

Calcareous Fens

Search distance = 5 miles

A calcareous fen is a rare and distinctive peat-accumulating wetland that is legally protected in Minnesota under the Wetland Conservation Act (*Minnesota Statutes*, [section 103G.223](#)). Many of the unique characteristics of calcareous fens result from the upwelling of groundwater through calcareous substrates. Because of this dependence on groundwater hydrology, calcareous fens can be affected by nearby activities or even those several miles away. For more information regarding calcareous fens, please see the [Calcareous Fen Fact Sheet](#) or review the [List of Known Calcareous Fens](#).

SEARCH RESULTS: No features were found within the search area.

DNR Old Growth Stands

Search distance = 330 feet

[Old-growth forests](#) are natural forests that have developed over a long period of time, generally at least 120 years, without experiencing severe, stand-replacing disturbances such as fires, windstorms, or logging. Old-growth forests are a unique, nearly vanished piece of Minnesota's history and ecology; less than 4% of Minnesota's old-growth forests remain. The DNR recommends avoidance of all DNR Old Growth Stands. The following DNR Old Growth Stands have been documented within the search area.

SEARCH RESULTS: No features were found within the search area.

MN Prairie Conservation Plan

Search distance = 330 feet

The [Minnesota Prairie Conservation Plan](#), a twenty-five year strategy for accelerating prairie conservation in the state, identifies Core Areas, Corridors, and Corridor Complexes as areas to focus conservation efforts. The Plan's strategies include protection, enhancement, and restoration of grassland and wetland habitat. To meet the Plan's goals, approaches within Core Areas will need to include restoration and approaches within Corridors will need to include conservation of grassland habitat which can provide stepping stones between larger Core Areas.

The following MN Prairie Conservation Plan Designations are within the search area:

- Corridor: Agassiz Beach Ridges
- Corridor: Alexandria Moraine
- Corridor Complex: Foxhome Prairie

Important Bird Areas

Search distance = 1 mile

[Important Bird Areas](#), identified by Audubon Minnesota in partnership with the DNR, are part of an international conservation effort aimed at conserving globally important bird habitats. They are voluntary and non-regulatory, but the designation demonstrates the significant ecological value of the area.

SEARCH RESULTS: No features were found within the search area.

Lakes of Biological Significance

Search distance = 330 feet

[Lakes of Biological Significance](#) are high quality lakes as determined by the aquatic plant, fish, bird, or amphibian communities present within the lake. To be included in this layer, a lake only needs to meet the criteria for one of these four community types. The lake is assigned a biological significance of Outstanding, High, or Moderate based on the community with the highest quality.

SEARCH RESULTS: No features were found within the search area.

USFWS Habitat Conservation Plans

A [Habitat Conservation Plan \(HCP\)](#) is a mechanism for compliance with the federal Endangered Species Act for a given set of activities and protected species. An HCP is required by the U.S. Fish and Wildlife Service (USFWS) as part of an application for an [incidental take permit \(ITP\)](#). The ITP allows the permit holder to proceed with activities covered in the HCP that could result in the unintentional take of federally listed species.

[Lakes States Forest Management Bat Habitat Conservation Plan \(Bat HCP\)](#): (search distance = 0; within area of interest only) This HCP was created to provide flexibility to the Minnesota Department of Natural Resources (DNR) to manage forests while addressing federal Endangered Species Act (ESA) regulations related to federally threatened and endangered bat species. The Bat HCP covers three bat species within Minnesota: northern long-eared bat, little brown bat, and tricolored bat. This report is intended to help non-federal, non-DNR landowners evaluate their potential eligibility for the Landowner Enrollment Program of the Bat HCP (For DNR-administered land, DNR staff should refer to the Bat HCP Implementation Policy).

[Landowner Enrollment Program](#) – DNR's incidental take permit may be extended through the Landowner Enrollment Program (LEP) to eligible non-federal landowners who conduct forest management activities. Landowners may be eligible to enroll in the LEP if they are a county land administrator, own more than 10,000 acres, or own land that overlaps a Bat HCP feature. The results below indicate if the defined area of interest overlaps a Bat HCP feature. For more information on how to enroll in the LEP, please visit the [Landowner Enrollment Program \(LEP\)](#).

SEARCH RESULTS: No Bat HCP features were found within the area of interest. Landowners are only eligible to apply for the Landowner Enrollment Program if they are a county land administrator or they own more than 10,000 acres.

USFWS Regulatory Layers

To ensure compliance with federal law, conduct a federal regulatory review using the U.S. Fish and Wildlife Service's (USFWS) online [Information for Planning and Consultation \(IPaC\) tool](#). This report is not a substitution for a Section 7 review.

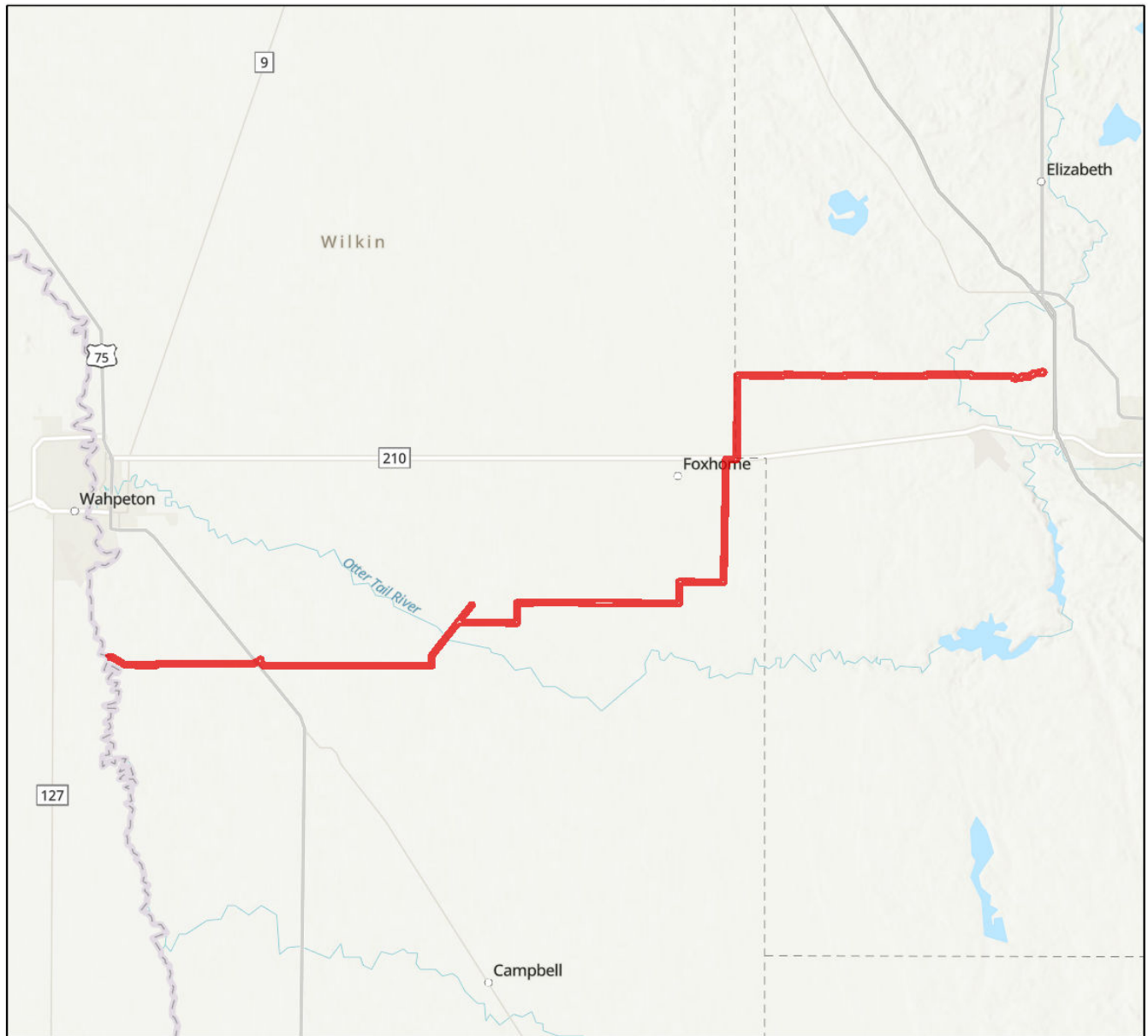
For informational purposes only, this tool currently checks the following USFWS Regulatory Layers:

Rusty Patched Bumblebee High Potential Zones: (*search distance = 0; within area of interest only*) The rusty patched bumble bee (*Bombus affinis*), federally listed as endangered, is likely to be present in suitable habitat within the high potential zones. From April through October this species uses underground nests in upland grasslands, shrublands, and forest edges, and forages where nectar and pollen are available. From October through April the species overwinters under tree litter in upland forests and woodlands. The rusty patched bumble bee may be impacted by a variety of land management activities including, but not limited to, prescribed fire, tree-removal, haying, grazing, herbicide use, pesticide use, land-clearing, soil disturbance or compaction, or use of non-native bees. The [USFWS RPBB guidance](#) provides guidance on avoiding impacts to rusty patched bumble bee and a key for determining if actions are likely to affect the species; the determination key can be found in the appendix. Please visit the [USFWS Rusty Patched Bumble Bee Map](#) for the most current locations of High Potential Zones.

SEARCH RESULTS: No features were found within the search area.

SCS_CO2 Pipeline_RA-Hybrid

Conservation Planning Map



0 1.5 3 6 9 12 Miles

Area of Interest

Size (acres): 1,795.43

County(s): Otter Tail, Wilkin

Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS
Esri, CGIAR, USGS
Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS



Conservation Planning Report: SCS_CO2 Pipeline_RA-North

This document is intended for planning purposes only for the area of interest defined by the user. The report identifies ecologically significant areas documented within the defined area of interest plus any additional search distance indicated below. These ecologically significant areas can be viewed in the Explore Tab of the Minnesota Conservation Explorer. Please visit [MN Geospatial Commons](#) for downloadable GIS data.

This document does not meet the criteria for a Natural Heritage Review. If a Natural Heritage Review is needed, please define an Area of Interest in the Explore Tab and click on the Natural Heritage Review option.

This document does not include known occurrences of state-listed or federally listed species.

MBS Sites of Biodiversity Significance

Search distance = 330 feet

Minnesota Biological Survey (MBS) Sites of Biodiversity Significance are areas with varying levels of native biodiversity that may contain high quality native plant communities, rare plants, rare animals, and/or animal aggregations. A [Biodiversity Significance Rank](#) is assigned on the basis of the number of rare species, the quality of the native plant communities, size of the site, and context within the landscape. MBS Sites are ranked Outstanding, High, or Moderate. Areas ranked as Below were found to be disturbed and are retained in the layer as negative data. These areas do not meet the minimum biodiversity threshold for statewide significance but may have conservation value at the local level as habitat for native plants and animals, corridors for animal movements, buffers surrounding higher quality natural areas, or as areas with high potential for restoration of native habitat. The DNR recommends avoidance of MBS Sites of Biodiversity Significance ranked High or Outstanding.

Wetlands within MBS Sites of Outstanding or High Biodiversity Significance may be considered Rare Natural Communities under the Wetland Conservation Act. For technical guidance on Rare Natural Communities, please visit [WCA Program Guidance and Information](#).

For more information please visit [MBS Sites of Biodiversity Significance](#).

The following MBS Sites of Biodiversity Significance are within the search area:

MBS Site Name	Biodiversity Significance	Status
Everts 21	Moderate	final
FOXHOME PRAIRIE	High	final

DNR Native Plant Communities

Search distance = 330 feet

A native plant community is a group of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native plant species form recognizable units, such as oak savannas, pine forests, or marshes, that tend to repeat over space and time. Native plant communities are classified and described by considering vegetation, hydrology, landforms, soils, and natural disturbance regimes.

DNR Native Plant Community types and subtypes are given a [Conservation Status Rank](#) that reflects the relative rarity and endangerment of the community type in Minnesota. Conservation Status Ranks range from S1 (critically imperiled) to S5 (secure, common, widespread, and abundant). Native plant communities with a Conservation Status Rank of S1 through S3 are considered rare in the state. The DNR recommends avoidance of rare native plant communities.

Wetland native plant communities with a conservation status rank of S1 through S3 may also be considered Rare Natural Communities under the Wetland Conservation Act. For technical guidance on Rare Natural Communities, please visit [WCA Program Guidance and Information](#).

DNR Native Plant Communities may be given a Condition Rank that reflects the degree of ecological integrity of a specific occurrence of a native plant community. The Condition Rank is based on species composition, vegetation structure, ecological processes and functions, level of human disturbance, presence of exotic species, and other factors. Condition Ranks range from A-rank (excellent ecological integrity) to D-rank (poor ecological integrity). A Condition Rank of NR means Not Ranked and a Condition Rank of MULTI mean multiple ranks are present because the record is a native plant community complex.

For more information please visit [Minnesota's Native Plant Communities](#).

The following DNR Native Plant Communities are within the search area:

MBS Site Name	NPC Code	Native Plant Community Classification	Conservation Status Rank	Number of Communities
Everts 21	WPn53c	Wet Prairie (Northern)	S3	2
FOXHOME PRAIRIE	PWL_CX	Prairie Wetland Complex	(S1, S2, S3)	1
Not Within MBS Site	PWL_CX	Prairie Wetland Complex	(S1, S2, S3)	1

Calcareous Fens

Search distance = 5 miles

A calcareous fen is a rare and distinctive peat-accumulating wetland that is legally protected in Minnesota under the Wetland Conservation Act (*Minnesota Statutes*, [section 103G.223](#)). Many of the unique characteristics of calcareous fens result from the upwelling of groundwater through calcareous substrates. Because of this dependence on groundwater hydrology, calcareous fens can be affected by nearby activities or even those several miles away. For more information regarding calcareous fens, please see the [Calcareous Fen Fact Sheet](#) or review the [List of Known Calcareous Fens](#).

SEARCH RESULTS: No features were found within the search area.

DNR Old Growth Stands

Search distance = 330 feet

[Old-growth forests](#) are natural forests that have developed over a long period of time, generally at least 120 years, without experiencing severe, stand-replacing disturbances such as fires, windstorms, or logging. Old-growth forests are a unique, nearly vanished piece of Minnesota's history and ecology; less than 4% of Minnesota's old-growth forests remain. The DNR recommends avoidance of all DNR Old Growth Stands. The following DNR Old Growth Stands have been documented within the search area.

SEARCH RESULTS: No features were found within the search area.

MN Prairie Conservation Plan

Search distance = 330 feet

The [Minnesota Prairie Conservation Plan](#), a twenty-five year strategy for accelerating prairie conservation in the state, identifies Core Areas, Corridors, and Corridor Complexes as areas to focus conservation efforts. The Plan's strategies include protection, enhancement, and restoration of grassland and wetland habitat. To meet the Plan's goals, approaches within Core Areas will need to include restoration and approaches within Corridors will need to include conservation of grassland habitat which can provide stepping stones between larger Core Areas.

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Important Bird Areas

Search distance = 1 mile

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Lakes of Biological Significance

Search distance = 330 feet

[Lakes of Biological Significance](#) are high quality lakes as determined by the aquatic plant, fish, bird, or amphibian communities present within the lake. To be included in this layer, a lake only needs to meet the criteria for one of these four community types. The lake is assigned a biological significance of Outstanding, High, or Moderate based on the community with the highest quality.

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USFWS Habitat Conservation Plans

A [Habitat Conservation Plan \(HCP\)](#) is a mechanism for compliance with the federal Endangered Species Act for a given set of activities and protected species. An HCP is required by the U.S. Fish and Wildlife Service (USFWS) as part of an application for an [incidental take permit \(ITP\)](#). The ITP allows the permit holder to proceed with activities covered in the HCP that could result in the unintentional take of federally listed species.

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[Landowner Enrollment Program](#) – DNR's incidental take permit may be extended through the Landowner Enrollment Program (LEP) to eligible non-federal landowners who conduct forest management activities. Landowners may be eligible to enroll in the LEP if they are a county land administrator, own more than 10,000 acres, or own land that overlaps a Bat HCP feature. The results below indicate if the defined area of interest overlaps a Bat HCP feature. For more information on how to enroll in the LEP, please visit the [Landowner Enrollment Program \(LEP\)](#).

SEARCH RESULTS: No Bat HCP features were found within the area of interest. Landowners are only eligible to apply for the Landowner Enrollment Program if they are a county land administrator or they own more than 10,000 acres.

USFWS Regulatory Layers

To ensure compliance with federal law, conduct a federal regulatory review using the U.S. Fish and Wildlife Service's (USFWS) online [Information for Planning and Consultation \(IPaC\) tool](#). This report is not a substitution for a Section 7 review.

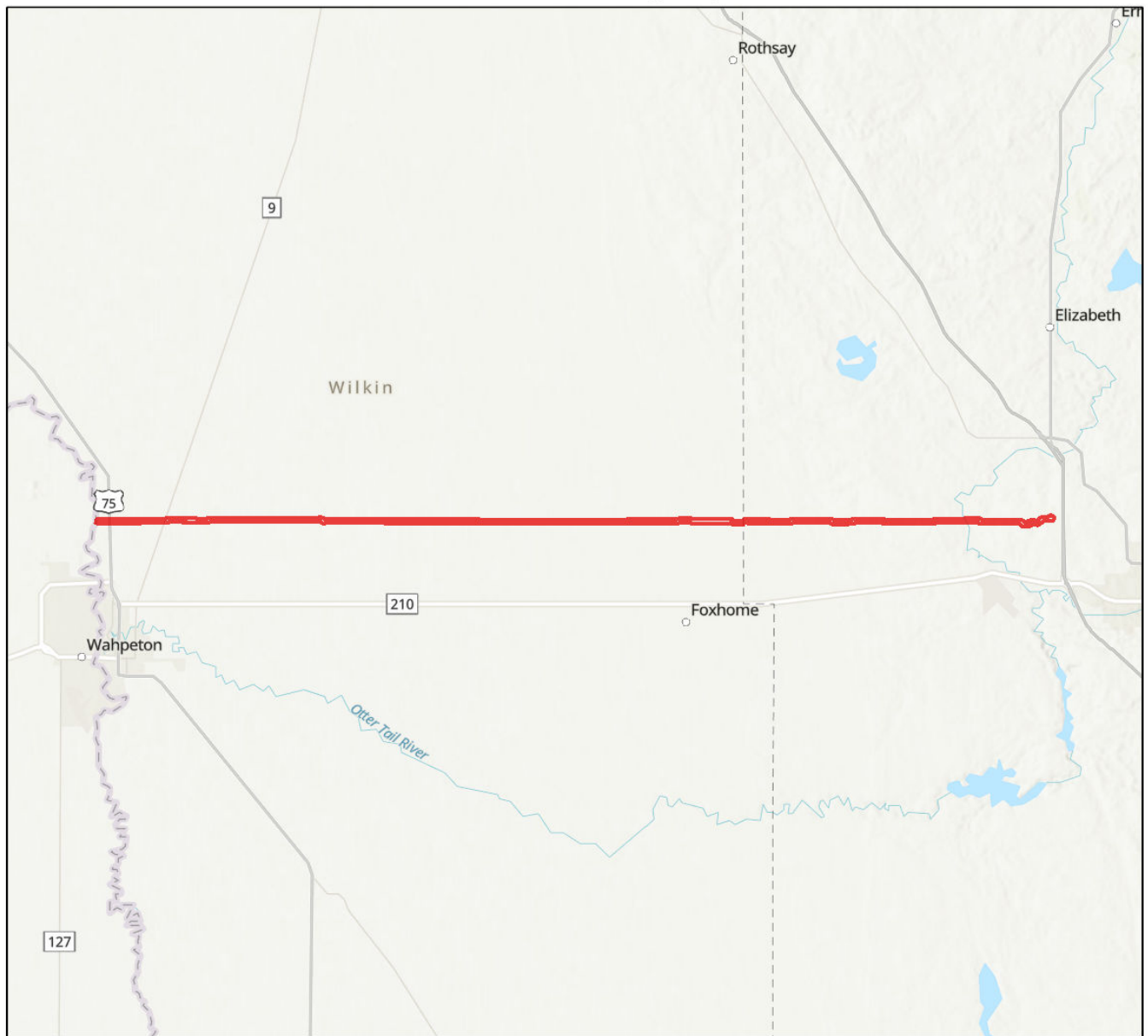
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SEARCH RESULTS: No features were found within the search area.

SCS_CO2 Pipeline_RA-North

Conservation Planning Map



0 1.5 3 6 9 12 Miles

Area of Interest

Size (acres): 1,391.53

County(s): Otter Tail, Wilkin

Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS
 Esri, CGIAR, USGS
 Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS



Appendix O

Comments on the Draft EIS and Responses

Attachment 3 Response to Information Request

CURE INFORMATION REQUEST NO. 2
TO DEPARTMENT OF COMMERCE ENERGY,
ENVIRONMENT REVIEW AND ANALYSIS UNIT

In the Matter of the Application of Summit Carbon
Solutions, LLC, for a Routing Permit for the Otter Tail
to Wilkin Carbon Dioxide Pipeline Project

Docket No.: IP-7093/PPL-22-422

OAH Docket No.: 22-2500-38948

Request Date: February 15, 2024

Response Due:

February 28, 2024

Requested By: Hudson Kingston & Sarah
Mooradian

Requested From:

Minnesota
Department of
Commerce

117 South 1st Street
Montevideo, MN 56265
320-269-2984
HUDSON@curemn.org
Attorneys for CURE

1. Please provide a detailed summary of the qualifications of Daniel Prascher and any other modeler(s) who conducted the modeling described in Appendix G and wrote the accompanying report.

Mr. Prascher and Dr. Ward conducted the modeling. Ms. Hart provided technical writing support. The enclosed attachment details the credentials of Mr. Prascher, Dr. Ward, and Ms. Hart.

2. Has Daniel Prascher conducted aerial and thermal dispersion analyses and/or Computational Fluid Dynamics (CFD) analyses on any other carbon dioxide pipelines? If yes, please provide a list with the names of those pipelines.

Yes, Mr. Prascher has conducted the analyses mentioned above for several operators in the continental United States. Please see the enclosed attachment for additional details. A list of specific pipelines cannot be provided because that work is governed by nondisclosure agreements.

3. Regarding the CFD model referenced in Appendix G, what were the boundary conditions? (e.g., was an atmospheric boundary layer profile used or a flat/uniform wind velocity? Was there thermal radiation? How was the CO₂ introduced (phase)? How were the winter conditions (snow) taken into account?).

Mr. Prascher and Dr. Ward modeled boundary conditions at the surface, which included a boundary layer in the moving air against the stationary ground. The upwind boundary layer (atmospheric boundary layer) was defined as a fully developed profile and all other boundaries were open.

Thermal radiation was not included in the model because the temperatures involved in the worst-case scenario being modeled were extremely cold – both the temperature of the product upon release and the ambient temperature. Since both were extremely cold, it greatly reduced the need for thermal radiation modeling. By not including thermal radiation modeling, the model is more conservative because thermal radiation would warm up the CO₂ release faster – reducing the impact distance.

The phase of the CO₂ was defined as a gas at atmospheric pressure as the lowest possible gas phase temperature at 1 atm. Winter conditions were modeled through the selection of air and ground temperatures reflective of the worst-case scenario (See the aerial dispersion report, Appendix B, for a discussion on how the worst-case scenario was determined.)

4. Regarding the CFD model, how large was the solution domain compared to the area of interest?

For the terrain model, it was the size of the digital elevation model (DEM) – 365 meters crosswind by 556 meters downwind) with a 100-meter height. The windbreak models were 400-meter square with a height of 100 m.

5. Regarding the CFD model, what was the ruptured pipe geometry, and was it created to match the scenario analyzed by the CANARY software?

Two circular boundaries were used for the upstream and downstream pipeline rupture geometry. The internal diameter of the pipeline was used for both rupture geometries used for the CO₂ insertion flow. This would match a full pipeline break and flow from each side of the ruptured pipeline for a guillotine break.

6. Regarding the CFD model, what was the justification for using such a simplified model (Darcy's Law approach) to account for the windbreaks?

Darcy's law is appropriate for modeling low-velocity flows or media with low permeability and porosity. It's also suitable for small pressure drops and low velocities, all of which apply to this application. Darcy's law is often used for flow through structure-restricted voids, including porous filters, capillary beds in biological tissue, and other places where a distributed structure occupies a significant fraction of the free-flow volume.

7. Regarding the CFD model, were any steps taken to ensure this simplified model and the values for the porous media used were accurate and appropriate for modeling trees?

Yes, please refer to the references in the Allied CFD report.

8. Regarding the modeled terrain and geometry in the CFD, what was upstream of the pipe rupture? Please provide images or diagrams to illustrate the scenarios.

To the extent this question is asking "What was the modeled terrain *upwind* of the pipe rupture," Mr. Prascher and Dr. Ward modeled no terrain upwind of the pipeline rupture so as not to obstruct wind flow to the CO₂ being carried downwind. This ensured that the model produced a potential worst-case scenario.

9. Regarding the CFD model, how were the fluids modeled (laminar or turbulent flow regimes)?

Mr. Prascher and Dr. Ward modeled everything assuming a laminar flow. The CO₂ leaving the pipeline had relatively low Reynold's numbers, meaning that it was not fully turbulent. Regardless, they

modeled everything in a laminar flow to create a worst-case scenario. This approach is more conservative than the actual case because laminar flows create the greatest impact distances.

10. Regarding the CFD model, how was the flow regime determined for the wind and the CO₂ rupture?

The flow regime was determined by calculating the maximum Reynolds number of mixture of air and CO₂ and comparing to the published value for the transition from laminar to turbulent regimes for external flow.

11. Regarding the CFD model, how was the multicomponent mixture of CO₂ and air modeled?

Local volume fractions of mixture of CO₂ and air were used to calculate the volumetric properties at each node.

12. Regarding the CFD model, what turbulence model was used if the fluid flow was treated as turbulent?

N/A

13. Regarding the CFD model, were phase change, variable material properties, and buoyancy (natural convection) included in the analysis? If yes, how were they implemented?

No, Mr. Prascher and Dr. Ward did not model a phase change. Mr. Prascher and Dr. Ward assumed that all the CO₂ in the pipeline became gaseous, which is more conservative than what happens in reality. This simplifies the modeling process. At the same time, the downwind results are not affected because they set the release CO₂ mass to be the same as the mass released in the CANARY model.

Yes, Mr. Prascher and Dr. Ward did model the variable material properties – they modeled the properties with both temperature and gas volume fraction dependent functions.

Likewise, they also modeled buoyancy as a volume force created by the difference in densities.

14. Regarding the CFD model, was there a grid/mesh/cells study performed to ensure it was sufficient to model the scenario and get accurate results?

Yes, a discretization study was conducted as part of the model creation to determine the maximum mesh size that would provide converged results. This study was done manually using COMSOL settings.

15. Regarding the CFD model, was a time-step sensitivity study used to ensure the relevant physical phenomena were modeled accurately?

No. The implicit solver in COMSOL used a backwards differentiation formula that was free to choose an appropriate time step based on the local error estimation in the previous solution step. In effect, this approach allows the software to optimize the time-steps automatically to increase accuracy of the model on the fly – in CFD modeling, different time-steps are appropriate at different points in each

model. Mr. Prascher and Dr. Ward preferred this approach over trying to determine a “one size fits all” time-step via a time-step sensitivity study.

16. Regarding the CFD model, what were the convergence criteria used for determining if the simulation was acceptable?

Velocity, pressure, temperature, and CO₂ concentration were solved with an absolute tolerance of less than 10⁻⁴ m/s, Pa, K, and mol/m³ respectively.

17. Was any validation or verification of the CFD model performed? Please provide records of the verification and validation.

Yes, Mr. Prascher and Dr. Ward validated the CFD model (Scenario 2 in the CFD report) against the CANARY model (Scenario 1 in the CFD report). Using two different modeling software applications with completely different computational approaches they applied them to the same scenario¹ and validated the CFD model against the CANARY model on a macro level—comparing the final result of one model to the final result of another model—which accounts for any and all variations in data, assumptions, and modeling between the two approaches. As is shown in the CFD report, the results of Scenarios 1 and 2 are very close, which validates that both approaches are reasonable and appropriate. If the results of Scenarios 1 and 2 would not have been reasonably close, neither model would have been validated and a different validation approach would have become necessary.

Furthermore, CANARY is the accepted industry standard for aerial dispersion modeling. Thereby providing a reasonable standard by which to compare and validate the CFD model in Scenario 2.

¹ Since the terrain modeled in Scenario 2 is so flat, the CANARY model in Scenario 1, which cannot account for terrain, can reasonably be compared to Scenario 2.

Appendix O

Comments on the Draft EIS and Responses

Attachment 4 Transcripts of Public Meetings

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DEIS MEETING - 22-422

BRECKENRIDGE - FEBRUARY six, 2024 - 6:00 P.M.

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

AND DEPARTMENT OF COMMERCE

In the Matter of the Application of Summit Carbon
Solutions, LLC, for a Routing Permit for the Otter Tail
to Wilkin Carbon Dioxide Pipeline Project in Otter Tail
and Wilkin Counties, Minnesota

MPUC DOCKET NO. IP-7093/PPL-22-422

Breckenridge High School
710 13th Street North
Breckenridge, Minnesota

February six, 2024

COURT REPORTER: Janet Shaddix Elling, RPR

1	I N D E X	
2	SPEAKER	PAGE
3	Andrew Levi	3
4	Dale Anderson	11
5	Dale Schneider	15
6	Sharon Leinen	24
7	Dale Schneider	30
8	James Vissers	31
9	Vance Wiertzema	33
10	Sarah Mooradian	36
11	Dale Schneider	38
12	Butch Jirak	44
13	Sharon Leinen	46
14	Dave Daum	50
15	Dale Schneider	51
16	Dale Anderson	51
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1 MR. ANDREW LEVI: Good evening, everyone.
2 Let's go ahead and get started.

