# Zim Sod Wetland Mitigation Site

## Wetland Mitigation Plan

Poly Met Mining Inc.



May 2014

## Zim Sod Wetland Mitigation Site Wetland Mitigation Plan

## May 2014

# Contents

1.0	In	troduction	L
2.0	W	etland Mitigation Site Description	2
2.1		Mitigation Site Selection	2
2.2		Zim Sod Site History	2
2	2.2.1	Pre-Agricultural History	2
2	2.2.2	Agricultural and Land Use History	2
2.3		Zim Sod Geology, Hydrology, and Ecology	3
2	2.3.1	Geology and Soils	3
2	2.3.2	Topography	3
2	2.3.3	Climate	3
2	2.3.4	Hydrology	3
2	2.3.5	Natural Communities	1
2	2.3.6	Site Constraints	1
2.4		Existing Wetlands	5
2.5		Additional Site Information Needed	5
3.0	W	etland Mitigation Goals and Credit Allocation	L
3.1		Target Plant Communities	L
Э	3.1.1	Coniferous Bog	L
Э	3.1.2	Coniferous Swamp	2
Э	3.1.3	Sedge Meadow or Open Bog	2
Э	3.1.4	Shallow Open Water	3
3.2		Hydrologic Restoration	3
3.3		Partially-drained wetlands	1
3.4		Excavated Ponds	1
3.5		Wetland Preservation	5
3.6		Credit Allocation	5
4.0	W	etland Restoration Plan	7
4.1		General Site Preparation	7

\\barr.com\projects\Mpls\23 MN\69\2369862\WorkFiles\WO 008 Corps Wetlands Permit\WetlandMitigation\WetlandMitigationPlan\2014 Mitigation Plans\Zim Mitigation Plan-2014 v2 d1.docx

4.2	Site Grading and Hydrology Restoration7		
4.3	Bog Restoration Methods	8	
4.4	Tree and Shrub Installation		
4.5	Excavated Ponds		
4.6	Natural Regeneration and Bog Establishment		
4.7	Supplemental Planting and Seeding		
5.0	Wetland Mitigation Performance Standards		
5.1	Performance Standards		
5.1.	1 General		
5.1.	2 Coniferous Bog or Swamp		
5.1.	3 Sedge Meadow or Open Bog		
5.1.	4 Shallow Open Water		
6.0	Wetland Restoration and Management Schedule	14	
6.1	Preparation – Year 0		
6.1.	1 Fall and Winter		
6.2	Year 1		
6.2.	1 Early Spring		
6.2.	2 Spring/Summer		
6.2.	3 Fall—End of First Full Growing Season		
6.3	Year 2		
6.3.	1 Spring/Summer		
6.3.	2 Fall—End of Second Full Growing Season		
6.4	Year 3		
6.4.	1 Spring/Summer		
6.4.	2 Fall—End of Third Full Growing Season		
6.5	Years 4 through 20		
7.0	Wetland Mitigation Monitoring		
7.1	Hydrologic Monitoring		
7.2	Vegetation Monitoring		
7.3	Monitoring Report		
8.0 I	References		

#### List of Tables

Table 1Wetland Mitigation Credits on the North Unit of the Zim Sod Sit	e
--	---

- Table 2Wetland Mitigation Credits on the South Unit of the Zim Sod Site
- Table 3Potential Tree Species that may be Planted at the Zim Sod Site
- Table 4
   Potentially Problematic Invasive Species for the Zim Sod Site

### List of Figures

- Figure 1 Zim Sod Location Map
- Figure 2 North Unit Soil, Topography, and Drainage Map
- Figure 3 South Unit Soil, Topography, and Drainage Map
- Figure 4 North Unit Conceptual Plan Credit Areas
- Figure 5 South Unit Conceptual Plan Credit Areas

### List of Appendices

- Appendix A Greenwood Soil Series Official Soil Description
- Appendix B Wetland Mitigation Plan Drawings
- Appendix C Wetland Data Forms
- Appendix D Ditch Lateral Effect Calculations

# 1.0 Introduction

On behalf of PolyMet Mining Inc. (PolyMet), Barr Engineering Company (Barr) has prepared the following project-specific wetland mitigation plan for the Zim Sod Wetland Mitigation Site (Site). The Site is located in two separate units on approximately 569 acres of land, much of which is proposed to be restored for wetland mitigation credits for the NorthMet Project (Project). The two units will be developed concurrently and are hereby collectively referred to as the Site. The Site is located in St. Louis County in the St. Louis River major watershed (#3) within the Lake Superior basin (Bank Service Area #1) and southwest of Eveleth (Figure 1). The North Unit is about 481 acres and the South Unit is about 88 acres.

The Site is currently an active sod farm that has been drained with ditches and sub-surface drain tiles. The project-specific mitigation plan includes the following methods of restoration to receive wetland mitigation credits, additional details are provided in Table 1 and Table 2:

- Restoration of 401.5 acres of drained wetland to receive 100 percent mitigation credit or 401.5 credits;
- Hydrologic restoration of 48.1 acres of partially-drained wooded wetlands to receive 50 percent credit or 24.1 credits;
- Restoration of natural surface grade and wetland conditions in 21.5 acres of ditches which will be filled to receive 50 percent credit or 10.7 credits; and
- Restoration of native vegetation on 22.6 acres of upland buffers within drained fields and filled ditches, each of which will remain drained due to open ditches that cannot be filled, for 5.7 credits based on the 25 percent credit calculation for upland buffer.
- Easement protection of 28.8 acres of native coniferous bog communities at 12.5 percent credit for a total of 3.6 credits for preservation.

A total of 454 compensatory wetland mitigation credits are proposed from the Site. A permanent conservation easement, including legal access, will be prepared and recorded to protect the Site within one year after initiating the restoration activities.

This mitigation plan includes discussions of the project-specific wetland mitigation site, wetland restoration goals, construction activities, and performance standards. The plan is being submitted to the U.S. Army Corps of Engineers (USACE) as part of the Section 404 Clean Water Act Permit application and the Minnesota Department of Natural Resources (MDNR), which acts as the administrator of the Minnesota Wetland Conservation Act (WCA) (Minnesota Rules 8420) for mining activities.

# 2.0 Wetland Mitigation Site Description

### 2.1 Mitigation Site Selection

The Site is within the same Bank Service Area and major watershed as the Project (Figure 1). The Project lies within the headwaters of the St. Louis River major watershed (#3) in St. Louis County and within Bank Service Area #1, which encompasses the watershed of Lake Superior.

The Site was selected for several reasons, including:

- Private land ownership with wetland mitigation potential that is located near large areas of taxforfeit or state-owned land,
- The lack of roads or other public infrastructure that could be affected by wetland restoration,
- The presence of sub-surface drain tiles installed to lower the water table and prevent soil saturation at the ground surface thereby effectively draining wetlands,
- A high density of ditching within the site, and
- Minimal effect on neighboring properties by altering site drainage.

The Site is located in central St. Louis County, between the towns of Zim and Sax. The proposed wetland restoration area is located within Sections 2, 3, 10, 11, 26, 27, and 34; Township 55 North; Range 18 West. Currently the Site is owned by two parties, but the entirety will be acquired by one party following the issuance of permits for the Project and will be controlled by PolyMet for the sole purpose of wetland mitigation during the required monitoring period.

### 2.2 Zim Sod Site History

#### 2.2.1 Pre-Agricultural History

Available data were reviewed to determine information on site history and pre-settlement conditions. The Original Public Lands Survey Plat Map from 1867 (Reference (1)) and a map created from the original plat maps (Reference (2)) each show that the majority of the area was a coniferous bog or swamp, with some areas of open bog. These data are reliable indicators of regional vegetation types, though are not accurate predictors of site-specific design parameters.

#### 2.2.2 Agricultural and Land Use History

Based on a review of historic aerial photos, it is evident that ditches have been present at the Site since before 1939. Only some portions of the North Unit along County Highway 7 had been cleared and cultivated for agriculture as of 1939. In each photo reviewed since 1939, it is evident that additional areas were added to the cultivation on the North unit. By 1981, the majority of the agricultural portions of the South Unit were developed and under intensive management for crop or sod production; likewise for the North Unit in the 1989 photo. According to the current landowner, much of the Site has been in operation as a sod farm for 40-50 years, though some portions were developed within the last 10 years.

## 2.3 Zim Sod Geology, Hydrology, and Ecology

### 2.3.1 Geology and Soils

According to soil mapping by the United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS), the entire Site is mapped as the Greenwood soil series (Reference (3)). The Greenwood soil (Dysic, frigid Typic Haplohemist) is a very poorly drained hydric soil formed in organic deposits more than 51 inches thick. The official soil series description for this soil is provided in Appendix A. The organic deposits in the area accumulated over lacustrine sediment, mostly silt, deposited by Glacial Lake Upham (Reference (4)). However, at the Site, the underlying lacustrine deposits were observed to be gleyed clay. The Greenwood soil series is described as having a pH ranging from 3.5 to 4.5 and the typical vegetation is composed of bog species including: black spruce (*Picea mariana*), tamarack (*Larix laricina*), bog rosemary (*Andromeda polifolia*), bog laurel (*Kalmia polifolia*), leatherleaf (*Chamaedaphne calyculata*), blueberries (*Vaccinium* spp.), and sphagnum (*Sphagnum* spp.)