3 My name is Andrew, I work with the
4 Minnesota Department of Commerce. We're here in
5 Breckenridge for the Draft Environmental Impact
6 Statement meetings for the Otter Tail to Wilkin
7 Carbon Dioxide Pipeline Project proposed by Summit
8 Carbon Solutions.

9 There's a PowerPoint, but the projector
10 is not working, so a couple things we'll just chat
11 about. We'll do some introductions very quickly,
12 very quickly talk about the proposed project, the
13 state permitting process and Draft Environmental
14 Impact Statement, or EIS, itself. And then we'll
15 open it up to your questions and comments.

16 So before I get started, I do want to
17 thank you for being here this evening. Your
18 comments and thoughts on the Draft EIS make for a
19 better Final EIS, and we really appreciate your
20 feedback.

21 Again, I'm Andrew with the Minnesota
22 Department of Commerce. We were tasked -- the
23 Energy Environmental Review and Analysis Unit, we
24 were tasked with writing the EIS. With me is
25 Jessica, she is in the back, she greeted you at the

1 door.

2 Also here from HDR, they are our
3 consultant on this project, is Joe, Will and Pat.
4 They're here to help answer any questions that I
5 need help with. Let's face it, there will be some.

6 And then Dan from Allied Solutions. Dan
7 did the rupture modeling for the EIS.

8 From Summit Carbon Solutions, Scott
9 O'Konek is here, along with Alex and Jason and
10 Christy and Britta.

11 And most importantly, Janet, our court
12 reporter, is here. Janet is transcribing what we're
13 saying and she'll get your comments spoken here
14 tonight into the record.

15 So, again, this is the Summit Carbon
16 Pipeline Project, Otter Tail to Wilkin. The
17 Applicant proposes to construct and operate
18 approximately 28.1 miles of four-inch carbon steel
19 pipeline and associated facilities, which are
20 mainline valves, a cathodic protection system, and
21 access roads that would transport captured CO2 from
22 the Green Plains Ethanol Plant to just south of
23 here, and on to North Dakota as part of the Midwest
24 Carbon Express Project.

25 The project is designed to capture

1 approximately .19 million metric tons of CO2
2 annually generated at the ethanol plant and
3 transported to North Dakota.

4 A pipeline routing permit is required
5 from the Public Utilities Commission because it
6 meets the definition of a pipeline in Minnesota
7 statute. Basically, it's designed to operate at a
8 pressure of more than 275 pounds per square inch
9 gauge and carry a gas. Various other approvals
10 would be required if the Applicant is granted a
11 route permit, such as commonly referred to as
12 downstream permits. Examples include like a license
13 to cross state lands and waters from the DNR, or a
14 permit from MnDOT to cross state highways, state
15 roads, et cetera.

16 The state permitting process so far, we
17 were out here I believe in May and had scoping
18 meetings. And then we disappeared for a while and
19 worked on a Draft Environmental Impact Statement
20 that is now done.

21 What we're doing now is the comment
22 period on the Draft EIS, which will be followed by a
23 Final EIS that will be issued. There will be a
24 comment period on the adequacy of that Final EIS,
25 and after that there will be a public hearing and

1 comment period that will be sometime in May. We'll
2 be back out here, most of us I think will all be
3 here, except an Administrative Law Judge will be
4 sitting in this chair running the meeting.

5 That's the meeting where we take the
6 information, you take the information that's in the
7 Environmental Impact Statement and tell the judge
8 what it means.

9 What we're trying to do with the EIS is
10 gather facts and, you know, at the public hearing is
11 when you get to tell the judge what you believe
12 those facts mean.

13 After the public hearing, there will be a
14 Commission decision on the adequacy of the EIS, and
15 then the judge, the Administrative Law Judge will
16 issue a report and recommendation as to what they
17 think should be done, what the Commission should do,
18 and then the Commission will make a final decision
19 on the route permit.

20 Sorry, that makes a lot more sense when
21 there's a slide on the screen.

22 So the EIS, it's in the back, there's
23 three copies you can look at in the back. It's also
24 available electronically.

25 It's all about informed decision-making.

1 Just a comment. We're trying to develop a common
2 set of facts that everyone can use to comment on the
3 project. The EIS doesn't advocate, it's an
4 information document.

5 It was prepared based on several
6 documents. The Applicant's application, along with
7 the scoping and environmental assessment worksheet.
8 Then we were here, you all provided scoping
9 comments. We incorporated those scoping comments
10 into a scoping decision. And that was essentially,
11 then, the table of contents of the EIS.

12 Information was provided by tribes and
13 state agencies on the preliminary Draft EIS, and
14 different tools were used to prepare a EIS. And
15 then, also, of course, it couldn't have been done
16 without the work of HDR and Allied Solutions.

17 There's a lot of information in the EIS.
18 It talks a little bit about the proposed project,
19 the regulatory requirements, the environmental
20 setting. It studies three alternative routes. It
21 studies alternative technologies to the project
22 itself. Alternative agricultural practices and
23 energy efficiency practices at the ethanol plant
24 itself. It discusses normal operation of the
25 pipeline and associated facilities as well as what

1 would happen if there was an accidental release of
2 CO2.

3 The EIS describes potential impacts and
4 tries to put them into context and characterize
5 those impacts as minimal, moderate, or significant.
6 It also discusses mitigation measures.

7 Again, the EIS is available
8 electronically on our website. And there's a flash
9 drive on the table in the back if you'd like to take
10 home a copy tonight. The print copy of it is
11 available in the local Breckenridge and Fergus Falls
12 libraries. Print copies are available for review in
13 the back here tonight, and there's summaries
14 available for you to take home, it's the Executive
15 Summary, and that's printed off for you to take
16 home.

17 So that's really all I had. We'll just
18 move on to your questions and comments on the Draft
19 EIS.

20 I think the comments that are most useful
21 at this time for us is we're trying to move from a
22 draft document to a final document, or what needs to
23 be -- what needs to be clarified. What needs to be
24 clarified in the EIS. What didn't you understand,
25 what is missing. Is there something that we didn't

1 talk about that we said we would talk about in the
2 scoping decision.

3 And is there anything that needs to be
4 added so that the Final EIS is more complete and
5 more accurate. Maybe there's something we could
6 discuss a little bit more that would be helpful.
7 Comments on the Draft EIS, any comments we receive
8 will be included as an appendix in the final and we
9 will respond to substantive comments in the final
10 and make changes as necessary.

11 And basically kind of the think about
12 that as if you provide some information that
13 convinces us, that changes our mind, and basically
14 kind of convinces us that, yeah, this should be
15 changed, then, yeah, our mind is changed and we can
16 go ahead and make those types of changes to the
17 Final EIS.

18 So a substantive comment then is a
19 comment on a specific section. This is what we see,
20 this is the concern and this would fix it. And
21 we'll take a look at those and we'll get to see, you
22 know, how that gets incorporated in the final.

23 So verbal comments can be -- are accepted
24 at the draft just tonight, just when we have the
25 court reporter here to take down the transcript so

1 we catch what you're saying for sure.

2 Other than that, you can submit comments
3 in writing. There's a comment form on the table in
4 the back that outlines different ways you can do
5 that. But basically you can do it, you can email
6 me, you can send me a letter, or there's an online
7 commenting tool that you can use. It's a fillable
8 form and it just pops up and you fill it out, fill
9 the form out, and you can attach PDFs or anything
10 you might want to attach to it.

11 You can comment any way you like. If you
12 don't like speaking in front of folks, you don't
13 have to just to submit a comment. You can submit
14 your comments in writing. We end up reviewing them
15 all in writing anyway, so they're all pretty equal
16 with regards to their format because they all get
17 read. So whatever is most comfortable for you,
18 please comment that way.

19 The comment period closes on
20 February 23rd, so please do get your comments in on
21 or before the 23rd.

22 So that's all I really have tonight.
23 We'll open it up to your questions and comments.

24 If you could please state and spell your
25 name for Janet when you come up to the podium. If

1 you could -- yeah, I think that that's all we really
2 have.

3 You can of course comment on anything
4 you'd like. I just want to remind you that in May
5 there will be an Administrative Law Judge here and
6 that's the person who is writing the report that
7 recommends what to do about the project. You can
8 certainly do that tonight, but our response to that
9 will just be comment noted because that's all we can
10 do right now. We're just trying to develop, you
11 know, a Final EIS. You can of course comment on
12 anything you'd like. Again, those questions are,
13 you know, what needs to be clarified, what is
14 missing and what needs to be added so that the Final
15 EIS is more complete and accurate.

16 And that's all I have. No one signed up
17 to speak.

18 Does anyone have any questions?

19 Yes, sir.

20 MR. DALE ANDERSON: I have a few.

21 MR. ANDREW LEVI: Can you come up to the
22 microphone, please, so Janet can hear you?

23 MR. DALE ANDERSON: My name is Dale
24 Anderson. The first name is D-A-L-E, last name,
25 A-N-D-E-R-S-O-N.

1 Some of the questions I got.

2 It's going to be a steel pipeline. Now,
3 am I under the impression that the CO2 gas is like a
4 freezing agent when it hits the air?

5 MR. ANDREW LEVI: Yes. Well, if there is
6 a -- are you speaking just in terms of a rupture?

7 MR. DALE ANDERSON: Right.

8 MR. ANDREW LEVI: Yeah. So if the
9 pipeline ruptures, the release -- and Dan can come
10 up and give you more of the specifics, but, yes,
11 it's cold, very cold.

12 MR. DALE ANDERSON: Okay. The next
13 question is what type of -- the pipes itself, they
14 come in so many lengths, but the connections are
15 what? I take it they're going to be welded.

16 MR. ANDREW LEVI: Yes.

17 MR. DALE ANDERSON: Okay. So that would
18 be like a hydro seam, in hydro you can only weld the
19 pipes together, so they can't be braced, they're
20 only welded; is that correct?

21 MR. ANDREW LEVI: I can't comment on
22 that, but I know these will be welded.

23 MR. DALE ANDERSON: Also, when the pipe
24 is in the ground, is there some way of doing it so
25 that they do not move as far as the freezing and

1 thawing so the pipes don't rupture?

2 MR. ANDREW LEVI: We took a look at that
3 in the EIS and basically what we concluded was that
4 the pipe would be deep enough for that freezing and
5 thawing, that lifting.

6 MR. DALE ANDERSON: It should be below
7 six feet.

8 MR. ANDREW LEVI: It will be 54 inches to
9 the top. The top of the pipe.

10 MR. DALE ANDERSON: And then around the
11 pipes there will be some kind of sand base so
12 there's no aggregate to rub on that pipe?

13 MR. ANDREW LEVI: Scott, do you want to
14 expand on if you're using padding or not?

15 MR. SCOTT O'KONEK: Sure. So the pipe
16 itself has a protective coating that's around it.
17 That, you know, will protect it from chips and
18 cracks and dings and dents. The entire coating, it
19 is an epoxy coating that goes over the entire pipe
20 and actually gets checked. Generally, that is
21 called jeeping. So to make sure that's a continuous
22 filled piece of pipe, so when you actually weld
23 that, you know, that comes epoxied from the factory,
24 but they check to find that it is complete. And
25 then the welds themselves get filled, too, before

1 they actually set down. And then, you know, there's
2 aggregate sizes that, you know, cannot go back into
3 the trench, that's correct.

4 MR. DALE ANDERSON: And then when it does
5 cross the Otter Tail River, the river varies at
6 depth and it becomes safe for that also so that the
7 river is above that pipe?

8 MR. SCOTT O'KONEK: Can you repeat that?

9 MR. DALE ANDERSON: Okay. When it
10 crosses the Otter Tail River to the North Dakota
11 side, then the elevation will change probably,
12 however deep that river elevation is?

13 MR. SCOTT O'KONEK: Yes. So, I mean,
14 there's an engineered design to make sure that, I
15 mean, I don't have the exact number, but we are
16 many, many feet below the river there. And actually
17 it's a bore that actually goes through there. And
18 it keeps it at that level the entire time. So the
19 entrance and the exit will be part of an engineering
20 draft, but also with the depth, and then we'll
21 actually use HDD drilling to put it from one side to
22 the other.

23 MR. DALE ANDERSON: Okay. That concludes
24 my questions. Thanks.

25 MR. ANDREW LEVI: Thank you.

1 Dan, would you want to come up real quick
2 and expand a little bit more to the temperature
3 question with regards to what happens if there's a
4 rupture?

5 MR. DAN PRASCHER: My name is Dan
6 Prascher. That's D-A-N, P-R-A-S-C-H-E-R.

7 Okay. Yeah. So it stays at a
8 temperature that is -- this is kind of embarrassing.
9 Okay. So it stays at a temperature that's
10 consistent with the ground and stays in liquid form.
11 And, yes, if there's a rapid decompression, then as
12 it flashes to gas, it releases -- it becomes very
13 cold. Similar to if you had one of those canisters
14 that cleans out your keyboard, pressed air, same
15 deal, you're triggering it, air is coming out, it's
16 decompressing it so the can gets cold. Same deal.

17 MR. ANDREW LEVI: Yes, sir. Come on up.

18 MR. DALE SCHNEIDER: Yeah. I got a
19 couple of questions here.

20 MR. ANDREW LEVI: Sir, could you state
21 and spell your name for Janet?

22 MR. DALE SCHNEIDER: Sure. Dale
23 Schneider, D-A-L-E, S-C-H-N-E-I-D-E-R.

24 Okay. I see here in the summary you got
25 some routing here. What is the north, RA north,

1 this is 23 miles long. And it says here parallels
2 roadways from the ethanol plant straight west to the
3 North Dakota border just north of Breckenridge.

4 Okay. What roads are those and where
5 does it come into Breckenridge? Where up north?
6 North ain't a good place for this shit. Is it a --
7 what do you call it? Bringing it into a facility
8 and then ship back out of there, a holding point?

9 MR. ANDREW LEVI: No. What happens is
10 the pipe will -- the pipe will continue into North
11 Dakota. The sequestration facilities are west of
12 Bismarck. So this document covers the Minnesota
13 portion of that, of this project.

14 MR. DALE SCHNEIDER: Okay.

15 MR. ANDREW LEVI: But once it hits the
16 river, there will be another HDD, another
17 directional drill, as Scott described it earlier.
18 And that --

19 MR. DALE SCHNEIDER: How far below the
20 riverbed is that?

21 MR. ANDREW LEVI: Again, Scott said it
22 would vary based on geotechnical work. I think we
23 found at minimum it's 20?

24 MS. PAT TERHAAR: Yeah, the minimum depth
25 would be 20, but likely it would be deeper than

1 that. It could be 30, 40, 50, it just depends on
2 the geology. And I don't think they're done with
3 their geotechnical studies yet for those.

4 MR. DALE SCHNEIDER: What is
5 geotechnical? What is the difference there that
6 makes a difference in height as it's buried?

7 MR. ANDREW LEVI: Scott, if you want to
8 expand on it.

9 MR. SCOTT O'KONEK: A lot of it has to do
10 with what types of rocks and geological layers are
11 in there, you know. What, you know, we want to be
12 below the bedrock, we want to be in an area that you
13 can actually efficiently and effectively run a drill
14 without having collapses. And we also want to make
15 sure there's enough protection that we won't have a
16 frac-out or a blowout when that drilling is
17 happening, you know.

18 So that's what I mean, too, you know,
19 we'll talk about minimum depths of 20 feet, or
20 whatever the case may be, but when you're talking
21 about these different routes, that you have to
22 realize, too, that whatever route it would be would
23 get an engineered design prior to an approval of
24 before that drill will take place.

25 MR. DALE SCHNEIDER: Yeah, but it would

1 be nice to know where it is up north of
2 Breckenridge, you know. But a 23-mile line means
3 that another one here of 29.1 miles, you know, the
4 hybrid --

5 MR. ANDREW LEVI: Sir, there's some real
6 big maps just outside the room that have -- that
7 have all of those routes detailed on an aerial with
8 the roads and you can see exactly where they are.

9 MR. DALE SCHNEIDER: I didn't see them
10 when I come up.

11 MR. ANDREW LEVI: Sorry, they're there.

12 MR. DALE SCHNEIDER: I have another
13 question here. I thought it was said that that
14 pipeline was going to be 54 inches below grade. So
15 that's not even below the frost. And that frost
16 does some hellacious things, you know. So why isn't
17 it deeper than that if it is going to be coming
18 through here?

19 MR. ANDREW LEVI: It's proposed to be
20 that deep, that's the depth --

21 MR. DALE SCHNEIDER: So it's just
22 proposed?

23 MR. ANDREW LEVI: Yeah. That's the best
24 that the company proposes to bury the tube. That's
25 also what's required, the minimum depth of cover in

1 Minnesota statute through agricultural areas.

2 MR. DALE SCHNEIDER: So we're supposed to
3 be out there with that.

4 And another question, what is this
5 schedule pipe business? Schedule 40, schedule 80,
6 schedule 120? Or are we just putting plastic in the
7 ground? What's the deal with it?

8 MR. SCOTT O'KONEK: It's actually a
9 carbon high grade steel pipe, American made. It
10 actually has a wall thickness of 1.89 -- .189
11 inches.

12 MR. DALE SCHNEIDER: .189.

13 MR. SCOTT O'KONEK: So if you look at the
14 idea of the pipe, they say that the inside diameter
15 is the four-inch and the outside diameter is four
16 and a half inches, okay. So what you're looking at
17 is about that difference around the pipe.

18 MR. DALE SCHNEIDER: So it's not any more
19 than schedule 40 pipe through the countryside?

20 MR. SCOTT O'KONEK: Yes, it is designed
21 and tested for this purpose.

22 MR. DALE SCHNEIDER: Yeah. It's designed
23 and tested, but you're putting it 54 inches in the
24 ground where it will be subject to the frost and
25 freezing. And it will be, you know, Mother Nature

1 does some hellacious things, I know that. So how
2 safe is it? What's the deal with that stuff? It's
3 lighter than air, correct? So the seven-inch is the
4 low pockets?

5 MR. ANDREW LEVI: Yeah. Heavier than
6 that, I guess.

7 MR. DALE SCHNEIDER: Heavier than that.

8 MR. ANDREW LEVI: Yes.

9 MR. DALE SCHNEIDER: Okay. So what about
10 going across the pastures where we got cattle and
11 stuff out there? To take a water hole, where is it
12 going to settle down to in the watering hole? So
13 the cattle come down there and take a drink and,
14 bam. And I know that stuff puts you down.

15 So that's my thoughts on it. Everybody
16 should be thinking about things like that.

17 I got another question, by the way. What
18 is this going to be used for after all these storage
19 areas, is it going to be stuck in the ground and
20 left there so it can get into the water aquifers and
21 everything? What's it for? What are you collecting
22 it for? I know to get it out of the atmosphere, but
23 I don't think it's going -- and partly for the
24 ethanol, but what's it going to be used for once
25 it's collected? Just to put it in a hole in the

1 ground?

2 MR. ANDREW LEVI: Yeah, it will be
3 permanently sequestered.

4 MR. DALE SCHNEIDER: So there's no use
5 for it afterwards?

6 MR. ANDREW LEVI: No, I don't believe so.

7 MR. DALE SCHNEIDER: So there's a
8 possibility of getting into water aquifers and
9 everything else around the countryside.

10 MR. ANDREW LEVI: Scott, do you --

11 MR. SCOTT O'KONEK: No. The way that
12 this works -- I know what you're thinking, what
13 you're talking to. And, you know, I'd like to touch
14 on a bunch of the safety aspects, the maintenance,
15 and, you know, this thing gets a smart pig, it's a
16 tool.

17 I'm going to start here, where we make
18 sure there is no shifting. We send a tool there
19 that actually can read the thickness of the location
20 dings or dents. So if there was any other shifting
21 or third-party damage that didn't get reported,
22 anything, these tools can pick that up. And that'll
23 be properly responded to.

24 And as far as sequestration, in permit
25 sequestration, what that does is this is far, far

1 underground in North Dakota. And what there is is
2 there's actually a salt water reservoir, is kind of
3 what it is, and it's more of what everybody thinks
4 of as a void, but it's like a core or a sponge space
5 a mile underground, a half a mile, whatever. And
6 when the CO2 goes in there over time and mixes with
7 that salt water, it solidifies and calcifies over
8 time, too. So I don't know the exact time frame on
9 it. It depends on the amount of volume that's down
10 there, too, and it solidifies and calcifies in the
11 ground.

12 MR. DALE SCHNEIDER: What's the time
13 frame?

14 MR. SCOTT O'KONEK: I don't know the time
15 frame on that.

16 MR. DALE SCHNEIDER: So it's got a whole
17 lot of time to get out into the aquifers and through
18 the ground.

19 What about going down holes?

20 MR. SCOTT O'KONEK: We actually have
21 monitoring wells around there, too. We have them
22 right now because we had to prove what was down
23 there. And with those monitoring wells, we're
24 always watching that movement and that down there to
25 make sure it's not doing anything it's not supposed

1 to.

2 MR. DALE SCHNEIDER: So what about
3 putting it down the hole?

4 MR. SCOTT O'KONEK: So the pressures are
5 going to be kind of what we're at right now, what
6 the pipeline is operating at. Because the pump
7 itself, it's all rated for that 2,185. So that
8 pressure would be the max operating pressure that it
9 goes down there, and then when it diffuses,
10 basically, or defers into that saltwater tavern, it
11 will be at ground pressure at that point. And I'm
12 not sure what it is, it can be up to 4,000 psi in
13 the ground at that point.

14 MR. DALE SCHNEIDER: In the ground?

15 MR. SCOTT O'KONEK: Yes.

16 MR. DALE SCHNEIDER: So if you have a
17 blowout, where does it go?

18 MR. SCOTT O'KONEK: It's already at that
19 4,000 psi.

20 MR. DALE SCHNEIDER: Will it be coming
21 back up? You got that much pressure, there's a lot
22 of things that --

23 MR. SCOTT O'KONEK: So the important
24 thing here, too, is the layers above that, the
25 layers above this sequestration zone, too, there's a

1 layer called the cap rock and it's a very hard layer
2 of rock that we had to prove was there. That way
3 you know safe storage can happen. So penetrating
4 that, that layers of rock, would be, you know,
5 unlikely.

6 MR. DALE SCHNEIDER: Um-hmm. When
7 possible. Okay. Yeah, okay.

8 I don't like it. Just so everybody knows
9 what the heck is going on with it.

10 MR. ANDREW LEVI: Thank you.

11 Are there -- I'm sure there's more
12 questions.

13 MS. SHARON LEINEN: Sharon Leinen,
14 L-E-I-N-E-N.

15 I have a lot of issues with this whole
16 project, but tonight I want to talk about the water
17 usage.

18 Now, I've read a lot of reports about
19 this project that nowhere has the water usage
20 coincided and I always get a different number. So
21 it seems like nobody really knows how much water
22 this whole thing is going to take. And with most of
23 the country in a drought right now, is this really
24 wise to be using water for this? Is the end result
25 going to be worth the loss of dripping water?

1 Also, the water will be coming out of
2 aquifers. I live in the country and have a well, I
3 don't want to have to drill a new well when the
4 aquifer goes down. The city of Breckenridge has
5 wells, I don't think they'd be too happy to have to
6 drill new wells as the aquifer goes down.

7 I know there's constant projects being
8 developed that would also capture carbon. The
9 University of Wisconsin is on the cutting edge of
10 that. And they are a lot less invasive than this
11 project. It wouldn't involve laying pipelines, they
12 capture the carbon right at the source.

13 I -- I just think this whole project
14 is -- it's kind of strange. I mean, digging all
15 this pipeline, all this expense, when it probably
16 could be done another way. And by the time this
17 pipeline is in the ground, if it goes in, is it
18 going to be obsolete? Is there going to be some
19 other method of capturing this carbon at that point
20 that we don't even use the pipeline?

21 There's just new technology coming out
22 every day and I have to wonder about that. I just
23 don't think the tradeoff in the water is going to be
24 worth the benefits we're getting back because once
25 the water is gone, it's gone.

1 So, I don't know, I don't know why I
2 can't find the amount of water that this is going to
3 take. I don't know.

4 MR. SCOTT O'KONEK: So this is in there.
5 So in our application, for our permit application,
6 which is, you know, part of this docket that
7 currently is there, the water number is actually in
8 there. We've actually had it there the entire time.

9 MS. SHARON LEINEN: Every report I read
10 it's a different amount of water.

11 MR. SCOTT O'KONEK: That number never
12 changed in that document since we put it in there.
13 What you might be referring to is you're looking
14 further than the Fergus Falls plant and you're
15 probably looking at other plants that are
16 potentially on this project. Because every plant is
17 different sized and would take a different amount.
18 But the amount that we've actually stated in our
19 permit application has not changed since the day we
20 submitted it.

21 MR. ANDREW LEVI: That number is in the
22 EIS, too. The Applicant estimates that the entire
23 facility would require about eight gallons per
24 minute in the winter and about 41 gallons per minute
25 in the summer. And it would be on average about 13

1 million gallons a year.

2 MS. SHARON LEINEN: That's a lot of
3 water.

4 MR. ANDREW LEVI: Yeah, that's a lot of
5 water.

6 MS. SHARON LEINEN: Yeah, it's a lot.

7 So, I mean, this is our water we're
8 talking about. Are we going to have drinking water
9 or are we going to give it up to sequester this
10 carbon? The tradeoff doesn't seem like it's worth
11 it. And I worry about the water supply because
12 everybody is running out of water and once it's
13 gone, it's gone.

14 MR. ANDREW LEVI: And water is one of
15 those things, when we talked about the downstream
16 permits, it's the DNR that appropriates the water.
17 So the Applicant would, you know, if they are issued
18 a permit and do construct the project, they would
19 need a water appropriation from DNR for use of
20 groundwater.

21 MS. SHARON LEINEN: Well, I mean, it
22 doesn't matter if you get the permit or not, you're
23 still using the water.

24 MR. ANDREW LEVI: Yeah, I guess. Yeah.
25 Yeah, that's true. And DNR looks at it holistically

1 and so there is a check there. But, yes, you're
2 correct, you're still using water, it would still be
3 using water.

4 MS. SHARON LEINEN: And I wonder also why
5 you're still moving forward with this when North
6 Dakota and South Dakota have rejected the permits
7 and put a stop to it. So why are you continuing on
8 with this when you have no place to go if you get
9 the pipeline in the ground?

10 MR. SCOTT O'KONEK: So Dave or Alex? You
11 guys. We are in the other states and that statement
12 in general is not true. Every state is in a
13 different position or a different spot in the
14 permitting.

15 MS. SHARON LEINEN: Yes, but you don't
16 have the permits.

17 MR. SCOTT O'KONEK: Iowa, we're waiting
18 on a permit, which we're thinking would be the first
19 quarter here at some point. South Dakota, we're in
20 a different spot with county engagement and line
21 routing in there, preparing to submit in South
22 Dakota. And actually tomorrow we get to hear a
23 ruling on one of the first steps that's going to
24 reboot our hearing process in North Dakota on
25 preemption. So we expect some movement in North

1 Dakota here. And I would say, you know, in the near
2 future, I don't have a time frame on that, but the
3 permits are actually still moving forward in all the
4 states.

5 MS. SHARON LEINEN: But you don't have
6 them.

7 MR. SCOTT O'KONEK: No, no. Just like
8 here, we're working through the state process.
9 Every state has their own process and that's what
10 we're working through, is each individual process
11 like we have here tonight in Minnesota.

12 MS. SHARON LEINEN: I know Summit is
13 going to make a lot of money, tax incentives, the
14 federal program. I pay federal taxes, I don't like
15 my tax money going for something like this that I
16 don't approve of.

17 Thank you.

18 MR. ANDREW LEVI: Thank you.

19 If I could just quick comment on the
20 permitting in other states. Yes, you're right, they
21 don't have the other permits from a state's
22 perspective. It's a state process and an
23 application came to us and we're required to, you
24 know, to review it. I think that, you know, you're
25 right, if they are issued a permit and they end up

1 not getting a permit in North Dakota, I don't think
2 they'd use it because there's nothing to connect to.
3 But just as a permit already in North Dakota
4 wouldn't impact this Commission's decisions-making.
5 It kind of flips the other way, too, in that it's a
6 Minnesota-specific decision and what happens in
7 North Dakota happens in North Dakota.

8 Does anyone else who hasn't asked a
9 question want to ask one? I just want to give folks
10 that opportunity.

11 MR. DALE SCHNEIDER: I just got one
12 question.

13 MR. ANDREW LEVI: Sure. Come on up and
14 ask.

15 MR. DALE SCHNEIDER: Okay. Dale
16 Schneider back at the podium again.

17 And I got an email from a buddy that said
18 the article came from his insurance company and they
19 said with this pipeline product going across his
20 land that he was not going to get any insurance,
21 they would no longer insure him. So, you know, it's
22 something -- I don't have the land, but it's just
23 something that people want to check on, you know,
24 what's going on with that. I just want to bring
25 that up.