#### 2.3.2 Topography

A topographic survey was completed in November 2010 and the one-foot contours based on the survey data are provided in Appendix B and in Figure 2 and Figure 3. Ditches are the most noticeable topographic features on the Site, ranging from 2 to 9 feet in elevation lower than the surrounding field surface. The USGS quadrangle maps show ground elevations just northeast of the North Unit at 1330 feet Mean Sea Level (ft MSL) sloping downward, to the south and west, to about 1315 ft MSL within the South Unit (Figure 2). The on-site topographic survey indicates that ground surface elevations within the North Unit have subtle variations ranging from 1326 ft MSL along the north edge to 1321 ft MSL in the southwest corner of the Site. The county ditch along the western edge of the North Unit decreases from 1319 ft MSL at the northern end to about 1313 ft MSL at the southern end. The field surface elevation within the South Unit varies from 1314 ft MSL in the northeast corner to 1308 ft MSL in the southwest corner at 1300 ft MSL, which is eight feet lower than the adjacent field (Figure 3).

#### 2.3.3 Climate

The average annual precipitation for Zim, Minnesota, is 27.9 inches based on the 30-year normal period 1971 to 2000. The average annual temperature in this area is about 37.7 degrees Fahrenheit.

#### 2.3.4 Hydrology

The Site lies near the middle of a large peatland complex that encompasses approximately 130 square miles, which is roughly bound by the Swan River to the west, U.S. Routes 2 to the south, 169 to the north, and 53 on the east. The hydrology in the majority of the peatland system has not been significantly altered by ditching or draining, although the area immediately to the south and east of the Site has ditches approximately every mile (on the section lines). Hydrology on the Site is likely to be primarily driven by direct precipitation and localized shallow groundwater with predictable annual declines in groundwater elevations during the summer. Groundwater in this peatland likely would contain very low mineral nutrients. Without mineral nutrients to buffer it, the soil water tends to be very acidic, which supports conditions appropriate for a bog community. Soil and/or water pH analyses will be completed

prior to restoration to provide additional soil information. In particular, if the soil is acidic (below pH 4.2) the Site is expected to support bog communities.

According to information from the current landowner, drain tiles are present throughout the Site within each field. The current landowner and operator of all sod production activities reports that the drain tiles are spaced 50 to 100 feet apart at depths of 4 to 5 feet and effectively drain the area for sod production. In some years, irrigation is necessary to maintain soil moisture for growing sod grasses. An estimated location of these drain tiles was created using a review of historic aerial photos (Figure 4 and Figure 5). In many of these photos, distinct parallel signatures are evident within the fields that appear to be caused by subsurface drainage. Additional information will be gathered on-site to verify drain tile locations and abundance by locating outlets in the ditches and confirming their presence below ground.

The primary water discharge within the Site and the general area is to the south and west through a system of drainage ditches which receive water from the subsurface drain tiles. The majority of these ditches are private ditches that only affect the drainage on the Site and primarily transmit water into a public, county ditch along County Highway 7 along the west edge of both units of the Site. The ditch along the eastern edge of the North Unit, flowing along the section line, is also a public ditch. Within the North Unit, the ditches along the north and south lines of Section 11 (along Dibbell Road and Ellsmere Road) are both public ditches. Public ditches and private ditches that facilitate drainage for the adjacent properties or the homesteads on the Site would not be impacted by restoration activities for this mitigation project as discussed later in this report. The South Unit has only one primary east-west ditch, which flows directly west into the county ditch along Highway 7.

The ditches are generally between 2 and 6 feet deep relative to the adjacent fields and are mostly wellmaintained to be clear of obstructions. The county ditch along Highway 7 is the deepest and widest ditch on the Site and at the southern end of the South Unit it is up to 9 feet lower in elevation than the adjacent field. Within the private ditches, there are several control structures that maintain water levels within about 18 inches of the soil surface for sod production.