1 MR. ANDREW LEVI: Thank you.

2 Yeah, sure.

3 MR. JAMES VISSERS: My name is James,
4 last name Vissers, V-I-S-S-E-R-S.

5 And I have a question about some of the
6 safety equipment you were just talking about. Is it
7 monitored kind of around the clock? How often are
8 those safety checks occurring?

9 MR. SCOTT O'KONEK: So a great question.
10 I love talking about safety because that's what we
11 need to do here, because if we can't prove the
12 safety, we're not going to get a permit. So thank
13 you for the question.

14 So this pipeline is monitored 24/7/365 by
15 a trained team of people that are qualified to
16 operate and to monitor a normal operating system, to
17 operate a system that may see an abnormal operating
18 condition. We will even have a redundant -- right
19 now I have a control center in Ames, Iowa, but we'll
20 have a redundant one somewhere else simply for the
21 fact of what if Mother Nature throws a tornado at
22 Ames, right, so you have a backup, a fail-safe.

23 This pipeline is monitoring measurement
24 temperature pressure 365. Even if we have a model,
25 a hydraulic model running side by side saying this

1 is normal operating parameters, and as long as
2 they're both acting the same and not stepping out of
3 bounds, that's normal operation. If something steps
4 out, instantly the system will let somebody know.

5 What is the action taken, right, is it an
6 alert to an operator or an automatic shutdown. It
7 all depends on what you're coming at, but there is
8 many aspects of the monitoring of the pipeline
9 systems, stations, compressors, valve sites, all
10 that stuff is happening all the time realtime.

11 MR. JAMES VISSERS: And what are some of
12 the response times if a leak was detected, or a
13 rupture?

14 MR. SCOTT O'KONEK: You know, they did a
15 good job in the Draft EIS here talking about that
16 stuff. The reality is, I think what got put in
17 there was 20 minutes, if I'm not mistaken. The
18 reality of what we had in there was ten minutes.
19 But what that encounters is the time it takes for
20 somebody to make a phone call and react on it, but
21 the valve closure or shut down actually happens in
22 seconds.

23 MR. JAMES VISSERS: And I suppose to take
24 it a little further, if there are damages from like
25 a leak or rupture and you speak about

1 accountability, who would be covering the costs of
2 the cleanup?

3 MR. SCOTT O'KONEK: Yep. Summit Carbon
4 Solutions, 100 percent, the total costs are on them.

5 MR. JAMES VISSERS: Thank you.

6 MR. ANDREW LEVI: I see you coming from
7 the back.

8 MR. VANCE WIERTZEMA: My name is Vance,
9 V-A-N-C-E, Wiertzema, W-I-E-R-T-Z-E-M-A.

10 With permitting, you said you don't have
11 the permits with North Dakota and South Dakota quite
12 yet, correct?

13 MR. ANDREW LEVI: They don't, no.

14 MR. VANCE WIERTZEMA: Okay. What if you
15 don't get the permits, like the previous question
16 was asked, are you going to start on the Minnesota
17 side if you don't have nowhere to go, or you can't
18 start it?

19 MR. ANDREW LEVI: I don't suspect they
20 would.

21 MR. SCOTT O'KONEK: What's that?

22 MR. ANDREW LEVI: If you didn't get a
23 permit in North Dakota, but here.

24 MR. SCOTT O'KONEK: No, because we would
25 not have sequestration at that point either, so

1 there would be no building.

2 MR. VANCE WIERTZEMA: Do you have like an
3 estimated cost of what this will cost from Otter
4 Tail to the Breckenridge?

5 MR. SCOTT O'KONEK: Yeah, actually. In
6 the Draft EIS, I don't have the number off the top
7 of my head because it has costs for all three lines,
8 the northern route, the hybrid, and the southern
9 route. And the cost to build all of them are in
10 there. If you give me a second I'll pull it up
11 here. I don't want to mistake anything. I have the
12 numbers in my head, but I don't want to misspeak.

13 MR. VANCE WIERTZEMA: Okay. If you don't
14 get the permits, is there a possibility that you
15 guys could use eminent domain?

16 MR. SCOTT O'KONEK: No. No, eminent
17 domain in Minnesota for CO2 is not listed as one of
18 the things that fall underneath eminent domain.

19 MR. VANCE WIERTZEMA: How about North or
20 South Dakota?

21 MR. SCOTT O'KONEK: It is within statute
22 of the other states, but not in Minnesota.

23 MR. VANCE WIERTZEMA: So you can force
24 this and just put the pipeline through?

25 MR. SCOTT O'KONEK: You have to go

1 through a state process that, you know, nobody wants
2 to use that in the end. There's a process for
3 filing and moving forward and how things go, but,
4 you know, I really can't speak to that.

5 MR. ANDREW LEVI: Before your next
6 question, the capture facility would cost about 30
7 million bucks and the pipeline itself would cost
8 about \$37 million.

9 MR. VANCE WIERTZEMA: Wow. That's a lot
10 of taxpayer money.

11 MR. SCOTT O'KONEK: That money actually
12 to build this thing is actually self-funded.
13 There's a 45 cube tax credit on the back side, but
14 actually to build all of this infrastructure is
15 actually all done in private, private money.

16 MR. VANCE WIERTZEMA: Private money from
17 who?

18 MR. SCOTT O'KONEK: Well, many different
19 investors, ethanol investors, John Deere. If you go
20 to our website, and please do, the list is all
21 there. You know, there's a lot of them.

22 MR. VANCE WIERTZEMA: Is there funding
23 from the USDA?

24 MR. SCOTT O'KONEK: Not that I'm aware
25 of, no.

1 MR. VANCE WIERTZEMA: Do you have a study
2 showing that the CO2 is a real problem around here
3 from the ethanol plants, like by Fergus and
4 Hankinson, is there a study showing, oh, man, it's
5 so high it's off the charts?

6 MR. SCOTT O'KONEK: I can't say right
7 here, but if you go look when and what the EPA is
8 saying about greenhouse gases, I mean, there's a lot
9 of material out there on that.

10 MR. VANCE WIERTZEMA: Yeah. I personally
11 do not believe in that. Our good Lord is the one
12 that makes climate change.

13 Thank you.

14 MR. SCOTT O'KONEK: Thank you.

15 MR. ANDREW LEVI: Thank you.

16 Sarah. And then, Sarah, only if you're
17 comfortable, could you take your mask off?

18 MS. SARAH MOORADIAN: Absolutely. That
19 would be hard to hear, absolutely.

20 Hi. I'm Sarah Mooradian, S-A-R-A H,
21 M-O-O-R-A-D-I-A-N.

22 UNIDENTIFIED: We can't hear you.

23 MS. SARAH MOORADIAN: All right. How is
24 that? Any better? I can try to speak up, too.

25 So just kind of going back to the

1 question a couple before about safety, I wanted to
2 ask, just reading first from page 4-5 in the DEIS,
3 so it says about halfway down the page, therefore in
4 the time it would take for the valves to close in
5 case of an emergency (25 minutes according to the
6 Applicant).

7 So I'm just kind of wondering, you know,
8 you said the Department put that in incorrectly, and
9 it says here the Applicant put it in. So what's the
10 actual time for the valves to close? Why is there
11 discrepancy?

12 MR. SCOTT O'KONEK: I can take you to the
13 spot where you can find it. It's actually in there.
14 It's in Exhibit G -- Appendix G, if you go in there
15 it talks about the dispersion inputs and all that
16 kind of stuff. So it actually talks in there of
17 that time frame.

18 MS. SARAH MOORADIAN: So what is the 25
19 referring to here?

20 MR. SCOTT O'KONEK: I don't know. You'd
21 have to ask who created it.

22 MR. ANDREW LEVI: What page?

23 MS. PAT TERHAAR: 4-5, it's about halfway
24 down.

25 MR. ANDREW LEVI: I think that that 25

1 minutes is wrong and we need to fix it, I think is
2 what that is. I'm sure that's the only mistake
3 you'll find, though.

4 MS. SARAH MOORADIAN: I wanted to be
5 sure.

6 Thank you very much.

7 MR. ANDREW LEVI: I'm glad you found it.

8 MS. SARAH MOORADIAN: I just wanted to be
9 sure. Thank you very much.

10 MR. ANDREW LEVI: Does anyone else have
11 any questions?

12 MS. CHRISTY BRUSVEN: Andrew, to follow
13 up on Scott's comment about Appendix G -- I have to
14 get the table number, maybe I should have gone to
15 the page. So it's Appendix G, Table 7, on page 12
16 of 19. It notes ten minutes for valve closure, and
17 we'll have that in our DEIS comments as well.

18 MR. SCOTT O'KONEK: In reality the cycle
19 time is 17 seconds.

20 MR. ANDREW LEVI: Yeah. And the ten
21 minutes is what we used in the dispersion modeling.
22 So, yeah, Sarah, I think that 25 minutes is just a
23 mistake, an oversight.

24 Yes, sir. Come on up.

25 MR. DALE SCHNEIDER: I do have another

1 question. As it goes on -- Dale Schneider again.

2 So what are the corrosion factors of CO2?
3 How hard are they? Are they like crude oil, are
4 they like, you know, what is -- what's in it that
5 corrode that pipe?

6 MR. SCOTT O'KONEK: Do you want to hear
7 from me?

8 MR. DALE SCHNEIDER: Whoever has
9 authority.

10 MR. SCOTT O'KONEK: So CO2 in carbon
11 steel, the toxicity is nil, nothing.

12 MR. DALE SCHNEIDER: Okay. So -- but
13 there is some, how much is it? What is it?

14 MR. DAN PRASCHER: You're talking about
15 the corrosion?

16 MR. DALE SCHNEIDER: Yes, sir.

17 MR. DAN PRASCHER: Dan Prascher.

18 When CO2 combines with water it can
19 become carbonic acid. And that can corrode the
20 inside of the pipeline. The way that pipelines
21 typically, and please, any time you want to jump in
22 here, because I know you know this, too. Yeah.

23 The way that pipeline operators control
24 that sort of thing is they have to be extremely
25 diligent about taking all of the water out of the

1 system, that's the same if you're talking about
2 crude oil, some other sort of liquid that's being
3 transported, or CO2. You know, a corrosion tech
4 who's been doing that sort of thing, that's
5 corrosion mitigation 101, which they down out all
6 the water.

7 MR. DALE SCHNEIDER: Um-hmm. So if it
8 doesn't all get taken out of there, some residual is
9 left in there and it can come out with carbonic
10 acid?

11 MR. DAN PRASCHER: You can say that with
12 any pipeline, but sure.

13 MR. DALE SCHNEIDER: The reason I'm
14 asking, is I worked in the North Scope for several
15 years. And BP had to blow all of that out of there.
16 And I hauled some of those pipes away from the wash
17 station and there was nothing left of it.

18 And running a pig down there, the pig
19 wasn't going down that line because it didn't meet
20 the full diameter of that line.

21 So then it had a magnum oil spill up
22 there. So, I mean, it's only as good as the people
23 operating it, you know. And, you know, I'm not
24 saying that they won't be diligent, but you never
25 know what kind of corners you're going to cut.

1 I'm just saying this for everybody to
2 hear because I've been involved with it. You know,
3 the aftermath of it. And I'd hate to see that CO2
4 coming across this country. That's probably the
5 worst place north of Breckenridge, because the
6 northwest wind, you know, how far does it disperse
7 in the wind before it's gone, before it's dispersed
8 to a livable amount?

9 MR. DAN PRASCHER: It doesn't take far
10 for it to disperse. The thing that's interesting
11 about CO2, is the very thing that's propelling the
12 wind is also the thing that's dispersing, mixing it.
13 The more it gets mixed, the more the CO2
14 concentration drops. It becomes safe actually very
15 quickly.

16 And this is a very small line. Very,
17 very small, four inches. And the less product that
18 you have to potentially, you know, in the very
19 remote chance that you do have a rupture, you have
20 less quantity to start with and so it disperses much
21 faster. And kind of what we haven't really been
22 talking about today is all of the safety stuff that
23 every company has to put into this. And especially
24 Summit. You know, that's their bread and butter.
25 Because it may sound kind of hokey, but it's true

1 that the one thing that we can all agree on is we
2 all benefit if the product stays in the pipe. It
3 benefits them, it benefits all of us.

4 MR. DALE SCHNEIDER: Yeah. But how are
5 these things all monitored, you know,
6 electronically?

7 MR. SCOTT O'KONEK: So the DEIS
8 actually -- you know, the cool part is a lot of
9 these questions are in the DEIS. You know, they
10 actually have answered a lot of these, too. So, I
11 mean, really it is monitored with the best
12 connectivity, you know, is that fiber, is that
13 satellite, is that solar, is that cellular, is that
14 redundant, which one is the main, which is the
15 redundant backup? But it's constantly, all of the
16 temperature pressure, temperature pressure and
17 measurement instruments are constantly realtime
18 feeding back into our control center, so it has a
19 live stream feed of what's going on, and the
20 stations and valve sites and everything can be
21 operated and initiated from that control center,
22 too.

23 MR. DALE SCHNEIDER: And this is all --
24 this is all recorded when it comes back to your
25 station?

1 MR. SCOTT O'KONEK: Recorded?

2 MR. DALE SCHNEIDER: Yeah.

3 MR. SCOTT O'KONEK: Absolutely. So if
4 PHMSA wanted to come in, to Dan's point, too, like
5 the regulation on this is not like what we decide,
6 right? It's being decided what we regulate, what we
7 did. PHMSA gets to put their foot in the door
8 whenever they want, whatever way they want.

9 The way I can actually, like, put it into
10 the best common way for everybody to realize is
11 let's look at it, let's think of it on the OSHA
12 side. You know how OSHA likes to implant themselves
13 wherever they want, whenever they want, for whatever
14 they want, and you have to give everything you have
15 on-the-spot, basically, or have a, you know, that's
16 what PHMSA does, too. They might be at our pipe
17 mills watching our pipe being made, okay. They have
18 shown up to me filling a pipeline in Wyoming, right.

19 They came in, they're checking my
20 documents to make sure all those documents -- cause
21 actually a lot of those documents we had already
22 submitted to them, they wanted to make sure they're
23 the same ones that are there.

24 The other thing they'll do is they'll
25 pull a guy off and start interviewing him over here

1 and see what his answers are. And these are just
2 small examples. But they get to choose when, where,
3 and how they insert themselves all the time. The
4 only thing I can guarantee you, is they will. I
5 just don't know when or what they're going to ask
6 about.

7 MR. ANDREW LEVI: Scott, can you remind
8 everybody what PHMSA is?

9 MR. SCOTT O'KONEK: Pipeline Hazardous
10 Safety --

11 MR. DAN PRASCHER: Pipeline Hazardous
12 Material and Safety Administration.

13 MR. SCOTT O'KONEK: I know it, too, I
14 just can't say it.

15 Thank you for that question.

16 MR. BUTCH JIRAK: Butch Jirak, B-U-T-C-H,
17 J-I-R-A-K.

18 You stated that the water, 13 million a
19 year?

20 MR. ANDREW LEVI: On average, yes, I
21 believe that's right.

22 MR. BUTCH JIRAK: Just to get perspective
23 of what's going there, if you divide that by 365,
24 and 24, and divide that by 60, somebody else can do
25 the math, but I got 25 gallons a minute.

1 MR. ANDREW LEVI: It varies by time of
2 year. Nine gallons per minute in the winter and I'd
3 say 40 in the summer.

4 MR. BUTCH JIRAK: You said that was the
5 usage of the water. That was the usage going
6 through the line. You made a comment earlier, that
7 that was winter time, the water usage. Because 13
8 million, divided backwards, upside, comes out to 25
9 gallons a minute, hypothetically.

10 MR. ANDREW LEVI: Sure.

11 MR. BUTCH JIRAK: Sure. Anyway, that was
12 an educated --

13 MR. SCOTT O'KONEK: Yeah, it's eight to
14 ten gallons a minute.

15 MR. BUTCH JIRAK: Eight to ten gallons a
16 minute.

17 MR. SCOTT O'KONEK: Eight to ten on Table
18 42 in the EIS.

19 MR. BUTCH JIRAK: All right. So then if
20 you do the math, it isn't 13 million gallons?

21 MR. SCOTT O'KONEK: I would have to --
22 what we have here annually is that number right
23 there, correct? So it's 20.9 million gallons a
24 year, daily is 11,800. You know, and we are using,
25 and when we say this, too, we're using our largest

1 numbers we can, you know, we're trying to make sure
2 we have the highest volume possibility.

3 MR. BUTCH JIRAK: Right.

4 MR. SCOTT O'KONEK: You have to remember,
5 too, these numbers don't account for shutdowns,
6 changeovers.

7 MR. BUTCH JIRAK: Yeah, on a good day
8 it's running and it's a good enough answer.

9 Okay. Thank you.

10 MR. SCOTT O'KONEK: Thank you.

11 MR. ANDREW LEVI: Thanks. And we'll
12 double check that paragraph versus that table.

13 MS. SHARON LEINEN: Sharon Leinen again.

14 Okay. I take issue with the fact that no
15 one is very concerned about this. If there's a
16 rupture, you say the wind is going to disperse it.

17 There's a video online about a rupture, I
18 believe it was in Missouri a few years ago, and
19 animals and people within a three-mile radius of
20 that rupture were either killed or severely injured.
21 Nobody in the closest town knew how to deal with the
22 CO2 because nobody had any experience with it. They
23 weren't equipped, they didn't know how, they didn't
24 have the equipment to deal with it.

25 Are you willing to train people, say, in

1 Breckenridge, or supply them with the equipment they
2 would need if there's ever an emergency? Because
3 there's going to be a rupture or a leak somewhere, I
4 don't care how safe it is and how many protocols you
5 have in place, it's going to break at some point or
6 another.

7 MR. SCOTT O'KONEK: So I want to back up
8 a little bit. I think you're talking about
9 Satartia, Mississippi.

10 MS. SHARON LEINEN: Yes.

11 MR. SCOTT O'KONEK: You may be right, but
12 this DEIS covers it very well. And I do want to
13 tell you, no animals were injured in this, or
14 people, you know, no animals at all, and you just
15 said many were killed and that's not true. But
16 anyways --

17 MS. SHARON LEINEN: They had it all in
18 the video.

19 MR. SCOTT O'KONEK: But, I mean, I don't
20 know who made this video you're talking about, but
21 if you actually go to PHMSA, the regulating body,
22 and read the DEIS in Chapter 8, I believe it talks
23 about exactly what you're discussing.

24 But, anyways, back to your other
25 question. Absolutely, we are working with emergency

1 responders, county commissioners, to do training, to
2 keep training up. We actually have to do this
3 regularly, annually, at least, you know, where we
4 actually run scenarios. We'll run, say, if this
5 happens at this location, how do we respond to it?

6 If first responders reach out to us, you
7 know, we have a lot of turnover and it's hard to
8 find enough people to fill all these boots, you
9 know. If they reached out to us with a bunch of new
10 people, we'll be training again. We're out there,
11 that's what we do.

12 Actually, our public outreach never
13 stops. It has to continue on forever and ever. But
14 I do hope and ask you to actually read the Satartia,
15 Mississippi report.

16 MS. SHARON LEINEN: I have a friend who
17 is an EMT here in town and if I ask him if there's
18 been any training for this, what is he going to tell
19 me?

20 MR. SCOTT O'KONEK: So at this point,
21 before this would ever go in, emergency managers
22 have been talked to, reached out to, to say, hey,
23 this is what we got going, this is what we're doing,
24 there will be a follow-up later when we know where
25 we're at, what you need and where you need it. And

1 how we should do training, they're going to tell us
2 a lot of it, this is what we need to cover, how,
3 what, and where they want to do it. And we in
4 operations, that will be done, even if we had done
5 it today, and we don't even know today if we're
6 permitting the northern route, the hybrid, or the
7 southern route.

8 MS. SHARON LEINEN: So who is paying for
9 the equipment?

10 MR. SCOTT O'KONEK: We do.

11 MS. SHARON LEINEN: Is that in writing?

12 MR. SCOTT O'KONEK: No, it's actually
13 public. If you go look, it's been sworn in
14 testimony in all of the states that we have
15 permitting going on. So it's sworn testimony at
16 this time.

17 MS. SHARON LEINEN: So if I go look, I'll
18 find it?

19 MR. SCOTT O'KONEK: If you have a lot of
20 time to listen to all the videos, you can find it.
21 Except South Dakota, we didn't get that far.

22 MS. SHARON LEINEN: Okay. I'm going to
23 check.

24 MR. ANDREW LEVI: Ma'am, the state, we
25 recommended a -- a consideration, anyway, of a

1 special permit condition requiring the Applicant to
2 provide a copy of that accidental release plan
3 developed in coordination with local emergency
4 responders to the Commission to review, should they
5 get a permit. And, you know, listed a few things
6 that we thought could be discussed in there,
7 including specific equipment, training, or
8 reimbursement that could be provided to emergency
9 managers.

10 So the state is very -- we're thinking
11 about the same thing you're thinking about and we're
12 recommending -- well, we believe that a plan that
13 discusses that information be, you know, would be a
14 good idea to provide that as a condition so that is
15 in writing, like what you're talking about.

16 MR. DAVE DAUM: If I could just add to
17 that?

18 MR. ANDREW LEVI: Can you come up? And
19 state your name, and spell it, too.

20 MR. DAVE DAUM: Yep. Dave Daum, D-A-V-E,
21 D-A-U, M as in Mary.

22 I would also state that PHMSA does
23 require us to provide training to emergency
24 responders annually, not to exceed 15 months, as
25 well as develop an emergency response plan in every

1 area that we operate. So those are requirements
2 that we have to follow.

3 MR. ANDREW LEVI: Does anyone else have
4 any questions?

5 It's 7:10. Do folks want to take a break
6 for five-ten minutes, stretch your legs, look at the
7 maps? And we can reconvene at 7:20, if you want to
8 stick around, or if not, thanks for coming. But
9 maybe that'll get some more questions rolling.

10 I see one person nodding their head so
11 we're going to go with that. So, yeah, let's just
12 take a break for ten minutes and come back at 7:20
13 and we can see if there's any more questions.

14 The Applicant provided some refreshments
15 there in the back, and there's also those maps, the
16 detailed maps in the back.

17 MR. DALE SCHNEIDER: Yeah. I'll take a
18 look.

19 (Break taken from 7:08 to 7:23.)

20 MR. ANDREW LEVI: Okay. Does anyone --
21 does anyone have any additional comment or question?

22 Come on up, sir.

23 MR. DALE ANDERSON: This is Dale Anderson
24 again.

25 By looking at the map out there, exactly

1 how far south does it actually come to, the
2 pipeline? Is there a township it goes through or
3 anything like that? Or -- well, is it western? It
4 doesn't really say.

5 MR. ANDREW LEVI: I believe that's listed
6 in here.

7 Scott, do you know off the top of your
8 head?

9 MR. SCOTT O'KONEK: I don't know off the
10 top of my head. Sorry about that. I don't know
11 them off the top of my head, but they're listed in
12 the permit application and the Draft EIS.

13 MR. DALE ANDERSON: So the general
14 public -- so is the general public going to see
15 where they go through or are we going to be Horsey
16 Puckett and not know where they're going?

17 MR. SCOTT O'KONEK: No, that map is
18 publicly available.

19 MR. DALE ANDERSON: Okay. And I got a
20 question as far as static electricity, is that going
21 to effect it?

22 MR. DAN PRASCHER: The pipeline?

23 MR. DALE ANDERSON: Yes. No doubt, it
24 goes into the ground.

25 MR. SCOTT O'KONEK: I don't know any

1 effect that static electricity would have on this.
2 You know, I'm just assuming that you're probably
3 referring to like oil and gas and stuff like that as
4 an igniter and things of that nature, maybe?

5 MR. DALE ANDERSON: Well, anything that
6 is metal is going to travel to the weakest spot and
7 that's where it's going to go.

8 MR. SCOTT O'KONEK: So in listening to,
9 like, we have a system -- cathodic protection
10 system. Alex, do you want to give the whole generic
11 overlay of how it works?

12 But basically we put a DC charge on the
13 pipe all the time, it's a constant charge on the
14 pipeline and then it is actually being delivered to
15 an annual bed instead of actually corroding or
16 eating away on the pipeline. So this always has a
17 charge on it.

18 So with the static electricity side, if
19 you're looking at it as a charge, the CO2 is not
20 combustible or ignitable. So if you're looking at
21 the soil and gas side, it's not comparative.

22 MR. DALE ANDERSON: So how far are the
23 check valves between each one that you can monitor?
24 Is it a mile, two miles or so?

25 MR. SCOTT O'KONEK: No, on this it's all

1 less than 12 miles throughout -- 13 miles, yeah, all
2 less than 13 miles from Fergus Falls to the border.

3 MR. DALE ANDERSON: But those valves are
4 close, right, automatically, unless there's an
5 interruption in the line, then, right?

6 MR. SCOTT O'KONEK: One more time.

7 MR. DALE ANDERSON: Interruption on the
8 line, if those valves are close, is that going to
9 affect the back pressure on it?

10 MR. SCOTT O'KONEK: No. Actually, it is
11 all designed to handle that. And this design and
12 this capacity, even if you would slam these shut,
13 there wouldn't be any hammer issue like probably
14 what you're used to in your oil and gas background.
15 But we could slam these valves shut and it wouldn't
16 even over pressurize the pipeline.

17 I do have those townships, if you want.
18 It's Foxholm, Sunnyside, and Breckenridge. It's in
19 the project description on the third paragraph --
20 section. There we go.

21 MR. DALE ANDERSON: Okay. Thank you.

22 MR. SCOTT O'KONEK: Thank you. Thank you
23 for coming out tonight.

24 MR. ANDREW LEVI: Anyone else have a
25 question or comment? I'm not seeing any hands.

1 Thank you very much for coming out
2 tonight.

3 I want to remind you of February 23rd,
4 the comment period closes on February 23rd. Please
5 do comment by that date. If you comment once and
6 decide you want to comment again, please do comment
7 as many times as you'd like.

8 If you have any questions along the way,
9 please feel free to get in contact with me and I can
10 help answer those questions or direct you to who
11 can.

12 So, again, thank you very much for being
13 here and get home safe.

14 (Matter concluded at 7:30 p.m.)

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DEIS MEETING - 22-422
FERGUS FALLS - FEBRUARY 7, 2024 - 1:00 P.M.
BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION
AND DEPARTMENT OF COMMERCE

In the Matter of the Application of Summit Carbon
Solutions, LLC, for a Routing Permit for the Otter Tail
to Wilkin Carbon Dioxide Pipeline Project in Otter Tail
and Wilkin Counties, Minnesota

MPUC DOCKET NO. IP-7093/PPL-22-422

Fergus Falls, Minnesota
1:00 P.M.

February 7, 2024

COURT REPORTER: Janet Shaddix Elling, RPR

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1 MR. ANDREW LEVI: Good afternoon,
2 everyone. Thanks for joining us.

3 My name is Andrew, I work with the
4 Minnesota Department of Commerce.

5 We are here in Fergus Falls at 1:00 in
6 the afternoon to discuss the Otter Tail to Wilkin
7 Carbon Dioxide Project Draft Environmental Impact
8 Statement.

9 There's a few things that I'd like to
10 touch on real quickly before we open up the meeting
11 to your questions and comments.

12 The first is introductions. There's a
13 lot of folks here today.

14 With me, Jessica, she was at the front
15 table, she also works with us at the Minnesota
16 Department of Commerce Energy Environmental Review
17 and Analysis Unit. Our group is the group that
18 drafted the Environmental Impact Statement.

19 Craig from the Public Utilities
20 Commission is here.

21 HDR, the consultant, they helped put
22 together the EIS. Joe and Pat and Will are here to
23 help answer any questions.

24 And Dan, up here with me, is from Allied
25 Solutions. Dan did the rupture study, the

1 dispersion modeling, that's in Appendix G of the
2 Draft EIS.

3 Summit Carbon Solutions is here, Scott,
4 Alex, and Jason. As well as Christy and Britta.

5 And the most important person here today
6 is Janet. She's our court reporter. She is getting
7 everything into the record and ensuring that your
8 comments and questions get in front of the Public
9 Utilities Commission.

10 So the Applicant proposes to construct
11 and operate approximately a 28.1 mile four-inch
12 diameter carbon steel pipeline and associated
13 facilities, including line valves, a capture
14 facility, and access roads, a cathodic protection
15 system, that would transport captured CO2 from Green
16 Plains Ethanol Plant to a permanent sequestration
17 facility in North Dakota.

18 So this project is regulated by the state
19 of Minnesota and so it ends, from a permitting
20 standpoint, the project ends at the border, but it
21 would pick up with a pipeline in North Dakota and
22 travel to a sequestration area west of Bismarck.

23 A pipeline routing permit is required
24 from the Public Utilities Commission because this
25 project would be signed to operate at pressure

1 greater than 275 pounds per square inch and carry
2 gas. Various other approvals might be required for
3 the project. If the Commission issues a route
4 permit, this might be a road crossing permit, for
5 example, from MnDOT.

6 Also, the company does not have the power
7 of eminent domain, so while it's not a permit, it
8 is -- it would be required that they have approval
9 for that, the easement that they need to construct
10 the pipeline.

11 Just a little bit about the process, the
12 state process so far.

13 The Applicant submitted a route permit
14 application and a Scoping Environmental Assessment
15 Worksheet was prepared. That Environmental
16 Assessment Worksheet is on the back table. It was
17 last night, it is not there now, but it will be by
18 the time we're done talking.

19 Scoping meetings were held here in May.
20 We met in Breckenridge and here in this room. And
21 also at a virtual meeting. And then the scoping
22 decision came out, and that scoping decision
23 outlined the table of contents that were to be
24 discussed in the study, in the Environmental Impact
25 Statement, and the Draft EIS was issued. So

1 everything on this page, on this slide, rather, has
2 been completed so far.

3 And this is the process that's left.

4 Today we're at the public meetings with a
5 comment period associated with the Draft EIS. The
6 Draft EIS will be issued as final, so what we're
7 after for these meetings and this comment period --
8 this comment period is what can be improved upon in
9 the draft, is there anything missing, so that is the
10 purpose of these meetings here today.

11 Once that's done, we will finalize the
12 EIS, and then there will be a comment period on the
13 accuracy of the EIS.

14 After that, we'll be back out here again,
15 I'm sure in Breckenridge on a Tuesday night and in
16 Fergus, here in the same place, in the afternoon and
17 evening for the project and we'll have a public
18 hearing. So we'll all be here, except the hearing
19 will be administered by an Administrative Law Judge.
20 And the Administrative Law Judge will issue a report
21 and recommendation to the Commission on whether or
22 not to issue a route permit for the project. And if
23 so, where should it go.

24 The Draft EIS studies three route
25 alternatives, so the report and recommendation would

1 recommend the route to choose, should the
2 recommendation be to issue a permit for the project.

3 After that report is issued, the
4 Commission then will make a final decision on
5 whether or not to issue a route permit and that
6 should happen sometime in August, I think.

7 So today we're here to talk about the
8 Draft EIS. We can talk a little bit about what it
9 is. There's three copies on the back table that you
10 can review and take a look at. The purpose of --
11 so, oh, there's sirens in the background.

12 MS. CHRISTY BRUSVEN: It's 1:00.

13 MR. ANDREW LEVI: This Draft DEIS is for
14 informed decision-making. We want to provide as
15 much information as we can to the Public Utilities
16 Commission so they can make an informed decision.
17 It is hopefully a common set of facts that everyone
18 can use to wrap their head around the project and
19 provide comments to the Commission. The EIS does
20 not advocate, it informs, and that is the purpose of
21 the EIS.

22 The EIS took some time to prepare,
23 several months. It is based on the Applicant's
24 route permit application, as well as the scoping
25 EAW. And it is also based on public comments that

1 we received during the scoping meetings when we were
2 here in May.

3 It also is based on additional
4 information provided by the Applicant. And all that
5 additional information that they provided is in the
6 appendix in the back of the EIS.

7 We had information, we had feedback from
8 tribes and agencies on the preliminary Draft EIS.
9 We used GIS to prepare a lot of the maps and figures
10 and acreage calculations, and we also used the
11 services of HDR as a consultant, and Allied
12 Solutions as a sub-consultant for the preparation of
13 the EIS.

14 The document covers a lot of information.
15 It's about 350 pages long, plus the appendices.
16 It's always hard for us in length, you know, if it's
17 too short then it's too short and not enough
18 information, and when it's too long, there's too
19 much information and we can't work our way through
20 that. I understand that.

21 I encourage you, there's an executive
22 summary that's available for a handout today, it's
23 on the back table. This is pretty short and you can
24 read through this and if there's any topic that
25 catches your attention, you can certainly find that

1 in the table of contents and read it in more detail
2 for that.

3 But it discusses the proposed project,
4 the regulatory setting, the environmental setting.
5 It talks about three routes around the maps on the
6 side of the room. It discusses alternative
7 technologies. So are there farming practices or
8 actions that could be taken at the ethanol plant
9 that could reduce the carbon intensity score or the
10 ethanol produced. And, yes, there are. It also
11 turns out that in combination, those two options,
12 it's better than individually, and it turns out that
13 if you did carbon capture on top of those two
14 things, that's the best scenario in terms of
15 reducing the carbon intensity score at the ethanol
16 plant.

17 It also talks about potential impacts and
18 mitigation measures both for normal operations and
19 then also for an accidental release. And Dan is
20 going to just summarize the results of that after
21 this.

22 Let's do that right now.

23 MR. DAN PRASCHER: Hi. I'm sorry. It's
24 Dan Prascher, D-A-N, P-R-A-S-C-H-E-R.

25 So Andrew asked me to kind of summarize

1 what was in Appendix G, in that gigantic thing that
2 the ethanol plant is based through that. But, you
3 know, if you have trouble sleeping tonight and you
4 need something, it's free, so it'll put you right to
5 sleep.

6 But I did help HDR write this part of it
7 and Andrew asked me to summarize what is in G. And
8 what G talks about is all of the types of
9 regulations that Summit has to abide by, all gas
10 operations have to abide by.

11 It has eight subchapters and it starts at
12 construction -- starts at actually manufacturing the
13 pipe itself, as regulations for that, for design,
14 for construction, and how you test it before it goes
15 into operation.

16 All of the people involved in that have
17 to be qualified and requalified every one to five
18 years, depending on how complex their jobs are.
19 Anybody who touches or can effect the integrity of
20 the pipeline have to be qualified. They also are
21 part of a antidrug and alcohol misuse program. So
22 they not only have to qualify, they have to be not
23 under the influence of anything if they do. They
24 are more stringent on any drug test you can take.

25 And in addition to that, there's gigantic

1 requirements for operating, and a subset. There's
2 many parts to that controlling the pipeline, talking
3 to the public, educating them, providing damage
4 control that might occur through the pipeline. And
5 then something called an integrity management plan,
6 which is extremely rigorous.

7 And the Applicant, Summit, understands
8 that if they are going to get in the business of
9 this, that an organization called PHMSA, which is a
10 subdepartment of the Department of Transportation,
11 is going to regulate it and they have the power to
12 shut them down. They have power to fine them
13 millions of dollars. They have power to make them
14 do whatever they feel is correct and to make sure
15 they're being safe about how they operate and they
16 know that. And so they're going to do everything
17 they can to avoid all of that.

18 I'm sure if you were in that position,
19 you would, too. I was an operator at one time and
20 we wanted to make our audits with PHMSA go very
21 smoothly.

22 In addition to that, the state, as I
23 understand it, is also going to have something to do
24 above that before they give them the right to
25 construct. And Summit understands that.

1 So that's not a brief summary, but
2 there's quite a few sections to it. And then in
3 compliance with that, Summit has to do an air
4 dispersion, they are required to understand that and
5 be able to present how a rupture or a leak could
6 affect people in the environment around it. So they
7 did that, they submitted it to the state. I checked
8 what they did, I ran my own independent study,
9 double checked it, and they're doing everything that
10 they should be doing and thinking about things that
11 I would think about.

12 And I've been in oil and gas, I've done
13 pipeline integrity for almost 20 years now, plus,
14 and so it's not a trust thing, it's just to verify,
15 right. And so I looked into that. The results of
16 that was yes, that the things that they chose and
17 how they did the analysis seemed appropriate.

18 We did go farther just to make sure. We
19 did what's called a computational fluid magnanimous
20 analysis. It used a multiphysics engine so that we
21 can model in realtime how a release would roll
22 across terrain. And we all have windbreaks in this
23 area, that's always the marks, right, is that is it
24 stopping the wind and the wind is doing the
25 dispersion, so we wanted to model that, too, and we

1 did. And in short it shows that if you're in a
2 south of wind you're going to stop these kinds of
3 dispersions really well. Really, really well.

4 And then also, just to be thorough, we
5 took a look at the sensitivity analysis and said
6 okay, well, what kinds of things are going impact a
7 release, a potential release. And, you know, we
8 discovered that the data shows that wind speed and
9 pressure, pipeline pressure are the two biggest
10 things.

11 And something to note about that. The
12 higher the wind, the less the dispersion. It's a
13 little bit not -- it's not intuitive, because if
14 everything that pushes it, if it pushes it too fast,
15 it actually causes a mix with the surrounding
16 atmosphere, when it causes the mix, it lowers the
17 concentration of the carbon dioxide in the air and
18 disperses faster. So, low, slow speeds, very calm,
19 very nondeterminant flow, that's what produces the
20 worst case scenario. And in Appendix G, if you feel
21 inclined to look at that, it shows all of this.

22 And assumptions I've made, we try to take
23 in all the reasonable things into account. The last
24 thing that anybody wants is to see something like
25 that and say, hey, this thing went worse than that.

1 So we want to make sure everyone understands this.

2 And that is a small pipeline. But anyway.

3 Sorry if that wasn't very good.

4 MR. ANDREW LEVI: I'm impressed to know
5 that, so don't worry about it.

6 So the EIS is available. There's printed
7 copies in the back if you want to take a look at
8 those during the meeting today. There's electronic
9 copies, they're available on our website. Which is
10 actually on the handout, that's on the comment form,
11 you can get it there. It's also available on the
12 eDockets application. I don't recommend getting it
13 there, but you can get it there, if you like.

14 There's also flash drives available to
15 take home. They're on the desk, you're welcome to
16 take one. They look like a credit card, but it's a
17 USB flash drive and you can bring that home and the
18 entire EIS is on that.

19 And they're also available in print at
20 the Breckenridge and Fergus Falls libraries and, as
21 I said, the summary is also available, the executive
22 summary is also available in print at the front
23 table.

24 That's all that we really have in the way
25 of a presentation.

1 Now I'll move to your questions and
2 comments at this point. And talk about quickly what
3 comments are most useful to us right now, as we're
4 preparing, as we move to preparing the Draft EIS
5 into a Final EIS.

6 We're looking for your points of view on
7 what needs to be clarified. Is there something in
8 there that is confusing that could be simpler and
9 could be easier to understand? Is there anything
10 that's missing? There's a scoping decision issued
11 for the project, is there anything that we said we
12 were going to talk about that we missed? You know,
13 let us know. And is there anything that needs to be
14 added so that the Final EIS is just more complete
15 and more accurate? What information would you like
16 to see?

17 So we'll use the comments on the Draft
18 EIS, we'll respond to substantive comments, and
19 we'll also make changes based on those substantive
20 comments as appropriate. So, you know, substantive
21 comment is more along the lines of, you know, here's
22 this paragraph, or section, or whatever, it might be
23 in the Draft EIS, this is what I'm seeing is a
24 concern and these are the things and this is why.
25 And so that's kind of what we're looking for. We're

1 looking if you can tell us what's wrong and provide
2 some information as to why and if you convince us
3 we'll be more than happy to change it.

4 Comments, you know, along the lines of,
5 you know, well, you know, we don't agree with this,
6 but if you don't tell us why, then we don't really
7 have anything to go on. So we kind of need that
8 whole story of comments so we can react and decide
9 if we need to change the EIS.

10 So, like I said, we'll take a look at
11 those comments and submit a final as appropriate of
12 the provisions, and that should happen I think in
13 April when that comes out.

14 So, again, you know, commenting tonight
15 is to focus on those things that we talked about.
16 And whatever you would like to comment on today,
17 verbal comments are only accepted here at the public
18 meetings, we have Janet available to record those.

19 You can also submit comments in other
20 ways, if it's something you'd like to do. You
21 certainly don't have to. You can provide comments,
22 written comments on this comment form. That's why
23 it's there. You can fold it and throw a stamp on
24 there and mail it in. You can also use the address
25 for your own envelope.

1 We have an online commenting tool on our
2 website, and you click on it and it brings up a
3 fillable form and you can attach a PDF and
4 attachments there and provide your comments that
5 way. You can also send me an email directly.

6 The important thing is that these
7 comments are received before the comment period
8 closes, which is February 23rd.

9 So commenting today, we need to have one
10 speaker at a time. Janet can't keep track of two
11 people talking at once and she will certainly stop
12 us if that happens.

13 So just a reminder that, yes, we need one
14 speaker at a time. I'll call on you -- there's one
15 speaker who signed up and then we'll go to a show of
16 hands. But when it is your turn to speak, if you
17 can come up to the microphone and state and spell
18 your name for Janet.

19 And then if you could direct your
20 comments to the questions pertaining to the content
21 of the Draft EIS, or comment on anything you like
22 today.

23 I just want to remind you that there will
24 be an Administrative Law Judge here in a few months,
25 in May, and it will be the Administrative Law Judge

1 that makes the recommendation and drafts a report
2 and recommendation on whether or not to issue a
3 route permit. Questions, like, comments and
4 questions concerning that today, of course, are
5 fine, but our response to that will be comment
6 noted. It is the Administrative Law Judge in May
7 that will actually do something with those comments.

8 So, again, I believe that's all I have.

9 If Nathan would like to come up. Nathan
10 Runke.

11 MR. NATHAN RUNKE: My name is Nathan
12 Runke, N-A-T-H-A-N, R-U-N-K-E.

13 I'm with the International Union of
14 Operating Engineers Local 49. Local 49 is a
15 construction labor union in Minnesota and the
16 Dakotas representing about 15,000 members, or 15,000
17 operators, mechanics, and stationary engineers. Our
18 members have extensive experience in constructing
19 and maintaining pipeline in Minnesota. Use of
20 pipelines has been consistently shown to be the
21 safest, most cost-effective means of transporting
22 liquids, gases, and slurries.

23 As Minnesota seeks to reduce its
24 greenhouse gas emissions, carbon capture and storage
25 technology has increasingly become more important

1 and in ongoing efforts. Carbon dioxide pipelines
2 are needed components, and it is critical that we
3 are constructing pipelines for people in Minnesota
4 who wish to reduce carbon emissions.

5 Our members and their families live,
6 work, and recreate across Minnesota and the Dakotas.
7 Like all Minnesotans, we value the safety of workers
8 and members of the public, as well as protection of
9 natural resources. As such, we advocate that
10 pipelines in Minnesota should meet high safety and
11 environmental protection standards, and should be
12 built by well-trained local construction
13 professionals and experienced contractors.

14 Pipelines can deliver economic benefits
15 to workers, but only if the project is committed to
16 using local labor. Our union has had extensive
17 conversations with Summit over the past few years
18 and we believe they are committed to ensuring that
19 this pipeline is built safely and it is an advantage
20 to Minnesota local workers and communities.

21 It is our belief that the Draft EIS is
22 complete and accurate and adequately captures the
23 benefits and impacts of the project.

24 Thanks for your time.

25 MR. ANDREW LEVI: Thank you.

1 Nathan, you are the only one who signed
2 up to speak.

3 Does anyone else want to come up?

4 Yeah.

5 MS. PATRICIA MABEY: Hi. I'm Patricia
6 Mabey, P-A-T-R-I-C-I-A, M-A-B-E-Y. I have a frog in
7 my throat.

8 I'm a 563 laborer. I've been doing this
9 for 23 and a half years. I've done building and
10 trades and building pipelines. And by keeping it
11 local, I'm from Fergus Falls, so I'm local, I've got
12 family that still lives here and works here and we
13 farm here, too. And by putting this in, it's going
14 to keep everything up to date, it's going to keep it
15 in the ground. We want to stay competitive. We
16 need to help farmers and reduce the carbon
17 emissions, and that's a good way to do this for this
18 project.

19 The report by Northstar Policy Action
20 states that local workers contribute five times more
21 to the community than the outside workers. I do
22 believe in employing local versus out of state. In
23 addition to helping local economies, this project
24 will provide opportunities for local community
25 members to get into a career.

1 Before I came into the trades, I worked
2 in a factory for seven-fifty an hour. Now I make
3 way more than that, and I was able to provide a good
4 economy for my family. And if the local members
5 here could do the same for their families, it would
6 be a win all around.

7 Sorry, I'm a little nervous.

8 It's not just about labor. We build
9 pipelines using modern equipment and engineering
10 technology so the product stays in the pipe.

11 I've worked in Minnesota, I've worked in
12 North Dakota. And it's got to stay local. And the
13 union trades is what's going to build it safe.

14 Thank you for your time.

15 MR. ANDREW LEVI: Thank you.

16 Who wants to come up next?

17 Yes, sir.

18 MR. CRAIG WINTERS: Craig Winters,
19 C-R-A-I-G, W-I-N-T-E-R-S.

20 This pipeline has, since we're only
21 dealing with Minnesota, as I understand, unless
22 things have changed. North Dakota and South Dakota
23 has denied permits to build this pipeline. I hope
24 this pipeline is not going to be a pipeline to
25 nowhere that is just going to be built just because

1 it can be built, but nothing will be done in that to
2 serve its purpose.

3 MR. ANDREW LEVI: Do you want to address
4 that question, Scott?

5 MR. SCOTT O'KONEK: This Minnesota
6 portion of the project would not be constructed
7 without North Dakota and South Dakota permits. So,
8 you know, it would be, you know, we need everything
9 to complete the project. There would be no
10 construction if there is no permits there.

11 MR. ANDREW LEVI: Anyone else have a
12 comment or question?

13 MR. KEVIN PRANIS: Kevin Pranis,
14 P-R-A-N-I-S. I've met her before once or twice.

15 So I'll start by thanking the EERA staff,
16 you know, and the Commission, for the excellent
17 Draft Environmental Impact Statement. They have
18 comprehensively looked at all of the different
19 effects.

20 I think people have a lot of questions
21 about this pipeline. This is not new in the United
22 States, but they are not certainly used to the
23 extent of the gas pipeline that we are more familiar
24 with.

25 And I think, you know, we heard maybe

1 them talk about the skills that our folks from the
2 operating chairs, I could say, I work with laborers
3 that build pipelines of all types, and the
4 construction techniques are very consistent. I'm
5 sure we have to keep the product under pressure, and
6 fluid dynamics, and less so with particular
7 substances and the like.

8 The carbon dioxide is toxic, but we have
9 too much in one place and that's a problem. You
10 know, we take it very seriously, the need to
11 construct a pipeline properly, engineer it properly,
12 site it properly, to minimize those risks and to
13 make sure we understand how to deal with it with
14 less impact if there were a release.

15 Summit's willingness to prioritize local
16 workers and labor ensure a high quality project and
17 also maximizing the benefits and policy action and
18 review and found incremental of, like, \$73 million
19 worth of benefits for using local workers in
20 Minnesota, as well as the southern Minnesota
21 segments and then North Dakota it's more like \$93
22 million in incremental benefits just for using local
23 workers, right, and relying on state workers.

24 And so I appreciate that commitment and
25 can say I agree, I think the EIS does a good job of

1 talking about these local and not local workers. I
2 would say that typically 50 percent is local workers
3 as a minimum for these projects, and the contractors
4 bring fewer people from elsewhere, but our contract
5 requires at least 50 percent be available to the
6 local work force.

7 So thanks.

8 MR. ANDREW LEVI: Thank you.

9 Nobody is jumping up.

10 Does anybody else have anything right
11 now?

12 Let's take a ten-minute break and look at
13 the maps and just chat amongst ourselves and see if
14 that spurs any additional comments or questions. We
15 can come back at 1:45 and reconvene and hopefully
16 we'll have some more questions and comments then.

17 So let's meet back here in about ten
18 minutes.

19 (Break taken from 1:35 to 1:51.)

20 MR. ANDREW LEVI: All right. Let's go
21 back on the record.

22 Does anyone have any questions or
23 comments?

24 Yes, sir, come on up.

25 MR. CRAIG WINTERS: Craig Winters.

1 I would like to comment on the modeling
2 that was done. Now, you tested it with wind rates
3 and so forth. Has the modeling been tested dealing
4 with, if a rupture occurs during a rain storm, and
5 all the CO2 would not get dispersed, it probably
6 actually would get dissolved in rain water and then
7 get into the groundwater and stuff. Has that been
8 addressed as far as the modeling?

9 MR. DAN PRASCHER: It hasn't.

10 MR. CRAIG WINTERS: Okay. And then
11 another question is kind of maybe not directly to
12 the EIS, but if it goes out to where it's being
13 sequestered, is the sequestering being done where
14 there is going to be no damage in North Dakota
15 dealing with the aquifers that are located there?

16 MR. ALEX LANGE: Alex Lange, L-A-N-G-E.

17 Yeah, so sequestration falls under the
18 North Dakota Industrial Commission for the
19 permitting side of things. But some of the things
20 we do look at is formations that we're injecting
21 into, and we pull fluid samples and validate that.
22 Although it can't be used for drinking water. So
23 that's a process we go through as part of the NDIC
24 permitting process, validating that it would be
25 drinking water.

1 MR. CRAIG WINTERS: So can you verify
2 that that won't be affecting any of the aquifers of
3 the residents of North Dakota?

4 MR. ALEX LANGE: That's correct. There's
5 multiple layers of rock formations, so there are a
6 lot of layers higher up elevation-wise than where
7 we're at for our injection rates.

8 MR. CRAIG WINTERS: Okay. Thank you.

9 MR. ANDREW LEVI: Thank you.

10 Can you hear me? Is this better? Can
11 you hear me better in the back? Okay, good.

12 Does anyone else have a question or
13 comment?

14 All right. Well, it doesn't appear so.

15 I just want to remind everyone that the
16 comment period closes February 23rd. If you have
17 any questions in the meantime, feel free to get in
18 touch with me.

19 My contact information is on the handout
20 here, it's also on the EIS.

21 We're meeting tonight at 6:00, feel free
22 to come back, and there's also a virtual meeting
23 tomorrow night so feel free to join, if you'd like.

24 And with that, thank you very much for
25 your time and thanks for being here today.

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(Matter concluded at 1:54 p.m.)

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DEIS MEETING - 22-422
FERGUS FALLS - FEBRUARY 7, 2024 - 6:00 P.M.
BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION
AND DEPARTMENT OF COMMERCE

In the Matter of the Application of Summit Carbon
Solutions, LLC, for a Routing Permit for the Otter Tail
to Wilkin Carbon Dioxide Pipeline Project in Otter Tail
and Wilkin Counties, Minnesota

MPUC DOCKET NO. IP-7093/PPL-22-422

Fergus Falls, Minnesota
6:00 P.M.

February 7, 2024

COURT REPORTER: Janet Shaddix Elling, RPR

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1 MR. ANDREW LEVI: Good evening, everyone.
2 Thanks for joining us tonight.

3 My name is Andrew, I work with the
4 Minnesota Department of Commerce.

5 And we're here in Fergus Falls at 6:00 to
6 discuss the Otter Tail to Wilkin Carbon Dioxide
7 Pipeline Project proposed by Summit Carbon
8 Solutions.

9 We'll start tonight with some brief
10 introductions. We'll talk about the proposed
11 project. We'll talk about the state permitting
12 process, where we've been and where we're going, and
13 discuss the Environmental Impact Statement and then
14 get to your comments and questions.

15 So, again, my name is Andrew, I work with
16 the Energy Environmental Review and Analysis Unit
17 within the Department of Commerce. We prepared the
18 Environmental Impact Statement for the project.

19 With me today is Jessica, she was at the
20 table.

21 Also with us today is HDR, they are a
22 consultant. Joe, Pat, and Will here are in the
23 front to help answer any questions you might have.

24 Also with me is Dan from Allied
25 Solutions. Dan helped us with dispersion modeling

1 and what might happen if there's an accidental
2 release.

3 Summit Carbon Solutions is here, they are
4 the Applicants here. Scott, Alex, and Jason are
5 here to answer any questions, along with Christy.

6 And, most importantly, Janet is here, she
7 is our court reporter and she's getting everything
8 down for the record so the comments do get to the
9 Commission.

10 So I'm sure everyone is aware, but the
11 Applicant proposes to construct and operate an
12 approximate 28 miles of four-inch diameter carbon
13 steel pipeline and associated facilities, access
14 roads, valves, the carbon capture facility itself,
15 to capture CO2 from Green Plains Ethanol Plant and
16 transport it to North Dakota for permanent
17 sequestration.

18 Pipeline routing permits in the Minnesota
19 Public Utilities Commission is required of this
20 project because it meets the definition of what is
21 required to operate at pressure above 275 pounds per
22 square inch and carry a gas. Various other permits
23 would be required if the company is issued a route
24 permit from the Commission, such as a crossing
25 permit from the Minnesota Department of

1 Transportation, local road authorities to cross
2 roads, a license to cross state lands and waters
3 from DNR for river crossings. And while this isn't
4 a permit, say, because the company does not have the
5 power of eminent domain, they would need landowner
6 permission, they need an easement from landowners to
7 cross their property.

8 So this slide just talks about what we've
9 done so far. The Applicant submitted a route permit
10 application, which we are then required to review.
11 We submitted -- prepared a Scoping Environmental
12 Assessment Worksheet and held scoping meetings. We
13 were here in May and received scoping comments. And
14 those comments were used to develop the scope for
15 the Environmental Impact Statement, especially the
16 table of contents. That scoping decision was issued
17 and then we prepared the Draft EIS, which was
18 published last month.

19 So there is still plenty of process left.
20 We're right now in the middle of a comment period on
21 the Draft EIS. The purpose of this comment period
22 is you told us what you wanted to see in the Draft
23 EIS and now we want to know how we did. Is there
24 anything that needs to be improved upon, expanded
25 upon, and that is what we're doing here with this

1 comment period.

2 After that comment period is closed,
3 we'll issue a Final EIS and then there will be
4 another comment period on the adequacy of the EIS.
5 Does the EIS adequately address the scoping
6 decision? Does the scoping decision say what was
7 going to be in the document? Is it adequately
8 covered?

9 After that, there will be a public
10 hearing and comment period so that will be here in
11 Breckenridge and Fergus Falls again. That would be
12 in May. We will all be here, except the meeting
13 will be run by an Administrative Law Judge from the
14 Minnesota Office of Administrative Hearings.

15 And the Administrative Law Judge will
16 prepare a report and recommendation to the Public
17 Utilities Commission on issuance of a route permit.
18 So that comment period in May is the comment period
19 of, you know, telling the Judge, should we issue a
20 permit, should we not issue a permit, you know, kind
21 of what to do with the facts that the EIS plays out.

22 And after the Administrative Law Judge
23 report comes out, the Public Utilities Commission
24 will make a decision on whether to issue a route
25 permit and that should happen sometime in August or

1 early September.

2 So there's a Draft EIS. Kind of what is
3 it? You know, it's an information document. The
4 whole point of the EIS is to help decision-makers
5 make informed decisions and also to inform the
6 public and interested parties about the potential
7 impacts. It doesn't advocate, it's just trying to
8 develop a common set of facts that everyone can use
9 to wrap their head around the project.

10 The Administrative Law Judge is here in
11 May and that's when you can tell the Administrative
12 Law Judge what those facts mean, the information in
13 the EIS says this and this is what we think you
14 should do about it.

15 This is just a little bit about how it
16 was prepared. It's based on, you know, of course,
17 the application submitted by the Applicant and the
18 scoping EAW that was prepared and your scoping
19 comments. Those were all used to develop the table
20 of contents for the document. As we worked through
21 and started addressing those issues, we had to ask
22 for additional information from the Applicant. All
23 of that additional information, questions and
24 answers, they are provided as an appendix in the
25 back of the EIS, so that information is there.

1 We shared the preliminary -- at the
2 request of the Public Utilities Commission, we
3 shared the preliminary draft of the document with
4 tribes and state agencies and received feedback from
5 several of them.

6 And we also, of course, HDR helped
7 prepare it with their team across the country, and
8 Allied Solutions helped with the CFE modeling and
9 dispersion modeling.

10 So the EIS covers a lot of different
11 things. It's long. It's 300 and some odd pages.
12 We told you we were going to take a hard look and we
13 did. It talks about the proposed project, the
14 regulatory framework. It talks about different
15 alternatives that were studied. It compares three
16 route alternatives against each other. It discusses
17 alternative technologies.

18 So part of the purpose of the project
19 from the state is to help lower the carbon intensity
20 score of the ethanol produced at Green Plains. So
21 Chapter 6 discusses different ways that the CI score
22 can be reduced without using the project. So
23 alternative formula practices were discussed as well
24 as implementation of energy efficiency changes at
25 the ethanol plant. In Chapter 6 both of those

1 things could produce the score board of those things
2 and in combination could produce the CI score more.
3 And if the project also demands it, those three
4 things together, obviously, would reduce the CI
5 score the most.

6 The Chapter 5 prepared the alternative
7 routes. Talked about normal operation of the
8 pipeline. There's also a chapter, Chapter 8, which
9 is what happens if there's an accidental release, a
10 leak or a rupture, along the pipeline. Appendix G
11 is associated with Chapter 8 and that is the work
12 that Dan did with dispersion modeling. And the CFD
13 analysis, and I think all of this is right here, and
14 I'll let Dan go ahead and discuss and summarize what
15 he did for the Draft EIS.

16 MR. DAN PRASCHER: Oh, I'm sorry.

17 Okay. My name is Dan Prascher, D-A-N,
18 last name is P like Paul, R-A-S-C-H-E-R.

19 And like Andrew said, I did the modeling
20 for the dispersion models that is Appendix G. The
21 other thing he mentioned is HDR did one of the parts
22 in that appendix, and that is the summary of all of
23 the various PHMSA regulations that all operators of
24 hazardous liquid and gas pipelines must adhere to.

25 And not just after what's being asked in

1 these proceedings, but if they are allowed to do
2 this, then they will go under the jurisdiction of
3 PHMSA, which stands for the Pipeline Hazardous
4 Material Safety Administration. And they're a very
5 large branch of the Department of Transportation.

6 And so if they are given the opportunity
7 to operate, then they would have to adhere to eight
8 different subchapters that are extremely long, and
9 they have to do that from day one and then every day
10 henceforth till death do you part.

11 So they cover everything from
12 constructing the actual building of the pipe where
13 it's manufactured, design of the pipeline itself,
14 how it's all constructed, put together. How it's
15 all tested. It all has to be tested before any
16 hazardous liquids are introduced. And then
17 operated.

18 And of course, when you're operating a
19 pipeline like that, the folks who are doing it then
20 could possibly affect the integrity of the pipeline
21 so they have to be trained, they have to be
22 certified. And I didn't mention this before, that's
23 both a written and a performance evaluation, and
24 they have to do that every so often. It's not just
25 like you're qualified once and you go off on your

1 way, they have to recognize that diligence and being
2 able to replicate that you're doing right, you're
3 doing it the same way. They have certifications
4 they have to go through and they have to recertify
5 every year. I mean, depending on how complicated
6 the task is that they are doing.

7 In addition to that, they also have to
8 submit to a antidrug and alcohol misuse program,
9 under which they also have to take random drug
10 tests. And these drug tests are much more stringent
11 than the type of drug test that is performed when
12 you hire into a new job.

13 And so in that way they're ensuring that
14 everybody who could possibly affect the integrity of
15 the pipeline will train and they're not under the
16 influence of anything, and there's documentation to
17 show that every so often.

18 In addition to that, the operation part
19 is how they control it, how they communicate with
20 the public, how to help them understand where the
21 pipe is, what to look out for.

22 They also have to have an intervention
23 program, which also is very involved. The public
24 excavators and other folks, emergency responders.

25 And then one of the largest parts is the

1 intervention plan. And one thing there is, you
2 don't just create one of these plans and then it's
3 stamped and you move on about your business, what
4 you have to do as part of what PHMSA expects, is you
5 do that and then you improve on it all the time. If
6 something is wrong, you need to bring it in before
7 something goes wrong and it actually affects anyone
8 else and they deal with it up front to bolster your
9 program and you get better, and that's from now
10 until forever.

11 So anyway, the point of all that is there
12 are several things that they have to do and they
13 need to do over and over again. You get better at
14 it. Not just do the same thing, but figure out how
15 to do better. And that's all with PHMSA, who makes
16 sure what they do.

17 So if you'd like to see, you know, the
18 major bullets of what all that is, I didn't even go
19 over all of it, and I'm going to wrap it up because
20 I'm supposed to be brief and I'm not being brief.

21 So I will just say that is in there to
22 give an idea of what they will have to do. And also
23 to that point, one of the other things that they
24 have to do on the integrity management plan is they
25 have to be able to find what this pipeline could

1 potentially intersect with good influence, good
2 effect, and how much.

3 And so part of that is an aerial
4 dispersion model, and in the event, a very small
5 event likelihood that there was a rupture, they have
6 to be able to define how big does this get and where
7 do you go and when is it not going to be of harm
8 anymore. And so we did that, the Applicant did
9 that.

10 And what I was asked to do by the state,
11 by HDR, is to take a look at what they did. And
12 they presented all of the materials to me, I checked
13 it, I did my own independent analysis as well, and
14 what they did we agreed with it. I then did a
15 little more conservatism and put a little more
16 conservatism into what I was doing and I did that
17 just to check things. And, again, it's not because
18 we don't trust them, that's like already said, it's
19 just to verify, right. And because these things are
20 important, they actually affect people's lives and
21 we've got to make sure that they're right and the
22 Applicant has to do that.

23 And so in doing that, we wanted to also
24 take it a few steps further and just make sure we're
25 covering all the bases. Like Andrew said, a lot of

1 work went into this. We tried to think of
2 everything possibly that could affect folks and
3 account for it.

4 And so one of those things is we did a
5 computational fluid dynamics model, it's something
6 accomplished through a multiphysics engine in order
7 to do a realtime simulation model of a potential
8 release. How it mixes with the environment from the
9 fluid dynamic, thermodynamics standpoint. And what
10 are the worst case possible conditions that may get
11 over terrain and interact with windbreak and
12 possibly, you know, affect other folk.

13 And then the final thing that we did with
14 part of that is we said, okay, well, what are the --
15 what are the sensitivity analysis, what are the
16 inputs that make the biggest, that create the
17 biggest effect on the dispersion. And it turns out
18 that wind speed and pipeline pressure are the two
19 most influential.

20 And so one thing to keep in mind with
21 that is it's actually the opposite with wind speed.
22 The higher the wind speed, the less of the
23 dispersion happens, or it travels the least amount
24 of distance away from the pipeline. And I know that
25 sounds counterintuitive, but the reason it is that

1 way is the thing that pushes it out is the wind. So
2 if the wind is moving quickly, is pushing it, and
3 it's also mixing it more, and as it mixes more the
4 CO2 concentration goes down and becomes safer
5 faster. And so that's what we did.

6 And, again, all of this, I'm being overly
7 plump with it, all of this is in there, all the
8 results, all the numbers are all there if you have
9 any questions.

10 MR. ANDREW LEVI: Thanks, Dan.

11 So the DEIS is available electronically
12 on our website. That website is on the bottom of
13 this handout. It's also available on the Minnesota
14 Public Utilities Commission's eDocket site. I don't
15 recommend that you get it there, but you can if you
16 want.

17 The problem with eDockets is everything
18 has to be under ten megabyte chunks, so it just
19 turned into a whole bunch of files. But it is most
20 convenient for either the flash drives on the table
21 to look, but the whole EIS is on there and you can
22 take it home and just plug it into your machine and
23 it's all there electronically.

24 It's available in print at the
25 Breckenridge and Fergus Falls public libraries.

1 There's review copies in the back. There's three
2 copies in the back by the cookies. So you can
3 certainly take a look at that tonight.

4 And there are summaries available on the
5 front table. This is the executive summary from the
6 EIS. It's this long document, I understand that,
7 but if you were to review the executive summary and
8 dive into the document itself through the table of
9 contents you'll get to the subjects that interest
10 you the most and that might be one way to tackle it.

11 I have written about as many pages as the
12 Harry Potter series. So the table of contents is
13 certainly a good way to go about it.

14 So we will move on to comments tonight.
15 We want comments most useful tonight and we're
16 looking for what needs to be clarified in the EIS.
17 Is there something in there that's confusing, that
18 can be written differently? Is there anything
19 missing?

20 So we issued the scoping decision, it's
21 what the table of the contents of the document is.
22 Did we miss something? And let us know if we did
23 and we can get that in there. And then is there
24 anything else that you think needs to be added to
25 the EIS to be complete and accurate based on that

1 scoping decision.

2 So comments on the Draft EIS along with
3 our responses to those comments will be included in
4 the Final EIS. And the Final EIS will include
5 appropriate revisions to the draft based on
6 substantive comments.

7 So a substantive comment is it kind of
8 gets to the heart of the issue. Here's a paragraph,
9 here's what, you know, you think is wrong with it,
10 what you think needs help, and then provide the fix,
11 basically. And then we'll take a look at it and we
12 will certainly fix it, we'll certainly make that
13 change if appropriate. A nonsubstantive comment
14 might be something along the lines of, I don't like
15 that paragraph, and we have nothing really to go on
16 and all we can do is say, comment, thanks for your
17 comment. So with these, you know, substantive
18 comments an any changes that you feel are necessary
19 to the EIS, that fix is what we're looking for.

20 So there's several ways to provide
21 comments. Verbal comments tonight and tomorrow
22 night at the virtual public hearing are the only two
23 opportunities left to provide your comments
24 verbally. We have a court reporter to be able to
25 take those comments down.

1 You can complete and submit this comment
2 form, fold it and tape it and throw a stamp on it
3 and that will come to me. You can of course also
4 use your own envelope and use the address that's on
5 here. We have our website. You can provide a
6 comment on the website. You can click a link,
7 submit a comment, and there's a fillable form that
8 pops up and you can attach documents to that. And
9 you can also email me directly.

10 And just a reminder that the comment
11 period for this is February 23rd, that is the
12 comment period for comments on the Draft EIS. It
13 closes on the 23rd, so you need to get your comments
14 in before then.

15 So tonight, the next thing is for your
16 comments and questions. If we could get you to come
17 up to the microphone and state and spell your name,
18 if you could. Janet can only get one person down at
19 a time, so if we could just remember that it is one
20 speaker at a time.

21 And if you could, you can honestly
22 provide comments on anything you'd like and ask, you
23 know, questions about it if you'd like to change the
24 project; however, from EERA's perspective in moving
25 from a Draft to a Final EIS, you know, those

1 questions that we talked about before are what needs
2 to be clarified. Is there anything missing,
3 anything that needs to be added for a more accurate
4 EIS are most useful for us right now.

5 And I forgot to grab the sheet, the
6 sign-in sheet, so I don't know if anybody has asked
7 to speak. So I think we can just move to a show of
8 hands.

9 Does anyone want to come up and provide
10 the first comment or ask a question? Two or three?

11 Seriously?

12 Do you want to come up?

13 MS. SUE BRIESE: Yes. So I'm Sue Briese,
14 B-R-I-E-S-E. And we're landowners.

15 I appreciate the process. I learned a
16 lot. And studying the procedure on this. So thank
17 you for all that information on things, and you
18 talked to us since then as well, since those last
19 things when we met last May.

20 I have some comments and I kind of jumped
21 around in this -- sorry, nobody else is going to
22 speak so I don't have to rush through it, do I? In
23 this summary? Anyway --

24 MR. ANDREW LEVI: Would it be easier to
25 move it to the side?

1 MS. SUE BRIESE: Oh. So, first of all,
2 and this has been something that we wondered about
3 for a long time, we had to do something, and that's
4 the reasons why.

5 But on page ES2 it talks about the
6 alternative routes, the three routes, the RA North,
7 the hybrid, the RA South, but to look it up we have
8 to go to a different spot to try to find it. And
9 then every time we have looked at it, the font is
10 very small. So we pulled up plat books and all that
11 stuff and the easements are all covered, 160 acres.
12 But we had to try to find out where it's going to,
13 kind of picture that and drop it into the overall
14 scheme. It would be nice if it would say, see
15 attached map, or put the map where it talks about
16 the three routes.

17 MR. ANDREW LEVI: Okay. That's a good
18 point.

19 MS. SUE BRIESE: So that's for my comment
20 on vagueness and transparency. Some things aren't
21 transparent but to you. But we don't read these
22 type of documents, we're not engineers and, you
23 know, we don't know a lot of, for the state of
24 Minnesota, we don't know enough to be dangerous, as
25 we say. So it's really hard to know.

1 And then, again, that's where we have to
2 rely on, like, hey, Dan said what's your capacity.
3 Dan, you've looked at this PHMSA, I listened to one
4 of the hearings in Iowa that was online while people
5 came and testified, and it was emotional for the
6 farmers. And one question is did they ever pass
7 anything based on those hearings they had? It was
8 like early summer.

9 MR. ANDREW LEVI: They are in the
10 process. They're in the process. They haven't done
11 anything yet.

12 Joe, do you want to come up and give a
13 brief little summary of where we're at with the
14 PHMSA regs? The short answer is they're in the
15 process, but nothing has been finalized.

16 MS. SUE BRIESE: And they override the
17 state?

18 MR. ANDREW LEVI: Yes, PHMSA sets the
19 safety standards, the state of Minnesota does not.

20 MR. JOE SEDARSKI: Joe Sedarski,
21 S-E-D-A-R-S-K-I, I work with HDR.

22 Very brief, but essentially the PHMSA
23 means that they -- sorry, I attended those hearings
24 as well virtually, and their whole purpose was to go
25 out and explain what they're trying to do for

1 getting potential rulemaking that they're looking
2 at. So there's a schedule that they're going to
3 actually provide new rules that may or may not come
4 out, depending.

5 The formal notices haven't come out.
6 It's getting close, we expect it sometime this June.
7 And we're watching that, as well as part of the EIS
8 order from the PUC was that we would monitor that
9 and provide an update within the Draft EIS, which
10 we've done nothing, there is no answer. There will
11 be rulemaking, like a formal rulemaking coming, and
12 something will come out of this.

13 MS. SUE BRIESE: Will anything change
14 with the PHMSA or the pipeline? Will anything
15 change with the psi?

16 MR. JOE SUDARSKY: That detail, I don't
17 know what is going to happen.

18 MS. SUE BRIESE: The letter --

19 MR. ANDREW LEVI: That might be a better
20 question for Summit to try to answer.

21 MR. ALEX LANGE: Alex Lange, L-A-N-G-E.

22 Based on the PHMSA rules -- let me back
23 up.

24 The diameter of the pipeline, the
25 pressure under which it operates is driven more by

1 the CO2 moving more. So then kind of the federal
2 regulations, federal regulations dictate kind of
3 what strength in pipeline wall thickness based on
4 the pressure rating. The pressure rating also falls
5 towards the hydraulic of the line and what pressure
6 we need to hit so we can move CO2 through the
7 pipeline.

8 MS. SUE BRIESE: So that's basically --
9 the design is from PHMSA?

10 MR. ALEX LANGE: Correct.

11 MS. SUE BRIESE: And then you pull the
12 psi through it?

13 MR. ALEX LANGE: Correct. So volume
14 height, define what our pressure is, and going from
15 the pressure rating that we need to the actual pipe
16 specifications that's defined if you follow the
17 equation which falls into PHMSA regulations.

18 MS. SUE BRIESE: Okay. Another question
19 I had. So the PUC in North Dakota denied the
20 permit. I imagine these other states are watching
21 Minnesota and there's counties in the southern part
22 of the state that you are kind of like the trail
23 maker?

24 MR. ANDREW LEVI: Am I kind of the
25 troublemaker?

1 MS. SUE BRIESE: The trail maker. I
2 don't know, maybe the troublemaker.

3 MR. ANDREW LEVI: It depends on your
4 perspective, I suppose.

5 We are required, the state of Minnesota
6 is required to process applications as they come in
7 in time frames associated with those. So we're
8 moving forward based on those time frames.

9 I think that where the state of Minnesota
10 process ends up with some of these other states I
11 guess is just where it ends up. We have the
12 timeline that we're following based on the rules
13 that we have to follow and that's what -- that's
14 kind of where we're at.

15 Does that answer? Is that what you were
16 asking?

17 MS. SUE BRIESE: Yeah. Kind of. I
18 imagine I looked at what you guys did, as to what
19 they're going to do.

20 MR. ANDREW LEVI: I know that from our
21 perspective we were asked by -- the Public Utilities
22 Commission was asked to delay looking at this
23 project because there's not a permit yet issued yet
24 in North Dakota. And the PUC's stance is
25 essentially that we, the state of Minnesota, has our

1 process and that process isn't influenced by what's
2 going on in North Dakota. Just like if North Dakota
3 had already issued a pipeline permit, it was being
4 built or whatever, that would influence the PUC's
5 decision on whether or not to issue a permit, so it
6 kind of goes both ways.

7 MS. SUE BRIESE: You have a statutory
8 obligation, you have to do that?

9 MR. ANDREW LEVI: Right. 280 days is
10 what we have.

11 MS. SUE BRIESE: Exactly, right.

12 MR. ANDREW LEVI: One more.

13 MS. SUE BRIESE: So if I ask a question
14 of you, if I have a copy and do comment, you know, I
15 probably will, but do you return comments
16 personally, like if I just had a question like
17 tonight?

18 MR. ANDREW LEVI: If you were to call and
19 ask I can try to answer your questions the best I
20 can. Formal comments that come in during the formal
21 comment period, we'll reply to those as we need to.

22 MS. SUE BRIESE: So if I ask you to
23 reply, you'll reply?

24 MR. ANDREW LEVI: I guess we'll find out.

25 MS. SUE BRIESE: And I have some comments

1 already written out, but I'm going to run through
2 them real quickly and maybe expand upon them at some
3 point.

4 But we've talked about before the land is
5 different, in different areas where the pipeline is
6 going to run through some of these differently than
7 way out west versus our land, which is on the river,
8 okay.

9 Water concerns. I don't know what I read
10 that, you know, the water tables will be decreased
11 when the CO2 is converted. I don't know enough
12 about it and I'm just asking that question.

13 Talking about this Appendix G, the leak,
14 and you identified that tonight so we do maybe need
15 to read through that ourself before we ask questions
16 on that.

17 And just the routes on page 2 talks about
18 the north route, and the three routes, sometimes I
19 think it could be prejudicial to certain landowners
20 because of their goals for their property versus
21 other people's goals. And everybody has a right to
22 deal with their own property.

23 You know, again, labor, I don't get the
24 details when it talked about transparency. Human
25 settlement is an area that it talks about, the RA

1 North would have several more residents, and then,
2 you know, I counted in our little area just west of
3 town, yeah, there's a lot of like maybe 99 people
4 potentially in those building sites and so I don't
5 know what it means when it talks about several more
6 residents.

7 MR. ANDREW LEVI: All we can do is count
8 houses.

9 MS. SUE BRIESE: Yeah.

10 MR. ANDREW LEVI: I don't know how many
11 people live in there.

12 MS. SUE BRIESE: Yeah. The biggest -- so
13 the people that are affected, it talks about Fish
14 and Game and my question is why isn't there more
15 concerning that? There would be further noise and
16 visual impacts on this land versus other residences.
17 It just -- I went to, like, the Fish and Game plan
18 is more important than a residence, and you can --

19 MR. ANDREW LEVI: I think that that, you
20 know, we talk about things in categories. We talk
21 about recreation, we talk about the human side of
22 things. But we don't necessarily -- we don't
23 necessarily weigh those against each other in the
24 EIS, we just try to outline what the impacts are for
25 the decision-makers, for the Public Utilities

1 Commission. And then it's basically, you know, it's
2 the Public Utilities Commission that then decides.

3 So if they decide that this project, or
4 any project, for that matter, if they're issuing a
5 permit and there's certain impacts over here and
6 certain resources and there's certain impacts over
7 here and certain resources, then they have to weigh
8 those two against each other and basically make that
9 decision as to what kind of gets mitigated and what
10 gets impacted and they make that decision.

11 So I hear what you're saying, but --

12 MS. SUE BRIESE: So they counted itself,
13 the project within that paragraph, that's what
14 you're referring to?

15 MR. ANDREW LEVI: Yes. So in the
16 recreation section, we're talking about recreation.
17 In the human health and safety section we're talking
18 about human health and safety. You know, they're --

19 MS. SUE BRIESE: They don't piggyback off
20 of the other.

21 MR. ANDREW LEVI: No. There's recreation
22 and tourism kind of goes together a little bit, so
23 there's some of that, but for the most part they're
24 not piggybacked onto each other.

25 MS. SUE BRIESE: Um-hmm.

1 MR. ANDREW LEVI: They stand alone.

2 MS. SUE BRIESE: Explain populated areas.
3 That's on ES4. It says there will be no impacts on
4 populated areas because no population areas are
5 within 1,600 feet of the route width. And I have
6 some maps, some GIS maps that, I mean, all these
7 sites are closer than 1,600 feet. What does that
8 mean?

9 MR. ANDREW LEVI: We used a definition
10 for populated area that is an incorporated area or a
11 legal entity, and since this is a designated place,
12 this is a statistical map based on the incorporated
13 places.

14 MS. SUE BRIESE: So, like, developments,
15 but not individual residents, individual people are
16 not counted --

17 MR. ANDREW LEVI: Yes.

18 MS. SUE BRIESE: -- in the 1,600 feet?

19 MR. ANDREW LEVI: If a residence is
20 outside of one of those areas, then, yes, for the
21 purposes of this it is not considered a populated
22 area.

23 MS. SUE BRIESE: See, and that's kind of
24 a little twist on words, is populated, you know. I
25 mean, because I know it's within 200 feet of some

1 residences.

2 MR. ANDREW LEVI: We do talk about
3 residences themselves further on, this is just the
4 executive summary, you know. Chapter 5, is really
5 preparing these routes and going through this, I
6 think it is around 150 pages long.

7 MS. SUE BRIESE: Good one.

8 MR. ANDREW LEVI: So we get into it, but
9 we do talk about the residences within certain
10 distances. It just didn't happen in the executive
11 summary.

12 MS. SUE BRIESE: Okay. I did appreciate
13 that Summit Carbon agreed to provide monitors for
14 houses, for residences within X amount of feet.

15 MR. ANDREW LEVI: We recommended that
16 they do that, they haven't, and we don't know if
17 they will.

18 MS. SUE BRIESE: Okay. Well, I like that
19 recommendation anyway.

20 So then, say, for example, not that it's
21 something that -- say, somebody wanted to agree to
22 solar panels on their land, with this pipeline
23 there, could they do it?

24 MR. ANDREW LEVI: I can let Summit expand
25 on that. But I think it would all be -- I'll just

1 let Summit expand on it.

2 MR. ALEX LANGE: So the 50-foot easement,
3 permanent easement, that will go through the
4 property, you know, we cannot have anything solid
5 built on top of 50 foot, mostly for safety reasons.
6 In case we have to inspect it, dig it up, and repair
7 and respond. So on that 50-foot input area, if it
8 would be a permanent impact, a permanent structure
9 on there, it, you know, would go on there. But a
10 lot of that, you know, and when I say that, too,
11 it's going to be negotiated with the contractor,
12 things of that nature, so a lot of that is a
13 negotiated period to make sure that the line is
14 still accessible.

15 MS. SUE BRIESE: And I know landowners
16 have been approached, obviously, for solar panels.

17 I think I'm done.

18 MR. ANDREW LEVI: Sounds good.

19 MS. SUE BRIESE: Thank you.

20 MR. ANDREW LEVI: If you think of any
21 more, come on up. Thank you, Sue.

22 Does anyone else have any questions or
23 comments?

24 MR. ANTHONY HICKS: I'm Anthony Hicks,
25 H-I-C-K-S.

1 And I actually just wanted to thank the
2 folks for this initial draft. Obviously, my
3 position is general manager of the ethanol plant
4 and, actually, I was quite surprised that it was as
5 neutral in its opinion as it was. I felt -- I was
6 concerned that it would be biased in one way or
7 another, but I think you've done an excellent job.
8 And I thank you for the time and effort you put into
9 it. And hopefully that, you know, the comments,
10 that you receive all of them.

11 It will be a tremendous benefit to our
12 community, and the plan itself adds 10 to 15 cents a
13 bushel bases to corn, and we are going to consume
14 about 20 to 22 million bushels a year. If we go
15 away, that corn will basically go on rail and
16 probably to the west coast. And the bases will
17 obviously reflect that because it bears on the
18 market, and that's a destination market. So it's a
19 positive approach for us and it will retain jobs
20 here.

21 Thank you.

22 MR. ANDREW LEVI: Thank you.

23 Anyone else?

24 Well, does anyone else -- yeah, come on
25 up.

1 MS. SUE BRIESE: Sue Briese.

2 At the last hearings, we did have some
3 comments, and thanks to Mr. Hicks we did have some
4 comments about some things that were outside the
5 scope where somebody wanted to bring in some other
6 type of project. And we realize there's been talk
7 about the economical benefits, and I think we're
8 here talking about the safety effects of the routing
9 and not how much money -- or how much money might
10 not be projected into our community.

11 MR. ANDREW LEVI: Um-hmm. Yep.

12 The Commission weighs all those factors
13 in their decision. Economics is one of those
14 things. Safety is one of those things. Impacts
15 to -- other impacts to humans, noise, aesthetics are
16 things. So, yeah, it's not just one thing that the
17 Commission looks at.

18 Yeah.

19 MS. LELA ROBINSON: Lela Robinson,
20 R-O-B-I-N-S-O-N.

21 I'd like to thank Mr. Hicks for coming
22 and sharing that, because I've been a part of
23 multiple pipelines for drilling and pulling pipe,
24 and I tell you what, it's been amazing. The kids,
25 the schools, the communities. It brings so many

1 workers, and we need that, you know. It helps keep
2 the money here and it supports the community itself.
3 And I just think it's a wonderful idea.

4 And I also work for LIUNA Local 563 with
5 another one here, and I thank you guys for the
6 opportunity of having that here, it's going to bring
7 up lots of work and help lots of families.

8 Thank you.

9 MR. ANDREW LEVI: Thank you.

10 MR. DALE SCHMIDT: My name is Dale
11 Schmidt, S-C-H-M-I-D-T.

12 I have not reviewed the literature I got
13 yesterday from the Chamber of Commerce, but I'd like
14 to read one article that came out in the paper on
15 February 7th. I'll make it short.

16 Math is not only the basis of truth and
17 duty, it means the same thing. That Gulligan,
18 beautiful truth comes to mind when reading a
19 just-published state case study that compares costs
20 and for a permanent dioxide field to output on the
21 plan on the 2,000 mile Summit steel pipeline to
22 wind- and solar-based electricity that fuel battery,
23 electric vehicles, or BEVs.

24 And as part of that, the new study, what
25 gives the better environmental and financial

1 returns, building cement on CO2 pipelines, that
2 encourages more ethanol use. Or investing in the
3 same amount on solar and wind generators to power
4 BEVs.

5 The resulting math presented by the
6 study, author Mark V. Jacobson, a civil and
7 environmental engineer at Sanford University was
8 detailed, and it's very beautiful in its conclusion,
9 don't spend another penny on Summit's five-state CO2
10 pipeline.

11 MR. ANDREW LEVI: Thank you.

12 Does anyone else want to come up?

13 I don't think so. I'll again stall for a
14 little bit and then if anybody wants to come up I'll
15 ask again.

16 But I'll just remind everyone about the
17 open comment period, and that's through
18 February 23rd. You can submit those comments in
19 writing, via email, regular mail, or the online
20 commenting tool. That's all laid out on this
21 handout. You can mail this in, too, if you'd like.

22 There's a virtual public meeting tomorrow
23 night, it starts at 6:00, and we'll start with the
24 same brief discussions from the other night, and
25 then we'll open it up to folks' questions and

1 comments.

2 So please do get your -- you can comment
3 verbally tomorrow night, too, at that virtual public
4 hearing. Please do get those comments in by
5 February 23rd. If you comment once, you're more
6 than welcome to comment again should something come
7 to mind.

8 So we look forward to reading all those
9 when they come in. I think that's all of what I had
10 to say.

11 Does anyone else want to come out and
12 would like to comment or ask a question?

13 All right. Well, thank you -- oh, yes,
14 come on up.

15 MR. SCOTT LANKOW: My name is Scott
16 Lankow, L-A-N-K-O-W.

17 I worked in manufacturing for 30 years
18 and typically projects like this, if anything, are
19 over engineered for safety's sake. And due to our
20 geographical location and proximity to the plant, we
21 will have the smallest diameter pipeline in the
22 whole route. It will be the least invasive as far
23 as construction because it is only four inches in
24 diameter. And because there will be no step-up
25 pumps in the line along the route, we will have the

1 lowest pressures, thereby reducing chances of
2 rupture, fractures, cracking, any kind of damage to
3 the pipeline.

4 So because we have, in my view, only
5 benefits to gain from this and the least amount of
6 risk of anybody in the whole route, I see nothing
7 but positives and positive outcomes for this
8 project. And I urge positive, you know, approval
9 for this project.

10 I'll just comment that typically these
11 pipes, you know, as was brought up earlier, these
12 pipes, this material, is going to be heavily
13 inspected. The workers will be -- I've been through
14 this, I mean, you're not just going to let somebody
15 off the street who doesn't hardly know what the
16 process is to be working on this. These people will
17 be heavily qualified.

18 I have no problem with this. I think
19 it's nothing but a good green light.

20 Thank you.

21 MR. ANDREW LEVI: Thank you.

22 Anyone else?

23 All right. Well, thanks for coming this
24 evening, and everyone drive home safe, and we'll see
25 you in May.

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(Matter concluded at 6:54 p.m.)

	affects (1) 12:7	4:11;5:9;7:17,22; 13:8,22	17:11;23:8;28:1,8; 32:15	37:11
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DEIS MEETING - 22-422

WEBEX - FEBRUARY 8, 2024 - 6:00 p.m.

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

AND DEPARTMENT OF COMMERCE

In the Matter of the Application of Summit Carbon
Solutions, LLC, for a Routing Permit for the Otter Tail
to Wilkin Carbon Dioxide Pipeline Project in Otter Tail
and Wilkin Counties, Minnesota

MPUC DOCKET NO. IP-7093/PPL-22-422

Meeting held remotely via:

WebEx and Telephone

FEBRUARY 8, 2024

COURT REPORTER: Christine Simons, RPR, RMR

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1 MR. ANDREW LEVI: Good evening, everyone.
2 My name is Andrew -- excuse me -- my name is Andrew
3 from the Minnesota Department of Commerce.

4 We're here tonight for the virtual
5 meeting for the Otter Tail to Wilkin Carbon Dioxide
6 Pipeline Project.

7 If we could move to the next slide,
8 please.

9 So just a little bit about tonight's
10 meeting before we get started. All attendees are
11 muted during the presentation. Following the
12 presentation, we will open the meeting up to your
13 comments and questions.

14 You can comment or ask a question tonight
15 by raising your hand. The raise-the-hand function
16 is down, kind of, on the bottom of the screen by the
17 smiley face down there. You can raise your hand; or
18 if you're on the phone, you can dial *3. That will
19 put you in a queue, and the host will then address
20 you and unmute your phone and unmute your line. And
21 you can go ahead and ask your question and comment.

22 So if you'd like to get in the queue now,
23 you certainly can. We will repeat these
24 instructions when we get to that point in the
25 meeting, but I just wanted to let you know how that

1 will work when we get there.

2 Next slide, please.

3 So these are the things we'd like to
4 briefly discuss tonight before we open the meeting
5 up to your questions and comments. We'd just like
6 to introduce everyone who is on the call today, talk
7 briefly about the proposed project, as well as the
8 state permitting process: Where we've been and
9 where we still need to go. And talk about the draft
10 environmental impact statement, and then, of course,
11 how you can submit your comments during this open
12 comment period and this evening.

13 So I guess we can start with instructions
14 again -- introductions again. My name is Andrew.
15 I'm with Energy Environmental Review and Analysis
16 within the Department of Commerce. We prepared the
17 draft environmental impact statement on behalf of
18 the Public Utilities Commission.

19 With me tonight from HDR -- HDR was our
20 consultant on this project, as well as Allied
21 Solutions, they were a sub-consultant -- we have
22 Joe, Pat, and Will. Will is on the call. He's
23 stuck in the car, so he's not going to turn the
24 screen on, but he will later if he needs to. And
25 Cathy is also with us this evening from HDR; and Dan

1 from Allied Solutions is with us. From the company,
2 from Summit Carbon Solutions, the applicant, we have
3 Scott, Alex, Jason, and Christy and Britta.

4 And she's a little bit busy right now, so
5 we won't ask her to turn on her screen, Christine is
6 here. She is a court reporter, and she is
7 transcribing this meeting so that your comments are
8 taken down and part of the record.

9 Next slide, please.

10 So, again, just to remind everyone, we're
11 here talking about the Otter Tail to Wilkin Carbon
12 Dioxide Pipeline Project. Summit Carbon Solutions
13 proposes to construct and operate approximately
14 28.1 miles of 4-inch diameter carbon steel pipeline
15 and associated facilities, which are mainline
16 valves, a cathodic protection system, and access
17 roads, as well as a capture facility to transport --
18 to capture and transport CO2 from the Green Plains
19 ethanol plant to the border where it would -- to the
20 North Dakota-Minnesota border near Breckenridge,
21 where it would interconnect with the larger Midwest
22 Carbon Express project. And that CO2 from the
23 ethanol plant would eventually find its way west of
24 Bismark, North Dakota, where it would be permanently
25 sequestered underground.

1 Next slide, please.

2 A pipeline routing permit is required
3 from the Public Utilities Commission because the
4 proposed project would operate at a -- is designed
5 to operate at a pressure of more than 275 pounds per
6 square inch and carry a gas. If a route permit is
7 issued by the Public Utilities Commission, various
8 other approvals might be required for the project,
9 such as a road-crossing permit from local road
10 authorities or the Minnesota Department of
11 Transportation; river crossings would require a
12 permit from the DNR, a license to cross state land
13 and waters.

14 Additionally, the company does not have
15 the power of eminent domain for this project, so
16 landowner permission would also be required for the
17 company to build the project.

18 Next slide, please.

19 This slide shows what steps in the
20 permitting process have already been completed. So
21 the applicant submitted a route permit application,
22 and, by law, once a route permit application is
23 submitted, the State needs to process those
24 applications.

25 The scoping environmental assessment

1 worksheet was prepared and scoping meetings were
2 held. Those scoping meetings allowed you the
3 opportunity to tell us what you thought we should
4 discuss and study in the draft environmental impact
5 statement.

6 The scoping decision was issued. Which
7 is, essentially, the table of contents for the --
8 for the draft EIS, and we worked -- EERA staff
9 worked with HDR and Allied to prepare the draft EIS,
10 and that was issued in late January.

11 Next slide, please.

12 As you can see from this slide, there's
13 still plenty of process left to go. There's
14 currently, right now, an open comment period on the
15 draft EIS. Once we receive and incorporate your
16 comments, we will issue a final EIS, and then there
17 will be a comment period on the adequacy of the
18 final EIS: Does the EIS address -- does the final
19 EIS address the questions -- excuse me, address the
20 information in the scoping decision? Essentially,
21 is what we said would be there, there?

22 After that, there will be a public
23 hearing and comment period. That will happen in
24 May. That will be in the project area, I believe in
25 Fergus Falls. This is an -- these same folks will

1 be there, except an Administrative Law Judge will
2 also be there. They will oversee the meeting.

3 And that is the meeting where you have
4 the opportunity to express your opinion, you know,
5 on the project: Should it be built, should it not
6 be built, and why? And the Administrative Law Judge
7 will prepare a report and recommendation to the
8 Public Utilities Commission.

9 While the ALJ is preparing that report,
10 the Public Utilities Commission will make a decision
11 on whether or not the EIS is adequate, and after
12 that ALJ report is issued, the Commission will make
13 a decision on whether or not to issue a route
14 permit. That decision is expected some time in late
15 August, early September.

16 Next slide, please.

17 So this is just a couple slides about the
18 draft EIS. You know, what is it? Well, it's an
19 information document. It is not designed to
20 advocate one way or the other. It is designed to
21 develop a common set of facts that folks can use to
22 wrap their head around the project. Is it designed
23 to inform decision-makers when they make a decision
24 about the project.

25 Next slide, please.

1 So the draft EIS was prepared. It was
2 based on several documents, including the
3 application submitted by the applicant and the
4 scoping environmental assessment worksheet published
5 by our -- by the Department of Commerce.

6 Scoping comments helped develop the table
7 of contents for the document, and as we developed
8 the draft EIS, we needed additional information.
9 Some questions came up and we asked the applicant to
10 provide that additional information, and there --
11 all of our questions and their responses are
12 included as an appendix in the EIS.

13 There was an opportunity, at the request
14 of the Public Utilities Commission, to allow tribes
15 and state agencies the opportunity to comment on a
16 preliminary draft EIS. We received feedback from
17 several tribes and agencies during that time. We
18 used geographic information, GIS desktop analysis to
19 prepare the document. We drove through the -- you
20 know, site visits, and as stated previously, this
21 would not have -- I couldn't, obviously, do this
22 myself, so it needed HDR and Allied to help prepare
23 that. Allied Solutions, Dan, prepared a rupture
24 analysis and really took a hard look at what would
25 happen if there was an accidental release of CO2.

1 Next slide, please.

2 There's a lot of information in the draft
3 EIS. You know, it's 350 pages long, plus
4 appendices. We told you that we would take a hard
5 look, and we most certainly did. It discusses the
6 proposed project. It discusses the regulatory
7 framework. It discusses the different alternatives
8 that were included for detailed analysis.

9 And there are three route alternatives
10 that were studied in the draft. There were
11 alternative technologies that were studied in the
12 draft, alternative practices that could be
13 undertaken by farmers or the ethanol plant to lower
14 the carbon intensity score of the ethanol produced.

15 We found that those alternative
16 practices -- both the farming practices and the
17 energy-efficiency practices -- could reduce the
18 carbon intensity score independently; more so in
19 combination. We also concluded that all three
20 practices -- both the proposed project, the energy
21 efficiency practices and the farming practices -- in
22 combination would, of course, reduce the CI score
23 even more.

24 We studied a no-action alternative, what
25 we expected to occur if the project was not

1 constructed. We also looked at lifecycle impacts of
2 ethanol.

3 These potential impacts were described.
4 We tried our best to put them into context and
5 characterize them as negligible, minimal, moderate,
6 or significant. We also suggested and recommended
7 mitigation measures to, you know, mitigate potential
8 impacts.

9 Another thing that we did is we looked at
10 operation of the pipeline. And we looked at
11 operation of the pipeline under normal operating
12 conditions, and then we looked at it under what --
13 if there was an accidental release of carbon
14 dioxide, either a leak or a rupture.

15 Again, I have mentioned a couple times
16 already that Dan prepared that -- the modeling --
17 and worked with Cathy and others at HDR to develop
18 Chapter 8, which is the accidental release chapter.
19 And I'll just take a quick break here and let Dan
20 briefly summarize his work in the preparation of the
21 EIS.

22 MR. DAN PRASCHER: Thanks, Andrew.

23 Like Andrew said, I'm Dan Prascher. I
24 spell my last name P as in Paul, R-A-S-C-H-E-R.

25 And I worked with -- I was asked by the

1 State and HDR to do a set of modeling to try and
2 figure out -- try and couch where the affected areas
3 would be and to how much -- if there ever was a
4 release. And the work that we did that he mentioned
5 in Appendix G, there are four sections, actually, in
6 there. The first one talks about PHMSA, what -- the
7 kind of regulations that they required -- that all
8 operators are required to adhere to, and then the
9 other three are studies that Allied did for this
10 effort.

11 PHMSA, the first section, that stands for
12 Pipeline Hazardous Material Safety Administration.
13 They're a branch -- major branch of the Department
14 of Transportation, and they regulate any entity that
15 is shipping hazardous substances across state lines.
16 And in certain states, they also regulate more than
17 that if there happens to be an agreement between the
18 state and PHMSA, but they are -- regardless of who
19 is doing that, the federal regs set down by PHMSA
20 are what each operator of oil and gas -- you know,
21 oil and gas have to adhere to. They have to -- they
22 are subject to those.

23 And to kind of give you a flavor of what
24 that is, I'll kind of go through that. I'll try and
25 be brief. And this would be in addition to gaining

1 the ability to build. So going through this process
2 that we're all here talking about today, and if the
3 State does allow Summit Carbon to build this. And
4 then they are asking for several things that
5 Summit -- they're asking for several things for
6 Summit Carbon to do.

7 But on top of all of that, once they
8 begin operation, they'll be required to do a litany
9 of things. There are eight major categories of
10 types of regulation that they will have to do,
11 starting on day 1 and continuing through for
12 forever. It's something that they are required to
13 do. And that starts with construction, it starts
14 with materials that are used in the pipe mill
15 creating the pipe from steel. There are regulations
16 that specify how that is to be done. Standards have
17 to be met all the way through construction and
18 design -- of course, before that -- and then how
19 everything is tested before it gets put into
20 service.

21 And then, of course, through operation --
22 and there are many different parts of that
23 operation. If there's a, you know -- if they're
24 being controlled through a control room, then there
25 are a lot of different regulations they have to

1 follow there.

2 Public awareness, damage prevention, how
3 they interact with the public. Not just the public,
4 but also emergency responders. Excavation
5 professionals that may be doing excavation in their
6 areas -- in the area of this project, and different
7 efforts that they go through to ensure that damage
8 doesn't come to the pipe. And corrosion control:
9 Finding it, dealing with it, preventing it, and one
10 of the major parts of that is the integrity
11 management plan.

12 And so they're required to put that
13 together, but it doesn't stop there. They don't
14 just make it and then they can go about their merry
15 way and put it on a shelf somewhere. It's in many
16 places of the IMP, the integrity measurement plan.
17 It talks about how there has to be review. There
18 has to be metrics met.

19 They're expected -- in summary, they're
20 expected to create an integrity measurement plan
21 that addresses all relevant risks. Not necessarily
22 the things that are imminent, but things that could
23 happen. You've got to prevent them so they never
24 come to fruition. And so what that means is they
25 have to test for that, that sort of thing. They

1 don't think they have an issue, but they don't know
2 that they don't, so they have to do tests.

3 And it's a continual improvement
4 situation where they do tests, they learn more
5 information. They use that information to bolster
6 what their plan is. Maybe they need to change
7 things, maybe they need to analyze things more
8 frequently. There's a -- it's a very large thing
9 that happens every year, and the expectation is that
10 it needs to get better, and it needs to show a
11 definitive and measurable progress over time.

12 Part of that plan, the requirements for
13 doing that, is to do an aerial dispersion model, and
14 so that's -- they're required to say, okay, through
15 this modeling, we -- worst-case scenario, we see how
16 far a potential impact could go and to what severity
17 could it go, and use that for planning purposes.
18 And that's also part of what was included in this
19 DEIS. The details of which are in Appendix G that
20 talk about -- talk about that, and so Summit did do
21 that.

22 And as a -- you know, a check, and we --
23 it's not that we don't trust Summit, but it's, you
24 know, trust, but verify, right? And so they
25 provided us -- they were very good about providing

1 us with information about that. They were really
2 good to work with in that way. They gave us their
3 analysis, all the information we asked for, and then
4 I checked what they did, agree with their approach,
5 and how they did that.

6 And then I also did an independent
7 analysis to check, and part of that analysis was we
8 went a little bit further. Because we want to -- as
9 Andrew said, we want to make sure that we're looking
10 at all of the relevant possible items that could be
11 useful to folks, and to help them really understand,
12 what are the total consequences? What are the total
13 benefits of this?

14 And so in that light, we took it a bit
15 farther. I did the modeling for the -- what's
16 called a computational fluid dynamics model. It's a
17 multiphysics software that we use that we can use
18 the model in realtime, a potential rupture, worst
19 case -- of course, we're trying to put our hands
20 around what could be the worst case. And what does
21 that do over terrain, specifically terrain that
22 would be common in -- you know, for this project in
23 those rights-of-way.

24 But then also encounter -- if it can
25 encounter something like windbreaks, because there

1 are a lot of windbreaks out there, what does that
2 do? And so through this -- the acronym is CFD
3 analysis. We were able to show that, yeah, the
4 terrain doesn't really affect it. And the windbreak
5 really does stop it, as you might suspect, right?
6 Because if the whole design of a windbreak is to
7 stop the wind, well, the wind is what's carrying a
8 potential release, so that kind of follows.

9 In addition to that, we also did a
10 sensitivity study. So what we were doing there is
11 we're saying, here are the key attributes that add
12 to or could affect CO2 release, and what are the
13 things that really, really show the biggest
14 impact -- or potential impact to release.

15 And it may be no surprise, the pressure
16 of the pipeline -- pipeline pressure and the wind,
17 and the one thing to note is it's not -- it's not --
18 it's not the higher the wind, the bigger the impact;
19 it's actually the opposite. The more wind that's
20 involved, the faster it actually mixes. Because the
21 thing that's propelling it is also -- it's
22 propelling the -- the thing that's propelling the
23 CO2 is also the thing that helps it mix with the
24 surrounding air, the environment.

25 And so the more wind you have, the less

1 impact distance you actually release. Just kind of
2 at first blush, it seems kind of counterintuitive,
3 but those are the two things that we found were
4 really impactful, were most impactful of the
5 other -- of all of the attributes that we looked at
6 and tested using machine learning and
7 gradient-boosted trees, which I -- now that I say it
8 out loud, I realize that always doesn't mean
9 anything to anyone. But we analyzed many, many
10 different models in order to build our final model.

11 And at any rate -- and again, I
12 apologize, that was not very brief. Those are the
13 kind of things that we did. If you are able to look
14 at Appendix G, it has all of the results in there.
15 Of course, this is a little different than the
16 meetings that we've had previous to this, and so I'm
17 happy to answer any questions that I can, any
18 questions that you might have. Thanks.

19 MR. ANDREW LEVI: Thank you, Dan.

20 Next slide, please.

21 So we talked a little bit how we
22 prepared -- what the draft EIS is, what's in it, how
23 it was prepared, and, of course, the big question
24 now is, where is it? It's available electronically
25 at the website there. That is the Department of

1 Commerce, that's the Environmental Review and
2 Analysis webpage, the EERA webpage.

3 I believe they're going to put these
4 links into the chat which will make them live, is my
5 understanding. And you can click on them and kind
6 of bring them up and bookmark them quick, if you'd
7 like to, but that is available there.

8 It is also available on the official
9 project docket, on the eDockets system. That gets
10 broken up for filing, and it ends up in a whole
11 bunch of chunks. So it's, of course, available
12 there, but it is easier to access it through our
13 website.

14 It is also available in print for your
15 review at the Breckenridge and Fergus Falls public
16 libraries.

17 Next slide, please.

18 So now we'll move on to commenting on the
19 draft EIS, and, you know, at this time, there's
20 certain comments that are most useful to us as we
21 are trying to move this draft document into a final
22 document. And those three things are listed there.
23 The first, is there anything that needs to be
24 clarified? Is there anything that's written in a
25 way that's confusing, or could be written, you know,

1 better so that it's easier to understand? You know,
2 what are those sorts of things. Is there
3 information that's missing? You know, let us know.
4 You know, perhaps we connected the dots without
5 including the information, you know, some of those
6 pieces, which made it difficult to follow.

7 And, also, is there anything that needs
8 to be added to the EIS -- to the final EIS so that
9 it is complete and accurate? Again, the scoping
10 decision was issued, and that is the table of
11 contents for the document. And so we need to make
12 sure that we are covering everything that is listed
13 in that table of contents in a complete and accurate
14 way.

15 So comments on the draft EIS, along with
16 responses -- EERA staff responses to substantive
17 comments will be included in the final EIS, and the
18 final EIS will also include appropriate revisions to
19 the draft EIS based on substantive comments.

20 So a quick way to think about a
21 substantive comment is just that a comment that
22 points out a concern and identifies, you know, why
23 it's a concern, and how it can be fixed. And then,
24 essentially, we'll take a look at that comment, and
25 if we're convinced, we'll change -- we'll change the

1 information in the draft as it turns to final.

2 A non-substantive comment would be, you
3 know, perhaps something along the lines of, you
4 know, I disagree with this paragraph or whatnot,
5 this analysis. But, you know, any information to go
6 along with that, there's nothing that we can really
7 do with that. All we can kind of say is, you know,
8 thank you for your comment, comment noted, but we
9 don't have any information to build on to determine
10 if we, you know, agree that that section of the EIS
11 should be changed.

12 Next slide, please.

13 So there's several ways to comment. You
14 don't have to speak over the Internet in front of a
15 whole bunch of folks you don't know who they are if
16 you don't want, but verbal comments are only
17 accepted at the public meetings. They were accepted
18 in Breckenridge and in Fergus Falls yesterday and
19 now tonight. And the reason they are is because of
20 Christine, because we have a court reporter here to
21 take down your comments. So tonight is the last
22 time we will accept -- can accept verbal comments
23 into the record for this portion of the process.

24 You can complete and submit a comment
25 form. That comment form will be available on our

1 webpage. There is also an online commenting tool on
2 our webpage which is listed there,
3 minnesota.gov/commerce/energyfacilities. Both the
4 forms will be there, that will be up tomorrow
5 morning, and the Internet -- there's a button you
6 can push to submit a comment and a fillable form
7 pops up, and you can submit your comments there.
8 You should get a pop-up window that follows after
9 you hit "submit" that says that you have submitted
10 your comments, and there's an "okay" button there.

11 And you can also mail your comments to me
12 or e-mail your comments directly to me at the
13 address on the screen. That address is also on the
14 comment form. This presentation will be on the
15 webpage, so you'll have that. And then my e-mail is
16 listed there as well, andrew.levi@state.mn.us for
17 those folks who might not have the screen in front
18 of them. Again, that's andrew.levi@state.mn.us.

19 And, lastly, the comment period does
20 close on February 23rd. So we do need your comments
21 sooner than -- on or before that date. If you
22 submit a comment -- or one comment and decide you
23 want to comment again, you certainly can. You can
24 comment as many times as you'd like during the
25 comment period. Again, just please have those

1 comments into us by February 23rd.

2 Next slide, please.

3 So, again, this is -- I'm going to turn
4 the meeting over. If you would like to submit a
5 comment, please either raise your hand by hitting
6 the raise-your-hand button at the bottom of the
7 screen or by hitting *3. The host will call your
8 name, and I believe there's a screen that will pop
9 up on your -- a pop-up that will appear on your
10 screen that you'll follow. And they'll let you know
11 that they've been unmuted. You can please state and
12 spell your name for the court reporter, and then go
13 ahead and provide your question or your comment.

14 You will remain unmuted during that time,
15 but once you're done with your questions and
16 comments, you will be muted again. If you would
17 like to speak again, you most certainly can. You
18 will just have to raise your hand again or dial *3
19 to get back into the queue.

20 Again, you have the opportunity to
21 provide any comment you'd like tonight. Those
22 questions that we spoke about earlier are most
23 useful to us right now: What needs to be clarified,
24 what is missing, and what needs to be added so that
25 the final EIS is complete and accurate.

1 And, again, I just want to remind you
2 that in May there will be an Administrative Law
3 Judge overseeing public hearings where you will have
4 the opportunity to tell the judge -- and thereby
5 tell the Commission -- what you -- you know, what
6 you think about the project. Should it be
7 constructed? Should it not be constructed? What
8 mitigation techniques should be used if it is
9 constructed and so forth.

10 So tonight we're focused on making the
11 best EIS we can, the most complete and accurate EIS
12 we can with your comment on the document as it moves
13 to final so that can be used by both the
14 Administrative Law Judge and the Public Utilities
15 Commission as they make their recommendation and
16 decision respectively.

17 So this slide will remain up for the
18 duration of the meeting so that you -- it's right
19 there with how you can comment.

20 And, I guess, do we have -- anyone raise
21 their hand?

22 MS. SARA RADIL: We are entering the
23 comment period. Currently, we do not have a raised
24 hand. So participants wanting to make a comment,
25 feel free to look at the bottom of your Webex screen

1 for the little hand, and I see a comment hand coming
2 through.

3 All right. Wade Mathiowetz, you are
4 currently being unmuted. Please accept the audio
5 pop-up. State your name for the court reporter and
6 spell your name for the court reporter, and then
7 please provide your comment. Thank you.

8 MR. WADE MATHIOWETZ: You want me to
9 spell it?

10 MS. SARA RADIL: Yes. If you could state
11 your full name and spell it for the court reporter,
12 that would be great, and then go ahead on to your
13 comment.

14 MR. WADE MATHIOWETZ: W-A-D-E, last name,
15 M-A-T-H-I-O-W-E-T-Z.

16 My question was for Dan. Was the
17 modeling done with the windbreak in the summer
18 months or in the winter months when there's no
19 leaves on the trees? And how many miles per hour
20 wind was that modeling done with?

21 MR. DAN PRASCHER: So one of the things
22 that we did was we looked at summer months, winter
23 months. We did the analysis both ways and looked at
24 what was -- what contributed to a worse case, and it
25 was the winter.

1 And we -- the mile an hour that produces
2 the worst amount or the largest amount of impact is
3 about four miles an hour. Anything above that, it
4 gets less, it's less dramatic. And the windbreaks
5 we used, we're looking at things like spruce, things
6 that have -- you know, evergreens, that are
7 typically used in at least one row of windbreaks out
8 there. But, yeah, that's what we used.

9 MR. WADE MATHIOWETZ: So the
10 four-mile-an-hour for wind does the worst in the
11 winter, and so at night the wind dies down, so we
12 could be at more threat during the night in the
13 winter not knowing all this.

14 MR. DAN PRASCHER: At a certain point it
15 just becomes so less that it doesn't really migrate.
16 But the thing to keep in mind is the only way this
17 actually becomes an issue for folks is if there is a
18 major rupture, what's called -- you know, a full
19 rupture, where it releases the maximum amount of
20 product into the air all at once. Anything less
21 than that doesn't release a big enough concentration
22 to be harmful to people.

23 And so it's that initial full release
24 that we were modeling, and we're looking at how does
25 that move, how does that develop into a cloud, how

1 does that move, and --

2 MR. WADE MATHIOWETZ: So you're saying
3 that a certain amount is not harmful to humans on a
4 four- to 24-inch line? And it takes ten to -- and
5 they even say this -- 25 minutes to shut down
6 valves, and you're saying it's not harmful to
7 humans, I beg to differ on that one.

8 MR. DAN PRASCHER: Yeah. Okay. Well,
9 it's not. And this is -- I mean, this is not me
10 saying that, this is the CDC that does tests on
11 this, uses research studies, real-life examples,
12 different releases that have been recorded. They
13 look at the research, they look at the information,
14 and then make a determination of what is harmful to
15 folks.

16 And a lot of times there's a time
17 component associated with that, and the short-term
18 exposure limit as put forth by the NIOSH, which is
19 part of the CDC. It's what they do, and they
20 collect these limits to help people understand
21 what's safe, what's not, what's of concern. But I
22 believe the effects of the short-term exposure limit
23 is possibly having some respiratory issues --
24 possibly. Not permanent -- not permanent health
25 risks to a person, and they put that at 30,000 PPM

1 for CO2.

2 MR. WADE MATHIOWETZ: Okay. You're
3 familiar with the pipeline rupture in Missouri in
4 2020, correct?

5 MR. DAN PRASCHER: In Mississippi, yes, I
6 am.

7 MR. WADE MATHIOWETZ: Or Mississippi, I'm
8 sorry, yes.

9 MR. DAN PRASCHER: Yeah, at Satartia, I
10 am.

11 MR. WADE MATHIOWETZ: I mean, that did
12 some damage there to folks, right?

13 MR. DAN PRASCHER: It made some people
14 sick. It did not --

15 MR. WADE MATHIOWETZ: Some unconscious,
16 some rescue vehicles couldn't make it there; is that
17 right?

18 MR. DAN PRASCHER: Yeah. I believe that
19 some rescue vehicles stalled.

20 MR. WADE MATHIOWETZ: And some people are
21 still dealing with aftereffects of that?

22 MR. DAN PRASCHER: I'm not aware of
23 people still dealing with that. I know that there
24 were people who went to the hospital. I believe it
25 was 40 -- I'd be guessing if I told you, but it was,

1 you know, not an insignificant amount of people.
2 They were sick, no one was hospitalized, no one
3 suffered permanent effects of that.

4 MR. WADE MATHIOWETZ: Well, even if it
5 was one person or two, it's still human lives here
6 we're talking.

7 MR. DAN PRASCHER: It is. It is.

8 MR. WADE MATHIOWETZ: And I think we need
9 to really, really, really not underestimate what's
10 going on here.

11 (Simultaneous cross-talking.)

12 COURT REPORTER: Wait --

13 MR. DAN PRASCHER: And that's -- I
14 appreciate your comment quite a lot, Wade. And
15 that's why we're trying to figure out what the
16 worst-case scenario is. And the thing to keep in
17 mind, too, Satartia was a 24-inch high-pressure
18 pipeline and we're talking about a four-inch.

19 MR. WADE MATHIOWETZ: Okay.

20 MR. DAN PRASCHER: Very, very different.

21 MR. WADE MATHIOWETZ: This says four-inch
22 for this pipeline, and there's -- in this DEIS that
23 was brought up for Wilkin and Otter Tail County, in
24 the drawings it says four to 24. Why is there four
25 to 24, and you're saying it's a four-inch pipeline?

1 MR. DAN PRASCHER: I can't speak to that.
2 Maybe someone else can, but as far as I know it's
3 always been a four-inch.

4 Andrew, do you want to --

5 MR. ANDREW LEVI: Yeah. If it does say a
6 four- to 24-inch, please let us know where. That's
7 a mistake.

8 MR. WADE MATHIOWETZ: It's in the
9 drawing. I went through 1,050 pages of this, so --
10 and there's no way that if it's a four-inch line
11 there should be any wording of 24 in there.

12 MR. ANDREW LEVI: Well, yeah, you're
13 exactly right. If there is wording of -- I mean, we
14 did talk about the Satartia release. Perhaps,
15 that's a 24-inch pipeline. But this is a four-inch
16 pipeline, and that's all it ever would be --

17 MR. WADE MATHIOWETZ: Right, but it's --
18 (Simultaneous cross-talking.)

19 COURT REPORTER: Wait, wait --

20 MR. ANDREW LEVI: And if it says that it
21 could be 24 inches, then that's obviously a mistake.

22 MR. WADE MATHIOWETZ: Yeah. In the
23 drawings, it says from four to 24. It's in,
24 probably -- the appendixes, I believe that's where
25 it's at.

1 MR. ANDREW LEVI: Okay. We'll look for
2 that.

3 MR. DAN PRASCHER: You know, one other
4 thing to note in Appendix G is doing these analyses,
5 especially with the CFD analysis, it shows how
6 quickly this dissipates, and worst-case scenario, it
7 would dissipate in just under four minutes. And
8 what I mean by "dissipate," I mean the PPM level,
9 the parts per million level, goes down to safe
10 levels everywhere. Not just at the furthest extent,
11 but everywhere within I think, like, it's
12 3.9 minutes. It's just under four minutes.

13 MR. WADE MATHIOWETZ: How long can you
14 hold your breath for?

15 MR. DAN PRASCHER: Well -- and so also to
16 put this into better perspective, it's -- that limit
17 that -- that's a 30,000-PPM level, and what the CDC
18 says is that a person will not have any sort of
19 permanent health effects if they're exposed to that
20 level up to 15 minutes, and we're saying that it's
21 four minutes.

22 MR. WADE MATHIOWETZ: Okay.

23 MR. DAN PRASCHER: If that makes sense.

24 MR. WADE MATHIOWETZ: I mean, that's for
25 an ordinary human. I'm -- we're not talking elderly

1 or anybody with respiratory problems. I mean, we're
2 doing all average numbers here, but we've got more
3 than just average people living in these places.

4 MR. DAN PRASCHER: Right, and --

5 MR. WADE MATHIOWETZ: It's a very big
6 health risk here, people.

7 MR. DAN PRASCHER: Well, it's -- you
8 know, yeah, it's not. But, those numbers, those
9 limits that are developed with the NIOSH or under
10 the CDC, they take a snapshot of the general
11 population. So we're just not talking, like --
12 well, we'll say like healthy individuals in their
13 20s. You know, it's actually a screenshot, and so
14 what they're saying is worst-case scenario, here's
15 what the level is that we recommend.

16 MR. WADE MATHIOWETZ: I understand that
17 part, but where this pipeline is going to be going
18 in other places, the general population isn't a good
19 feel for it. If you're going by close to a nursing
20 home, throw them numbers into it, and then
21 everything is going to -- the dramatics change a
22 lot.

23 MR. DAN PRASCHER: Yeah.

24 MR. WADE MATHIOWETZ: I mean, the
25 children -- I mean, I don't know, guys. I think

1 you've got to really dig deep on this one.

2 MR. DAN PRASCHER: Well, and from my
3 understanding looking at the right-of-way, it
4 doesn't pass by any places like daycares or schools
5 or retirement homes, any of that stuff. It's
6 very --

7 MR. WADE MATHIOWETZ: Within how many
8 feet, what's a fair setback --

9 (Simultaneous cross-talking.)

10 COURT REPORTER: This is Christine. Can
11 you hear me? Both of you were talking over each
12 other, and so then I can't hear.

13 So, Dan, you were saying that "it doesn't
14 pass by any places like daycares or schools or
15 retirement homes or any of that stuff. It's
16 very," and then I -- both were talking, so I didn't
17 hear what you said.

18 And then, Wade, after Dan's done, if you
19 could repeat what you said, please.

20 MR. DAN PRASCHER: I was just saying it's
21 very rural, very isolated.

22 COURT REPORTER: Thank you.

23 MR. WADE MATHIOWETZ: Okay. So you said
24 there's no schools and nursing homes in close
25 proximity. What is "close," or what is the

1 distance, I guess?

2 MR. DAN PRASCHER: Pick a distance, it's
3 all distances. It's not within any sort of
4 discernable affected distance.

5 MR. WADE MATHIOWETZ: Okay. That really
6 didn't clarify any feet or anything.

7 MR. DAN PRASCHER: So, yeah. So it's not
8 within, what, 2,000 feet, and we're looking at
9 distances that are affected by this pipeline around
10 600 feet.

11 MR. WADE MATHIOWETZ: Okay. So you're
12 saying 600 feet is the closest it will be then?

13 MR. DAN PRASCHER: That's the part where,
14 after 600 feet, the potential rupture would not be
15 concerning by any stretch of the imagination for
16 people, and we looked at further than that.

17 MR. WADE MATHIOWETZ: Okay.

18 MR. DAN PRASCHER: I think, actually, in
19 the study, doesn't it, Andrew, say 1,600 feet?

20 But, still, we're talking about double of
21 what the affected dispersion length would be.

22 MR. WADE MATHIOWETZ: Okay. In the DEIS
23 report it says Summit recommends people have a CO2
24 detector for 1,000 feet. So you're saying 600 feet,
25 anything after that really isn't harmful, but we

1 should have a CO2 detector at 1,000 feet. I'm kind
2 of confused there.

3 MR. DAN PRASCHER: Yeah. Because
4 everyone wants to be prudent about this. We want to
5 be safe. This does have -- as you said, it has, you
6 know, real consequences. It has -- really affects
7 people's actual lives. So we want to be safe, and
8 there's nothing wrong with putting in detectors.
9 It's just trying to do -- trying to do what's right,
10 what's going to protect the general population.

11 MR. WADE MATHIOWETZ: Okay.

12 MR. DAN PRASCHER: And make them feel
13 better, make them feel -- I'm sorry, I spoke over
14 you.

15 MR. WADE MATHIOWETZ: No, that's fine.
16 Just, you recognize there is a problem, then, up to
17 1,000 feet. That's what I was clarifying. Thank
18 you.

19 MR. DAN PRASCHER: No. No, there's not a
20 problem up to 1,000, but what I am saying is we need
21 to be prudent. And there's nothing to say we can't
22 be more conservative, and so we're just being
23 conservative.

24 MR. WADE MATHIOWETZ: That's all I have
25 now.

1 MR. ANDREW LEVI: Thank you.

2 MS. SARA RADIL: All right. Thank you.

3 Next, we have it looks like a screen
4 name, P-F-U-R-S-H-O-N-G. You are being unmuted.
5 Please accept the audio pop-up, state and spell your
6 name for the court reporter, and then provide your
7 comments.

8 And just a reminder, when we are
9 commenting, let's make sure that we're allowing one
10 person to speak at that time so that way Christine,
11 the court reporter, can get a clear record. Thank
12 you.

13 MS. PEG FURSHONG: My name is Peg
14 Furshong, P-E-G, F-U-R-S-H-O-N-G.

15 I would just like to build off of what
16 Wade has said. First of all, respectfully, the CDC
17 generally comes up with their examples related to
18 CO2 in a contained space with a roof and a ceiling
19 and four doors. Typically the humans that they
20 expose to a harmful pollutant like CO2 have two
21 different time exposures: There's a short exposure
22 and a long exposure. Typically, the person or the
23 test subjects are healthy individuals.

24 Dan Zegart, the investigative reporter
25 who reported on Satartia, has done follow-up

1 interviews with the local residents that were
2 exposed to that rupture. People were impacted at a
3 three-mile radius or more from the actual rupture
4 site of that incident.

5 And we're two years after that incident
6 and people still have significant medical issues
7 with COPD, asthma, they're lethargic, they still
8 have headaches, muscle aches, and are unable to
9 return to work. And he's reported that I -- you
10 know, I've watched the interviews of the people from
11 Satartia. They were hospitalized, and some of them
12 were hospitalized. No one died; I wouldn't dispute
13 that. But there have been long-term health effects
14 for those individuals, and they're still struggling.

15 So the setbacks, you know, if it's an
16 actual full-out rupture, there is no safe distance.
17 Unless you're out of the impact zone, which
18 depending on the weather, the time of year, and the
19 season could be up to six miles. So that's
20 concerning.

21 And it seems like, if you look at this
22 route, the ethanol plant is located in Fergus Falls
23 proper. It's going to be going by and near people,
24 a populated area. Definitely would be in a rupture
25 zone if there was a problem, and those people would

1 be impacted.

2 And so I think that that's really
3 important to think about if we're just talking about
4 this particular part of the proposed project and the
5 application for this 28 miles. It originates in a
6 populated area. The carbon-capture is going to be a
7 populated area because they'll be capturing the
8 carbon at the ethanol plant.

9 And so I really think that it's important
10 to be cognizant of that and not dismissive, because
11 this is a test project. We've never seen -- you
12 know, Summit has said, this is a first-of-its-kind
13 pilot project. There's not one of these types of
14 pipelines anywhere in the United States, and
15 certainly not in the Upper Midwest. And so we don't
16 know what is going to happen. We can anticipate
17 what might happen, but we don't know what's going to
18 happen until we have something more tangible to base
19 our decisions off of.

20 Because most of the, you know, dispersion
21 modeling and things like that are done in areas that
22 aren't necessarily in northern climates or cold
23 climates, or have the weather and the geography that
24 we have here. Because there never has been one of
25 these types of pipelines anywhere in this area.

1 So we're just guessing, right? Is that
2 fair to say, Dan? We're guessing as to what's going
3 to happen?

4 MR. DAN PRASCHER: Yeah. I would say
5 that's not necessarily a fair statement, no, and let
6 me give you a little more background. So I model
7 the majority of CO2 pipelines in the continental
8 United States, and I've done that for the last
9 couple of years.

10 There are several pipelines operating,
11 not quite like this is, but the pipeline part of it
12 has been a known quantity for quite some time. It's
13 been in federal regulations as part of 49 CFR 159,
14 which is hazardous materials. Supercritical CO2 is
15 considered one of those, and it's been in Federal
16 Code for, what, the last decade, something like
17 that.

18 It actually is very well known and -- but
19 you do make a point. You do make a point about the
20 cold climate, and the software that we use, the
21 multiphysics engines that we employ, they do account
22 for all of that. They do account for the humidity,
23 temperature. And if you look in the Appendix G, it
24 goes through all of the things that we tried to --
25 that we did use in order to really model what this

1 is going to look like in Minnesota, where it's being
2 proposed.

3 Because we don't -- we don't want to do
4 something that's more akin to, you know, Arizona,
5 and then say, well, if you use your imagination --
6 because, like I said earlier, this is important. We
7 need to get it right, and we did that.

8 One other point I would like to make is
9 the difference between Satartia and where it's being
10 proposed now in Minnesota is that Satartia, yes, it
11 was much, much more CO2 released, and, also, the
12 geology was such that it kind of created a perfect
13 storm. It was up on a mountain, or a very large
14 hill, I guess. But the valley and the terrain made
15 it so that it created a maximum push. It was like a
16 V-like valley that it went right down into.

17 And the reason that's bad is because it
18 kind of shields it from crosswinds. You don't get
19 the mixing that you normally see in flat, open
20 terrains like you do here in Minnesota. And so it
21 had the chance, when it's down in those valleys --
22 and I'm not talking about, you know, like a ditch or
23 something. We're talking about, you know, a 30-,
24 40-foot wall. You know, the V, this height, 30, 40
25 feet. It was really a perfect storm event.

1 And, yes, it did elongate it quite a lot,
2 and we wanted to make sure that we were not modeling
3 that. We were modeling what we're seeing here in
4 Minnesota. They did a realistic look at what we're
5 doing here, and what the study showed is the terrain
6 that's here in Minnesota really doesn't contribute
7 to elongating those -- those impacts like we did see
8 in Mississippi.

9 MS. PEG FURSHONG: Well, I appreciate
10 that, Dan.

11 I would just say two things, and I don't
12 necessarily need a response, but I will say them. I
13 don't -- you make it sound like this is really safe,
14 and it's not. Because PHMSA has issued their
15 concerns, and they're reevaluating their criteria
16 and guidelines because they don't think that CO2 is
17 like other pipelines. While they have been
18 operating, they are foreshadowing more significant
19 concerns as this becomes a popular idea to make
20 money.

21 Second of all, I would say, because the
22 PUC allowed Summit to break this up into, like,
23 segments, maybe the Fergus Falls-to-Breckenridge
24 doesn't have any kind of terrain like you're
25 referring to down in Satartia, but the rest of the

1 proposed footprint does.

2 I live in the Minnesota River Valley, and
3 there are 30- and 40-feet, you know, valleys all
4 in -- you know, in segments of this proposed route.
5 At least, where I live in Renville County. So we're
6 going to have to pay for modeling again. Because
7 the modeling that we're doing for this little
8 segment is not going to be useable anywhere else in
9 the footprint -- the proposed footprint.

10 And I realize that Summit hasn't applied
11 for the rest of the footprint yet, but they fully
12 intend to since they have easements in ten counties.
13 And they have been buying easements, and they've
14 been advertising it. And so we're going to waste
15 taxpayer dollars modeling another round of this as
16 they submit another application and -- or however
17 many they're going to submit.

18 But I'll just leave it at that. I
19 appreciate your comments. I hope you can understand
20 why people are concerned is because there's a lot of
21 information that's not congruent with everything
22 that people have access to to understand this
23 project. Thank you.

24 MR. DAN PRASCHER: Yeah. I do greatly
25 appreciate what you said. Yeah, absolutely. This

1 is serious. That's why we're trying to take it
2 seriously.

3 And maybe, Andrew, you can speak to,
4 maybe better than I can, about there aren't any
5 taxpayer dollars paying for any of this.

6 MR. ANDREW LEVI: Yeah. I just wanted to
7 say, Peg, that I appreciate your comments, and I can
8 tell you that we are very concerned about the safety
9 aspect of it, too. We were asked to do the CFD
10 modeling as part of scoping, and we did that. And
11 we spent a lot of Summit's money doing that.

12 And I think that those -- you know, the
13 results of that study are publicly available, just
14 like folks wanted them to be. So I'm really -- I'm
15 really proud that we were able to do that as we were
16 asked to do.

17 You know, Summit is responsible for the
18 cost of all permitting. So, you know, again, Dan is
19 correct. There would be no -- there is no taxpayer
20 money involved. And I guess when those applications
21 come in, you know -- for the other portions of the
22 project, if they do come in, and if -- you know, if
23 the CFD modeling that's done here isn't applicable
24 to down here, well, then I think that decision gets
25 made at that time.

1 You know, the environmental review for
2 this portion of the project is specific to -- that
3 portion is specific to here, and if another
4 alternative -- another -- excuse me, another segment
5 of the larger project comes in, then we'll take the
6 same hard look at that segment as well. So we
7 wouldn't -- I don't think we would simply say that,
8 yeah, it's completely different terrain, but -- you
9 know, it's completely different, but that counts
10 here. I don't see us doing that at all.

11 But I do appreciate what you're saying,
12 and, you know, we're very concerned about that
13 aspect of it, and that's why we did Chapter 8 the
14 way we did and Appendix G the way we did. So thank
15 you for your comments.

16 MS. SARA RADIL: Thank you.

17 And we have a handful of participants
18 with hands raised, so we'll move on. One inquiry
19 came through the chat, Andrew: Just to -- if you
20 could clarify if there is a public hearing date set
21 at this point?

22 MR. ANDREW LEVI: It's mid-May. It's
23 mid-May. If someone will -- there is a schedule set
24 out by the Administrative Law Judge. That date is
25 probably on there. It escapes me right now. If

1 someone will look that up.

2 Christy looked that up. I saw her pop
3 up, and Christy will let us know what that date is.

4 MS. CHRISTY BRUSVEN: Yeah. Andrew, the
5 schedule for this, the public hearing is set for
6 May 15th and May 16th.

7 MR. ANDREW LEVI: So, yeah, mid-May.

8 MS. SARA RADIL: All right. Thank you.

9 We'll move back to our participant
10 comments now. A couple refresh -- reminders that we
11 are on our first round of comments, so to ensure
12 that we're able to get through all participants,
13 let's attempt to use approximately five to
14 ten minutes for comments. And then what we'll do
15 is, as we wrap up the first round, raise your hand,
16 again, and we'll go back through and open it up for
17 additional comments. I just want to make sure that
18 everyone has an opportunity to comment here.

19 So our next participant, we have Ginny.
20 Please accept the audio pop-up, state your name and
21 spell your name for the court reporter, and then
22 provide your comment. Thank you.

23 MS. GINNY ALLIE: I'm sorry. I missed
24 that. I couldn't hear you, the last part.

25 MS. SARA RADIL: Yes. Go ahead and state

1 and spell your name for the court reporter, and then
2 provide your comment.

3 MS. GINNY ALLIE: My name is G-I-N-N-Y;
4 last name is A-L-L-I-E. And what else was I
5 supposed to say?

6 MS. SARA RADIL: And then feel free to
7 provide your comment or question.

8 MS. GINNY ALLIE: Okay. I just was
9 piggybacking off of Wade Mathiowetz's comments
10 regarding the information being on much of the EIS
11 listing the pipe to be four to 24 inches. And I put
12 something in the comment -- or the chat to indicate
13 a whole bunch of figures, that I saw that, and the
14 response was that it was helpful and that it could
15 be used for editing purposes.

16 But my concern is, well, do we
17 automatically assume that it's not right, or does
18 that need to be looked at more carefully to see if
19 four to 24 inches is really what was intended?

20 MR. ANDREW LEVI: No, it was a mistake.
21 It's four inches. It will be four inches on the
22 inside, and then four and a half inches on the
23 outside. So it will have a diameter of about a
24 quarter of an inch all the way around. It's a
25 four-inch pipe with a four-and-a-half inch outside

1 diameter. It is not -- it will not be bigger than
2 that. That's what they have applied for, and that
3 is all the Commission -- if they issue a permit, it
4 says specifically in the permit the size of the pipe
5 they can construct, and Summit Carbon is asking for
6 a four-inch pipeline and not a 24-.

7 That is, obviously, a big mistake.
8 That's my fault, and we'll get it fixed. I'm glad
9 that someone -- I'm glad that it was brought to our
10 attention, but I apologize for that. We will do a
11 search for that and make sure that that's fixed in
12 the final.

13 But Summit is applying for a four-inch
14 pipe. Should the Commission issue a permit, the
15 permit would specify that diameter, and,
16 essentially, if they build something different, then
17 they're violating their permit and it would take get
18 taken away.

19 MS. GINNY ALLIE: All right.

20 MR. ANDREW LEVI: It looks as if Christy
21 hopped on, so, Christy, if you have something to
22 add?

23 MS. CHRISTY BRUSVEN: Andrew, I would
24 just add, you're absolutely correct that the
25 application is for a four-inch pipeline. The

1 figures attached to the environmental control plan,
2 the ECP, which is an attachment, do have "typical."
3 Which are typical practices, showing best-management
4 practices. Some of those show, you know, a four- to
5 24-inch pipe because that practice would apply
6 regardless of the diameter of the pipe, or it shows
7 differences, where necessary. So that may be why
8 folks are seeing some references to 24 inches, but,
9 again, the application here is for the four-inch
10 pipe.

11 MS. GINNY ALLIE: Okay. Thank you for
12 answering that. I just -- because it did say on the
13 bottom of all figures from 2 through 15 on Appendix
14 D, proposed pipeline four to 24 inches. And I think
15 there were other places that said that as well, but
16 thank you for commenting. That's all I have.

17 MR. ANDREW LEVI: No, again, thank you
18 for bringing that to our attention. That is --
19 Minnesota, that's their ECP, it's an environmental
20 construction plan, and it is for the entire State of
21 Minnesota. They would, you know, if they do -- if
22 the applicant does submit an application -- and as
23 Peg alluded to -- talked about, you know, they
24 actively are doing so, I believe that construction
25 plan would also apply to those new portions. So,

1 yeah, that's something that we could look at in the
2 final to try to eliminate that confusion. So we
3 apologize about that. I'm sorry.

4 Do you have anything else?

5 (No response.)

6 MS. SARA RADIL: And if you have anything
7 else, feel free to raise your hand again, and we'll
8 wrap back through the list, as mentioned. So thank
9 you for your comment.

10 Craig, you're being unmuted. Please
11 accept the audio pop-up, and then state and spell
12 your name for the court reporter and provide your
13 comment. It looks like, Craig, you are unmuted.

14 MR. CRAIG WOODWARD: Can you hear me?

15 MS. SARA RADIL: Yes.

16 MR. CRAIG WOODWARD: Okay. Great. My
17 name is spelled Craig, C-R-A-I-G; Woodward,
18 W-O-O-D-W-A-R-D.

19 MS. SARA RADIL: Thank you. Feel free to
20 provide your comment.

21 MR. CRAIG WOODWARD: Okay. And I
22 appreciate the comments that, you know, Dan and the
23 others have made, and also the attendees that are
24 listening in and commenting. Yeah. You know, I'm
25 not unlike them in having some concerns, certainly,

1 about a hazardous liquid CO2 pipeline.

2 And you've mentioned Satartia and that
3 and all, and it kind of brings me around. I circled
4 around to something that I believe Dan hinted on,
5 but I don't know if any information was really
6 provided in terms of plume model that was done by
7 Summit. I thought I had read that they have done
8 that and maybe indicated that it was done, but I'm
9 just wondering, what evidence do you have of that?
10 And what did they say about their plume modeling?

11 You know, I've heard of some that has
12 been done by others, not Summit. But it can be
13 fairly significant because they believe they have --
14 how -- pounds per square inch in that four-inch
15 pipeline, Dan, was it like 2,100 pounds per square
16 inch, does that sound appropriate?

17 MR. DAN PRASCHER: Yeah. It's a little
18 higher than that, but yeah, approximately. It's --

19 MR. CRAIG WOODWARD: A little higher than
20 that, so that's a tremendous amount of pressure to
21 push it, obviously, to where they want to go, which
22 apparently is North Dakota.

23 And, you know, carbon steel pipe, I
24 think, seems there's sometimes an issue. Obviously
25 in Satartia it busted the seam and exploded, and so

1 that is a fear, I'm sure, of residents, you know,
2 those folks in Fergus Falls or wherever they might
3 go in the State of Minnesota. So I can appreciate
4 that.

5 But do you have any hard facts in terms
6 of their plume modeling, Dan?

7 MR. DAN PRASCHER: Yes. Yeah. They did
8 their modeling. And part of our due diligence that
9 we wanted to do is to say, okay, Summit send us your
10 assumptions, the data you used, let us know what
11 kind of modeling software that you used, and we're
12 going to check all of it; and we did.

13 And like I mentioned briefly, I just kind
14 of skipped over it, but I did check what they did.
15 Using their assumptions, using all the data that
16 they collected, I agree with their outcome, what
17 their -- with what they arrived at. I think it's
18 reasonable.

19 And part of -- and when I say
20 "reasonable," what I mean is that our job as
21 pipeline integrity professionals, myself and others,
22 is "reasonable" means we're looking at the worst
23 reasonable case, right? So we're not looking for
24 that one-in-a-gazillion. Like, we're not trying to
25 predict a meteor strike, you know, coming in from --

1 MR. CRAIG WOODWARD: Right.

2 MR. DAN PRASCHER: We're trying to look
3 at, all things considered, what is the worst-case
4 scenario, and that's what we're using, what's
5 reasonably worst-case scenario to do it. And so --
6 and that's -- they did that, and I think they did a
7 pretty good job.

8 I am usually a little more conservative
9 than most, and so I assumed some things more
10 conservatively than they did, and they -- that's
11 what I put in the report. I'm trying to show that,
12 you know.

13 MR. CRAIG WOODWARD: Good for you.

14 MR. DAN PRASCHER: Well, you know --

15 MR. CRAIG WOODWARD: Well, that's -- yes.

16 MR. DAN PRASCHER: We want people to
17 know, yeah.

18 MR. CRAIG WOODWARD: Absolutely.

19 MR. DAN PRASCHER: So yeah.

20 MR. CRAIG WOODWARD: What were their
21 findings? Did you have anything specific that I
22 could learn from?

23 MR. DAN PRASCHER: It's in the report,
24 it's Appendix G.

25 MR. CRAIG WOODWARD: G, got it.

1 MR. DAN PRASCHER: Yeah. And it shows
2 what I came up with, it shows what they came up
3 with.

4 MR. CRAIG WOODWARD: Um-hmm.

5 MR. DAN PRASCHER: And then all the
6 variables that we used --

7 MR. CRAIG WOODWARD: Sure, sure.

8 MR. DAN PRASCHER: -- in that.

9 MR. CRAIG WOODWARD: Okay.

10 MR. DAN PRASCHER: But -- yeah. You
11 know, and -- yeah.

12 MR. CRAIG WOODWARD: Well, I appreciate
13 that, Dan. Thank you.

14 One other question that I have and it --
15 well, a comment, not necessarily a question, but did
16 you speak with them in terms of the conversion
17 process of going to an ethanol plant and then
18 converting that gas to a liquid? And did they
19 discuss that at length with you, or how did they
20 approach that process, Dan?

21 MR. DAN PRASCHER: You mean as far as
22 capturing the carbon --

23 MR. CRAIG WOODWARD: Yes.

24 MR. DAN PRASCHER: -- and liquifying it?

25 MR. CRAIG WOODWARD: Yes.

1 MR. DAN PRASCHER: No, and that really
2 wasn't my purview.

3 MR. CRAIG WOODWARD: Okay.

4 MR. DAN PRASCHER: I'm familiar with that
5 process --

6 MR. CRAIG WOODWARD: Okay.

7 MR. DAN PRASCHER: -- and one thing
8 that -- and one thing that I was going to mention,
9 the pressure, the twenty- -- just shy of
10 2,200 pounds.

11 MR. CRAIG WOODWARD: Um-hmm.

12 MR. DAN PRASCHER: You know, you there
13 are several pipelines that I model in the
14 continental United States, and it's not uncommon to
15 go above 3,000.

16 MR. CRAIG WOODWARD: Um-hmm.

17 MR. DAN PRASCHER: The trick is,
18 regardless of what the pressure is -- and the
19 pressure is really to keep it in that liquid form.
20 It's not to propel it down the pipeline. But the
21 key thing to take away is they must -- regardless of
22 the pressure, they have to construct the pipeline
23 out of materials that are suitable per API 5L
24 standard. That's a standard by American Petroleum
25 Institute. It's been revised and updated over the

1 years. The most current is 5L, and it says, if you
2 are going to create a pipeline, it must adhere to
3 these kinds of things. It has to be appropriate for
4 the kind of material that's being transported. It
5 also has to be appropriate for the pressures, and so
6 that means there's a large factor of safety that's
7 also built into the design of these. So, you know,
8 sometimes these pipelines get up to a half-an-inch
9 or inch thick.

10 MR. CRAIG WOODWARD: Uh-huh.

11 MR. DAN PRASCHER: You know, they need
12 the extra wall to do that. But, yeah, all of that's
13 dictated to all oil and gas operators by PHMSA
14 regulations.

15 MR. CRAIG WOODWARD: Sure. Sure. Well,
16 again, I'm going to come back to the conversion
17 process and just if there were -- I don't think you
18 indicated there was much of a discussion about that
19 process with Summit, but -- whoever would be
20 converting gaseous CO2 to liquid form. But in the
21 research that I've done, I think there is a
22 tremendous amount of heat that is generated in that
23 process. Which leads me to have great concerns for
24 our state of Minnesota in terms of water usage, and
25 that's precisely how they intend to dissipate the

1 extreme heat in that conversion process. And I know
2 this, that they will probably try to get water
3 permits, vis-à-vis working with the DNR, or whoever
4 in Minnesota, in order to provide water.

5 I know this in terms of they're in other
6 states as well. They're in the Midwest trying to
7 get the pipeline up and running. They have -- they
8 have a meeting March 14th in Des Moines, Iowa, in
9 which they will go before that resource commission.
10 And they are going to ask for water permits totaling
11 a half a billion gallons of water in the course of a
12 year. That is 500 million gallons of water in the
13 course of a year.

14 I know that -- I know that Minnesota has
15 aquifers that they pull water from. Iowa does, too,
16 and a lot of states do. The aquifers in Iowa, from
17 what I -- in the research that I have done have
18 indicated that they are depleting because of our
19 droughts. So I am quite concerned over that issue
20 of water usage, and it will take -- if they come to
21 Minnesota, I know POET is here. POET has signed up
22 with Summit. There's going to be a great need for
23 water. I hate to see that depleted knowing that
24 Minnesota as well has been under drought conditions
25 and probably will be next year as well.

1 So, anyway, I don't know if that's been
2 addressed. I don't think it, maybe, has been, but I
3 think maybe it's an environmental study you have
4 done. Maybe that should be brought into it in some
5 facet so that it's recognized. So that's an
6 additional comment I would have.

7 MR. ANDREW LEVI: Thank you for that
8 comment.

9 I just wanted to point out that the EIS
10 does talk about water usage. Sara, I think she's on
11 the meeting, she pointed out that there's a
12 discrepancy between what's in the table and what's
13 in the paragraph. But it looks as if the company
14 would be using about 8.2 gallons of water per minute
15 in the winter to cool and about 40 gallons per
16 minute in the summer months to cool. The EIS
17 currently says though that's an average water usage
18 of about 13 million gallons. I did the math wrong
19 on that. I believe it's a little north of 20
20 million gallons.

21 MR. CRAIG WOODWARD: That's what I
22 thought, yeah.

23 MR. ANDREW LEVI: And we'll get that
24 fixed. But that's currently what it's saying is 8.2
25 in the winter and 40 in the summer, and that's per

1 minute.

2 And you're absolutely correct that water
3 appropriation in the State of Minnesota is done by
4 the Department of Natural Resources. And, you know,
5 I'm expecting the DNR to provide some comments on
6 this particular section of the draft EIS.

7 I'm sorry. I didn't mean to cut you off
8 if you had more. I just wanted to let you know
9 those numbers in case -- just so you know we're
10 aware of the -- it's a lot of water.

11 MR. CRAIG WOODWARD: It is. It is.
12 Thank you, Andrew and Dan, both for your comments,
13 and that's all that I've -- I've eaten up my five
14 minutes, I'm sure. Thank you.

15 MR. ANDREW LEVI: Thank you very much.

16 MS. SARA RADIL: Thank you, Craig.

17 Up next, we have Ed Iverson. You are
18 being unmuted. Please accept the audio pop-up, and
19 then state and spell your name for the court
20 reporter and provide your comments.

21 MR. ED IVERSON: Ed Iverson, E-D,
22 I-V-E-R-S-O-N.

23 I guess you told Wade that the CO2
24 dissipates in three to four minutes. And first of
25 all, I don't think I can hold my breath that long

1 either, but I just want -- you never know when to
2 take that last breath to hold it is the problem.

3 And I guess I've farmed for just about
4 30 years. I've worked with anhydrous ammonia a lot,
5 and had one experience -- I had a really nice mask
6 so I could breathe in it. And I was walking back to
7 the tractor, and I thought that I was out of it. I
8 could not see any anhydrous cloud or anything. I
9 took my mask off. All of a sudden, I could not
10 breathe.

11 And I ended up getting back to the
12 tractor, but I just -- I want -- and I know they're
13 different animals, but I want you to be aware of
14 just how fast that can happen. And if it happens in
15 three to four minutes, your panic has set in, and
16 you're in a lot of trouble, and I just -- this gas
17 stuff that hangs low really, really bothers me. And
18 I guess that's all I really had to say.

19 MR. ANDREW LEVI: Thank you for saying
20 that. I'm glad you're okay, obviously. Yeah. I
21 mean, we're concerned, too. That's why we did it,
22 and that's why we're presenting the information so
23 that it's available so folks know what that distance
24 is, what that time frame is. You know, that's what
25 we're trying to do with the EIS itself.

1 With regards to mitigating that, there
2 are things that can be done in terms of education.
3 I know that, you know, the -- should they be issued
4 a permit for the project, that the company would be
5 conducting an education -- they would -- emergency
6 response plan, which would include an education
7 component. I know that the State would have ideas
8 as to what we think maybe should be included in
9 that, you know. And if you have any ideas, please
10 comment on that and let us know, and that would be
11 appreciated.

12 So, again, yeah, it is a big deal, and I
13 bet that would scare the crap out of me. I'm sure
14 it did you, too. And -- yeah, and it's a serious
15 thing. Thank you.

16 MR. ED IVERSON: Well, the biggest thing
17 is, if you can't see it, you don't know which
18 direction to run. And I just -- to me this seems
19 like a bad idea, but I appreciate you taking my
20 comment. And I guess that's all I have for now.

21 MR. ANDREW LEVI: Thank you.

22 MS. SARA RADIL: Thank you for your
23 comment.

24 Peg, you are up next. You're being
25 unmuted. Please state your name and spell your name

1 for the court reporter, and then provide your
2 comment.

3 MR. ANDREW LEVI: You don't have to spell
4 it again, Peg.

5 MS. SARA RADIL: Okay.

6 MS. PEG FURSHONG: Thanks. Peg Furshong.

7 Just two quick things. When I referenced
8 taxpayer dollars, could you clarify for me, are all
9 the agencies being reimbursed for their time spent
10 on this project? Or are you referring mostly to the
11 modeling that --

12 MR. ANDREW LEVI: I'm referring to the
13 modeling, yes, you're correct.

14 MS. PEG FURSHONG: Yeah.

15 MR. ANDREW LEVI: So any comment on --
16 you know, if MnDOT provides comments or AG, you
17 know, Department -- I should -- okay. The
18 Department of Transportation provides comments or
19 the Department of Agriculture or the Pollution
20 Control Agency provides comments, then, yes.

21 I don't know exactly how they're funded
22 and where their money comes from, but I do know
23 where the money comes from for the EIS, and that's
24 from -- not from taxpayer dollars. But, yes, Peg,
25 you're correct, that I'm sure there's a state

1 employee somewhere looking at this on a, you know,
2 general fund money somewhere.

3 So, yes, I was referring specifically to
4 our role in -- EERA's role in this, and I appreciate
5 that clarification. Sometimes we get into our
6 little boxes and forget it's a big city out there.

7 MS. PEG FURSHONG: I know, and it's not
8 just the state level. The counties, their meetings,
9 there's county commissioner meetings, there's county
10 offices, all sorts of levels of local government
11 that are involved in this process at the expense of
12 taxpayers for this project. So I think that that's
13 just something we should be aware of.

14 I did also want to ask if the EIS
15 requires this process -- if they permit this process
16 to have transparency with the water use. Because we
17 know that sometimes in corporate industries, they
18 will reach out to other businesses who aren't fully
19 using an appropriation of water and try to access
20 that water.

21 And we know that potentially that could
22 happen here with the ethanol plant already having --
23 some of them having appropriations for water may not
24 be using the full amount, and they make
25 arrangements -- because they're partners in this

1 deal, right, ultimately -- to share water
2 permitting.

3 And I just feel like, you know, when
4 we're thinking about climate change and we're
5 thinking about the state suffering from drought and
6 transparency for the public that Summit's usage of
7 water should be separate from the ethanol plant's
8 usage of water.

9 And they both should be transparent to
10 the local communities. Because this is an extremely
11 water-intensive industry, and putting carbon-capture
12 on the ethanol plant is going to double their
13 footprint in every single community.

14 And while we're just -- I think the other
15 thing about this EIS process that's interesting is,
16 we're just talking about one plant, and there's a
17 proposal right now for a minimum of six in
18 Minnesota, but potentially additional POET plants.
19 And you're talking about 20 million gallons of water
20 annually for one plant, multiply that by six or
21 more, and we're looking at that much more water.
22 And does the State of Minnesota -- I know we're the
23 land of 10,000 lakes, but, honestly, with the
24 drought that we've been experiencing -- and it's
25 only going to get worse as we move forward -- do we

1 have enough water in the State of Minnesota to
2 support infrastructure that is going to be this
3 water intensive and not a public good?

4 That's the question that we face, and we
5 shouldn't go into this naively thinking that we'll
6 let them build the infrastructure and figure out the
7 water later. Because they clearly can't run the
8 infrastructure without the water appropriation, and
9 that, to me, is a real pivotal concern that isn't
10 expressed clearly or doesn't communicate well in the
11 draft EIS. It's not really clear to the -- clear
12 that that's an important part of this to make it
13 work, and I think that that should be addressed.

14 MR. ANDREW LEVI: I'm sorry, Peg. Just
15 to clarify so I know what you're saying and what you
16 want clarified, is you want water use from the
17 ethanol plant and -- but more specifically,
18 acquiring that water -- well, not for the ethanol
19 plant, but for the capture facility, that acquiring
20 that water into the future, you want that discussed
21 more?

22 MS. PEG FURSHONG: I just think -- two
23 things. One, I think the ethanol -- the water
24 that's going to be used for this infrastructure
25 needs to be separate -- accounted for separately

1 than the water from the ethanol plant. It's got to
2 be clear that it can't be muddled.

3 So if an ethanol plant isn't fully using
4 its water appropriation, they don't just slide that
5 water -- because the capture is at the ethanol
6 plant. So it would be easy to let Summit use the
7 water for the carbon-capture very easily. It would
8 be hard to monitor that.

9 So whatever water is used for the ethanol
10 plant, make sure that it's accountable to the
11 appropriation for the ethanol plant, and whatever
12 water that you think that this carbon-capture
13 process needs, it should be publicly transparent how
14 much water that is and that they're accountable for
15 that. I think that really needs to be clear.

16 But, also, the draft EIS doesn't
17 really -- the gentleman, Craig I believe his name
18 was, this is all coming out in Iowa right now, and
19 they're shocked to realize how much water is needed
20 for this project accumulatively. And so that's the
21 problem with us breaking the project up in Minnesota
22 is we're not seeing the cumulative impacts or needs.

23 But, clearly, this is a huge amount of
24 water that this project needs to even run. So if we
25 let them build this infrastructure, do we have the

1 water to make it sustainable? They say this has a
2 25-year life. Do you really think we have that kind
3 of water in Minnesota to support this for 25 years?
4 I mean, we should -- if they're projecting the life
5 of the pipeline, we should be projecting if we have
6 the water to support that. I just think that's
7 really important.

8 And the draft EIS doesn't really
9 articulate the amount of water that's needed or
10 clarify that that is just for this one ethanol
11 plant. So that it's clear that for every ethanol
12 plant the infrastructure is approved for, we need
13 that much more water. That's what I would really
14 like articulated better.

15 MR. ANDREW LEVI: I understand what
16 you're saying, Peg. Thank you.

17 MS. SARA RADIL: Thank you for your
18 comment, Peg.

19 Up next, we have Sharon Leinen. You're
20 being unmuted. Please accept your audio pop-up, and
21 state and spell your name for the court reporter,
22 and then provide your comment.

23 MS. SHARON LEINEN: Okay. My name:
24 Sharon, S-H-A-R-O-N; Leinen, L-E-I-N-E-N.

25 Just to add a little bit to what Craig

1 and Peg were saying. I live in the country. I have
2 a well. I, too, am concerned about how much water
3 this is going to take. I don't want to have to
4 re-drill my well, and I'm wondering if we aren't
5 sacrificing one of our resources just to save
6 another. The water use needs to be looked at,
7 definitely.

8 And the second thing is, I live about a
9 quarter of a mile from the proposed pipeline, and I
10 have no treeline or anything between me and the
11 pipeline to disperse the CO2 if a rupture should
12 happen. I'm just wondering how we are going to be
13 warned if there is a rupture, if we're going to be
14 warned. Because it's kind of scary to think about
15 it.

16 MR. ANDREW LEVI: Thank you for that,
17 and, yes, it is scary.

18 Scott, do you have any comments about a
19 preliminary -- well, do you have any comments,
20 Scott, response further?

21 MR. SCOTT O'KONEK: All right. You've
22 got to give me a second, Andrew. I'm just trying to
23 unmute myself here, if I could figure out the right
24 button to push.

25 MR. ANDREW LEVI: You pushed it.

1 MR. SCOTT O'KONEK: You know, if there --
2 if there was a release or something -- and, you
3 know, Dan can probably back me up on this also,
4 too -- you know, a quarter-mile is quite out of the
5 distance of, you know, what's stated in the draft
6 EIS of a, you know, problematic area.

7 But if there was something that happened,
8 you would hear, you know. I mean, obviously we
9 know -- we talk about the pressure that's in this
10 pipeline. You would be hearing that pressure coming
11 out of the pipeline. You would see the actual cloud
12 coming out of the pipe that -- you know, it's
13 changing back from a liquid to a gas. There's lots
14 of freezing that happens there, and there's actually
15 going to be, you know, frozen water particles coming
16 out of the ground. So if there was something going
17 on, you would hear and see something.

18 MS. SHARON LEINEN: So you're telling me
19 I have to be constantly vigilant in case there's a
20 rupture. What if I'm mowing the lawn and I'm not
21 looking over that way and I can't hear this rupture
22 going on?

23 MR. SCOTT O'KONEK: You know, I can't
24 talk about every hypothetical scenario that we may
25 run across, but those are the things that would be

1 coming from the pipe in that instance. And the
2 distance, you know, that you're talking away from
3 the pipeline is totally safe in any circumstance.

4 MS. SHARON LEINEN: Would you feel safe
5 living that close to the pipeline?

6 MR. SCOTT O'KONEK: Absolutely.

7 MS. SHARON LEINEN: Hmm. Yeah. Okay.
8 Well, I just think that people should be aware.
9 There should be some kind of a warning system in
10 place so that we know if something is going on, and
11 there doesn't seem to be anything planned for that
12 at the moment.

13 MR. SCOTT O'KONEK: And, you know, too --
14 and, Andrew, I just want to touch on, you know,
15 we -- like -- and you've touched on this a little
16 bit, too, public awareness never stops, public
17 training, you know, never stops. Like, we have to
18 work with all local responders, local agencies,
19 continually train, continue to communicate what's
20 out there. What do you do if you see this or hear
21 this? All of that stuff does not stop ever. It's
22 going to continually be updated. We're going to
23 reach back out, and, you know, that education and
24 communication never stop.

25 MR. ANDREW LEVI: I just wanted to point

1 out that the State of Minnesota cannot set safety
2 standards. That said, the State of Minnesota could
3 ask the company if they would like to implement a
4 safety protocol standard, whatever you'd like to
5 call it.

6 And the State has -- the EERA has
7 recommended as a potential mitigation -- something
8 to think about anyway -- is a reverse -- kind of
9 reverse 911 system. To where if something happens
10 along the pipeline, you know, notice would go out
11 via phone to folks along the pipeline.

12 You know, we understand that if the whole
13 rupture takes three to four minutes, not -- you
14 know, not sure if that system would -- could be
15 implemented in time, but it's something that we've
16 at least brought up as something to think about to
17 address that idea of the company being able to get
18 in touch with landowners in a hurry and let them
19 know something's up.

20 MS. SHARON LEINEN: What I'm hearing is
21 those that live along the pipeline route are going
22 to be in a constant state of worry, wondering if
23 there's a rupture going to happen, if somebody's
24 going to let us know. That's not a very nice way to
25 live.

1 MR. ANDREW LEVI: I don't -- I imagine it
2 wouldn't be.

3 MS. SHARON LEINEN: Thank you.

4 MS. SARA RADIL: Thank you for your
5 comment.

6 Tess Dornfeld, you are being unmuted.
7 Please accept your audio pop-up, state and spell
8 your name for the court reporter, and provide your
9 comment. Thank you.

10 MS. TESS DORNFELD: Hi. Tess Dornfeld,
11 T-E-S-S, D-O-R-N-F-E-L-D.

12 I wanted to follow up a little on the
13 discussion about the water use. A 25-year timeline,
14 that's pretty concerning to me. And I don't know,
15 do we have modeling, you know, of the different
16 potential scenarios of what will happen to our
17 state's water resources in the next 25 years? You
18 know, if these -- we could say that we have
19 sufficient water to supply that today, but in
20 20 years things could look a lot different.

21 There's just been the news out today that
22 we've now passed 1.5 degrees of warming for
23 12 months in a row, and we don't know for sure
24 what's going to happen 20 years from now. And so
25 can we really say that we can reliably commit that

1 amount of water 25 years from now not being sure --
2 or, like, even if we can make our best guess of
3 whether that will still seem reasonable.

4 MR. ANDREW LEVI: I think that -- thank
5 you for that. That's a very good point. I think
6 that -- you know, the Department of Natural
7 Resources is -- appropriates water in the state.
8 It's their job and their responsibility to ensure
9 that they're doing that in a way that, you know,
10 maintains that resource. I think that -- I think
11 I'll start with that and say that, and I don't
12 believe that we looked at long-term forecasts or
13 trends in the draft EIS with regards to water, even
14 the aquifers.

15 I appreciate that comment, and we'll --
16 you know, we'll move -- take a look at all those
17 after the scoping -- this comment period ends. So
18 thank you for that.

19 MS. TESS DORNFELD: Yes. And I did also
20 want to ask then about, when it comes to the DNR,
21 you know, they have their process for the water
22 permits, and you mentioned that you expect they'll
23 be commenting on this. In my understanding, the
24 discussion has been this "13 million" that should
25 really be 20-million-gallons number. That is just

1 for the ongoing operations, but then there's also
2 water that will be impacted during the construction.
3 And that there'll also be permitting needed for that
4 from the DNR, and that that's not outlined in the
5 DEIS.

6 And so I wonder how the DNR can comment
7 on that if they don't actually have the details on
8 what that construction appropriation would be?

9 MR. ANDREW LEVI: Yeah. Well, yeah, they
10 would need water for hydrostatic testing. If they
11 take that from a water body, they would need a
12 permit from DNR for that. That water generally gets
13 discharged back into the -- you know, that's not
14 a -- it's not like cooling. It's not a --
15 destructive is another word, but it doesn't convert
16 the water; it stays as water. So, you know, if they
17 did do that from a water body, they would need a
18 permit from DNR.

19 So and -- and I think other minor
20 watering might be, you know, watering the roads and
21 things. And I thought we did touch on that, and
22 maybe we didn't. We'll go back and take a look for
23 sure, but I believe we did.

24 Cathy, do you have anything to add to
25 that?

1 And then, Christy, we can move over to
2 what it is you have to say.

3 MS. CATHERINE STOREY: Yeah. I just had
4 a note that on page 5-137 of the draft EIS we do
5 talk about the amount of water that would be needed
6 for construction, which is 125,000 gallons, and then
7 that's also where we talk about the amount of water
8 needed for operations.

9 MR. ANDREW LEVI: Thank you, Cathy.

10 MS. CHRISTY BRUSVEN: I have nothing to
11 add. That was the same cite I was going to provide.
12 Thanks.

13 MR. ANDREW LEVI: It turns out I have
14 that page open on my computer screen as Cathy was
15 saying that. No, thank you for that.

16 So, yeah, it looks like 125,000 gallons
17 for construction. Of that, 110,000 gallons would be
18 used for hydrostatic testing.

19 MS. SARA RADIL: Thank you for your
20 comment.

21 Heidi Fossen, you're being unmuted.
22 Please state and spell your name for the court
23 reporter, and then provide your comment. Thank you.

24 MS. HEIDI FOSSEN: Can you hear me?

25 MS. SARA RADIL: Yes, you are on.

1 MS. HEIDI FOSSEN: Okay. Heidi Fossen,
2 H-E-I-D-I, F-O-S-S-E-N.

3 My question is around the energy needed
4 for this project. It's my understanding that the
5 energy needed to actually capture the carbon and
6 turn it into gas is very energy-intensive. I was
7 just wondering if the additional electricity needed
8 to maintain the daily operations of the facility is
9 included in this study.

10 Does the carbon intensity score for the
11 ethanol take into account the additional energy
12 needed to operate the carbon-capture facility? Does
13 the local electricity grid have the capacity to
14 accommodate the daily operations of the capture
15 equipment? And will the local citizens be affected
16 by the increase in energy needed for this project?

17 Sorry. That was like five questions.

18 MR. ANDREW LEVI: I've got four. So
19 we'll try to answer those four, and then let me know
20 what the fifth one was that I missed.

21 So with regards to a number, there is a
22 number in the EIS, and I'm really hoping that Pat or
23 Cathy or Joe right now is looking that up.

24 With regards to the CI score, Will, do
25 you have any insight into electrical use in the

1 capture facility and how that might relate to the CI
2 score in the ethanol produced at the ethanol plant?

3 MR. WILLIAM NEDS: Yeah, I didn't look
4 into --

5 MR. ANDREW LEVI: Will, sorry, if you
6 could state and spell your name for the court
7 reporter.

8 MR. WILLIAM NEDS: Sorry, first time.
9 William Neds, W-I-L-L-I-A-M and N-E-D-S.

10 So I did look at -- I looked at the
11 alternative strategy section rather than what would
12 be constructed or proposed. I do recall coming
13 across the number, so when they bring it up, you can
14 tell me. But I quickly looked at how that would
15 affect the CI score, and it is significantly less
16 than the current energy use for the project.

17 I think it would have made an impact of,
18 maybe, one-point increase, and then when you account
19 for the carbon-capture -- which is an approximately
20 30-point deduction -- maybe would average to about a
21 29-deduction is like a conservative estimate.

22 But I don't think that that was in any of
23 my chapters. I don't know if I can point you to
24 where that done. That was just a quick run-through
25 in my head.

1 MR. ANDREW LEVI: Thanks, Will.

2 And that's something that we could check,
3 and if it's not there, we could go ahead and add
4 that in the final.

5 Cathy, it looks like you have that
6 number?

7 MS. CATHERINE STOREY: Yeah. It's on
8 page 5-51 of the draft EIS. The -- and from the
9 applicant, the project would need 38,501,733
10 kilowatt hours per year, and the Lake Region
11 Electric Cooperative does not anticipate that it
12 would need to add power generation capacity in order
13 to meet that need. So that's what's in the draft
14 EIS now.

15 MR. ANDREW LEVI: And I think that --
16 does that answer your questions? I think that the
17 grid and how it might affect local citizens kind of
18 got combined into one, in that, the electrical co-op
19 doesn't anticipate needing additional generation to
20 supply the ethanol plant. Which I, you know,
21 conclude that that wouldn't affect, you know, their
22 portion of the grid then that they supply.

23 MS. HEIDI FOSSEN: Thank you. That's all
24 I had.

25 MR. ANDREW LEVI: Thank you.

1 MR. WILLIAM NEDS: I can add a little bit
2 more, if you need -- as a comparison now that I have
3 the actual number, if that would be of help.

4 So the current electricity for the site
5 is 38,000 megawatt hours per year, which is
6 equivalent to approximately 2.7 points in the CI
7 score. And I believe the number --

8 (Connection lost.)

9 MR. WILLIAM NEDS: -- kilowatts, so
10 you're still looking at a factor of 10 --

11 COURT REPORTER: William --

12 MR. WILLIAM NEDS: Yes.

13 COURT REPORTER: -- it cut out for just a
14 second. So you were saying that: Equivalent to
15 2.7 points in the CI score, and I believe... And
16 then I think you had another number after that?

17 MR. WILLIAM NEDS: Yeah, the number that
18 Cathy had mentioned. I was saying it was about a
19 factor of ten off of the current energy use.
20 Essentially, the decimal point, so it would be less
21 than one.

22 COURT REPORTER: Thank you.

23 MR. ANDREW LEVI: Thanks.

24 And with -- I'm sorry, it is about 7:50.
25 I know it looks as if Wade has his hand up. I

1 believe we'll move to him next. I'm looking at the
2 person in charge, but after Wade, let's go ahead and
3 take a five-minute break for Christine, for the
4 court reporter. She's been typing vigorously here
5 now for two hours, and as I keep talking she still
6 has to type, so I'll stop. But we'll just take a
7 quick break after Wade's comments.

8 MS. SARA RADIL: Okay. We will move on
9 to Wade, and you have previously provided your
10 information, so please go ahead with your comment.
11 Thank you.

12 MR. WADE MATHIOWETZ: A comment towards
13 Scott. They said they would try and let you know if
14 there's an emergency pertaining to this pipeline,
15 whether it be a rupture or a leak. What if you're
16 handicapped, meaning can't move fast or blind and/or
17 deaf? How are you going to address those issues?
18 How are you going to notify me?

19 And if there was any emergency concerns
20 with this pipeline, why ain't they brought forth
21 before we try and put this pipeline in? It seems
22 like we've got the cart ahead of the horse here. I
23 think safety is one of the utmost concerns of us
24 citizens of this fine state of Minnesota. And yet,
25 as you all know, if we drink water, you're involved

1 in this.

2 So I think everybody needs to know, and
3 they weren't transparent with that. And they wanted
4 just -- landowners just to keep quiet and nobody
5 make any comments on this. I think this is a really
6 big safety concern, and this should be made more
7 public than what it is.

8 MR. SCOTT O'KONEK: Did you want me to
9 answer that, Andrew?

10 MR. ANDREW LEVI: Yeah. Sorry, I --
11 yeah.

12 MR. SCOTT O'KONEK: Okay. Thank you,
13 Wade. So, I mean, we'll have plans in place
14 identifying people, you know, in potential impact
15 areas. We'll work with the local emergency
16 responders that, you know -- on, you know, how to,
17 you know -- if there was, you know, something in
18 this area, how to respond? Who do we need to
19 respond for? Is there, you know, people that may be
20 more sensitive than other people?

21 All of those things will actually be
22 taken into account in the emergency response plan.
23 That emergency response plan is always being
24 updated, too, in case of changes. And that plan
25 will actually be shared with everybody once we know

1 exactly what we're crafting to and doing it. That's
2 why we don't have it right now.

3 So that plan, as it discusses in the
4 DEIS, you know, we have to get that to many people
5 out there. And it will be appropriately distributed
6 and trained upon before, you know, operation would
7 ever go into place.

8 MR. WADE MATHIOWETZ: What kind of
9 financial burden is this going to create? I live in
10 a rural area, and our fire and EMS and all our
11 personnel here is mostly volunteer, and we don't
12 have extra funding for all this. You know, this
13 stuff is colorless, odorless, it displaces oxygen.
14 Vehicles don't run. So, now, do we have to equip
15 these people with different kinds of vehicles,
16 different kinds of equipment? You know, nobody out
17 here is even close to -- be prepared for any of
18 this.

19 You know, I think as a big company like
20 you guys are, you should come with the safety stuff
21 first. You know, you're trying to hide behind the
22 horse here on this.

23 MR. SCOTT O'KONEK: Wade, thank you for
24 that. I -- you know, as far as when it comes to
25 emergency response and, you know, I know there's a

1 lot of different people that may need things, all
2 the emergency -- we work through the county
3 emergency managers to figure out what may be needed
4 with different departments, you know.

5 And that stuff, you know, there will be
6 no extra burden or cost if there is additional needs
7 by the forces that you're talking about, our first
8 responders. Someone will actually pay for that.
9 That would be, maybe, a good boost of, you know,
10 stuff that -- equipment or things you guys need for
11 that local area.

12 So that will be actually on Summit's
13 dime, and the things that will be needed will be
14 worked with those departments and with the emergency
15 managers of the areas.

16 MR. WADE MATHIOWETZ: We all can say
17 these things, but will they come to frutation [sic]?
18 It's going to cost a lot of money, and I just -- you
19 know, we wouldn't be talking about this if it wasn't
20 just for the money, right? We all know that. Every
21 one of us listening here tonight and involved with
22 this, it's all about the money. Not about what
23 humans lose or gain, it's always about the money,
24 and that's what's wrong with this whole damn
25 project. It's all about the money. Just follow it.

1 Follow the money, it will lead you where this is
2 going, in somebody else's back pocket at taxpayer's
3 expense.

4 This is not going to solve us -- you guys
5 think the world is warming up from global warming,
6 come on. Go back in history. Read the history,
7 it's not. From what we're going to spend on this
8 whole project, it's going to -- I mean, we could
9 take a 1,000-gallon tank and put one drop of water
10 in it, and this is what we're going to solve.

11 Let's get back to reality here, people.
12 This is a farce, and it's going to cost us our water
13 rights. What's it going to cost for us after
14 20 years when we have no water to get it here? We
15 can't live without water. The plants can survive,
16 and we're surviving now without this CO2 pipeline,
17 period.

18 MR. ANDREW LEVI: Thanks, Wade.

19 It's about 8:00, so let's go ahead and
20 take a break. Come back -- is five minutes enough,
21 Christine?

22 COURT REPORTER: Yes. Thank you.

23 MR. ANDREW LEVI: So let's just come back
24 at 8:05, and we'll pick up -- I guess, we'll see if
25 anyone -- well, yeah. We'll pick back up with Wade

1 in five minutes. Thanks.

2 (Break taken from 8:00 to 8:05.)

3 MR. ANDREW LEVI: We will go back on the
4 record.

5 Sara, go ahead.

6 MS. SARA RADIL: Okay. Thank you.

7 Wade, just confirming if you had any
8 additional comments?

9 MR. WADE MATHIOWETZ: Yes. I think the
10 permit for the project without the safety and
11 equipment and plans in place, it's -- we need to
12 have that first before this permit is issued,
13 preconstruction.

14 MR. ANDREW LEVI: Yeah. I agree with
15 you, Wade. So we have recommended -- so if they get
16 a permit, let's say that. In case I forget to say
17 it again during the rest of what I'm about to
18 explain. If they get a permit, they would need
19 to -- before they can construct, they need to -- the
20 company would need to file several things.

21 One of those things is called a plan and
22 profile, and that's basically -- it's a plan of
23 where the pipeline would go. And we review that
24 plan and make sure that it's going where they said
25 it was going to go and some other things associated

1 with that. But -- and this isn't just for
2 pipelines. This is required for transmission lines.
3 It's required for all these -- you know, this
4 infrastructure.

5 And what we do is with these other plans
6 and these other things that might be required, so,
7 for example, here what we're recommending would
8 happen would be that any emergency response plan be
9 provided to the Commission, developed with the
10 emergency responders, and cover these things that
11 you're talking about. It's written out in Chapter 8
12 as a recommendation by us, EERA, and that be
13 provided 30 days prior to the plan and profile.

14 So we agree. Let's not put the, you
15 know, cart in front of the horse here. We need to
16 look at all of this stuff first. We need to make
17 sure that this safety plan is acceptable to the
18 folks that would be implementing it. That would
19 be -- and we would ask that that be in that plan,
20 you know, a signoff be in that plan. This is what
21 we're asking for.

22 Again, we can't set safety standards.
23 It's just what we're asking of the Commission, and
24 that that plan be filed 30 days prior to them even
25 filing their plan and profile. So that gives us

1 time, the Commission time, the state time to take a
2 look at that and make sure that, you know, the
3 things are lining up.

4 So we -- I hear you. I hear what you're
5 saying, and we've recommended a mitigation to
6 hopefully help with that, to not let construction
7 get out ahead of any of these other very important
8 steps that need to happen. These -- they're not
9 boxes that need to get checked, but I guess, you
10 know, these things that need to happen first before
11 this can be constructed. So I do want to say that,
12 yes, I agree with you on that aspect of things for
13 sure.

14 MR. WADE MATHIOWETZ: Thank you.

15 The Pipeline Hazard [sic] Material Safety
16 Administration, do they have any safety protocol
17 finalized yet for anything like this? I mean,
18 that's our guideline people we go with, right?

19 MR. ANDREW LEVI: Yeah. PHMSA sets the
20 safety standards. Dan touched on that a little bit
21 at the beginning. I'm worried if I asked him to do
22 it again, we'll be here until 10:00.

23 But, Dan, if you can briefly go over
24 those, you know, at a 60,000-foot-level real quick.

25 I mean, the short answer, Wade, is yes.

1 Yes, there is, but Dan can get into that a little
2 bit more.

3 MR. WADE MATHIOWETZ: That's okay. He
4 went through it. I just want to make sure that, you
5 know, their safety standards is up to CO2-standards.
6 That's what I was alluding at, you know.

7 MR. DAN PRASCHER: They are. They are.

8 Yeah. And I didn't touch on, maybe, I
9 don't know, half of what's required. It's extensive
10 and ongoing.

11 MR. WADE MATHIOWETZ: Thank you.

12 MR. ANDREW LEVI: Thank you, Wade.

13 MS. SARA RADIL: Thank you for your
14 comment.

15 Currently I do not see any other hands
16 raised in our participant list. So if you're
17 looking to make a comment, feel free to raise your
18 hand, the small raise-hand button at the bottom of
19 the screen; or if you're joining by phone, dialing
20 *3. Thank you.

21 MR. ANDREW LEVI: While folks are
22 thinking about whether or not they have an
23 additional question or comment -- or a first
24 question or comment -- I just want to, again, thank
25 everyone for coming tonight, participating tonight.

1 We greatly appreciate that.

2 I want to go ahead and remind you about
3 this open comment period. It's open until February
4 23rd. Please do submit comments. We greatly
5 appreciate those. We read them all.

6 (Presentation screen changed.)

7 MR. ANDREW LEVI: And I was going to have
8 to do that. Thank you very much.

9 So, again, these are the different ways
10 you can provide comments. If you have any
11 questions, you know, shoot me an e-mail, send me an
12 e-mail, and we can help answer those. But, again, I
13 just -- while we're waiting, thank you very much for
14 participating this evening.

15 Maybe we'll go ahead and wait about
16 another minute, and if no one wants to speak, we'll
17 call it good, but we don't want to cut anyone off.

18 I don't know if it's been a minute or
19 not, but it sure felt like a minute.

20 Julie just threw my e-mail into the chat.
21 If you'd like to click on that real quick, that
22 should pop-up, in case you have a question later on.

23 But, again, I'm not seeing any hands.
24 So, again, thank you very much for participating
25 this evening, and everyone have a good rest of your

1 night. Thank you.

2 (Public comment concluded.)

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