#### 2.3.5 Natural Communities

The MDNR Ecological Classification System (Reference (4)) considers this region of the state to be the Tamarack Lowlands Subsection. This area is characterized by the level peatlands that occur in the bed of former Glacial Lake Upham. Most of the natural communities in this sub-section are coniferous bog or swamp wetlands that are dominated by black spruce and tamarack as well as extensive open bogs and sedge meadows. The wetlands on-site and nearby are primarily tamarack and black spruce bog communities. This area is also identified as the Sax-Zim Bog Important Bird Area (IBA) (Reference (5)) due to a rich diversity of bird species and a large number of owls residing in the area.

#### 2.3.6 Site Constraints

One utility easement crossing a portion of the North Unit is a Northern Natural Gas (NNG) underground pipeline. Two utility easements cross portions of the South Unit: the NNG pipeline and a Minnesota Power overhead transmission line. Typically, within these types of easements, tree and shrub growth is not

allowed. The companies holding these easements will be contacted prior to restoration activities for specific information regarding the easements and any limitations. If necessary, credit calculations will be adjusted to reflect the appropriate area of each of these utilities.

In the North Unit, two homes are located within the Site boundary and two additional properties with homes are outside of, but adjacent to the Site boundary. These homes are elevated above the wetland restoration areas and the drainage on each of these properties will be maintained to protect the buildings from increased water levels. Additional analysis will be completed to ensure the homeowners will not be affected the hydrologic restoration on the Site.

## 2.4 Existing Wetlands

The site was evaluated for the presence of wetlands in November, 2010. Wetland data forms are provided in Appendix C documenting that evaluation. All of the sod fields on the Site are identified as drained wetland, which is maintained by an intensive system of subsurface drain tiles and ditches (Figure 2 and Figure 3). The fields have been systematically drained for many years and managed primarily for sod production. The ditches are considered degraded wetlands. Partially-drained wetlands on the Site are likely present within the wooded areas, which have not been cleared for sod farming, but have been affected by the drainage system.

## 2.5 Additional Site Information Needed

Prior to restoration, additional information will be collected for the final restoration design and planning. Ecologists will visit the Site to verify the effects and extent of existing drainage systems, soil, and vegetation. The following information will be collected:

- Drain tile outlets will be located and subsurface drain tiles mapped in representative portions of the Site.
- Shallow monitoring wells will be installed within some of the fields and in the forested areas to confirm the effects of the drainage.
- Vegetation will be reviewed in areas adjacent to the mitigation Site to help establish target communities.
- Soil and groundwater pH will be tested to determine suitability for bog restoration.

Information will be used for planning final restoration methods and to determine the final estimate of compensatory mitigation credits available for the Site.

# 3.0 Wetland Mitigation Goals and Credit Allocation

To the degree feasible, the primary goal of the wetland restoration on the Site is to restore a native wetland plant community. The plan for the restoration will also include an adaptive management plan to account for the natural development and to recognize changing conditions and unpredictable factors contributing to the dynamics of the Site. Restoration methods will be designed to restore a coniferous bog community (Reference (6)); however, developing a bog community is highly dependent on soil and groundwater parameters that are difficult to control. Therefore, a coniferous swamp community will be the contingent community if the soil and groundwater conditions are not adequate for bog regeneration. Coniferous bog or swamp is the target for the majority of the Site, from which 438 forested wetland credits will be established.

Historically, portions of this landscape were open, emergent wetland communities. Trees may not become established in some portions of the Site with excess soil moisture or where easements prevent planting. Where trees do not successfully establish, the target community will be an open bog or sedge meadow. Credit allocation may be modified in the future for areas where trees do not develop.

Shallow open water communities will be the target communities in the ponds created on the Site. These ponds will be excavated in order to gather borrow materials used to backfill ditches elsewhere on the Site to eliminate drainage. Shallow open water communities will be created on 8.3 acres.

The target communities described below include four primary wetland types that may become established. Credit allocation calculations are provided in Table 1 and Table 2; a map of the conceptual restoration plan showing the anticipated restoration is provided in Figure 4 and Figure 5.

## 3.1 Target Plant Communities

The majority of the Zim Sod Site will be restored to a coniferous bog or swamp community. The restoration of coniferous bogs and swamps are somewhat experimental in nature as few such projects have been successfully completed in Minnesota, making it difficult to determine realistic goals and performance criteria. As such, performance standards for the Site will be somewhat general in that the primary target is a forested native wetland community.

#### 3.1.1 Coniferous Bog

Coniferous bogs occur where an accumulation of peat becomes isolated from mineral-rich groundwater such that the majority of the water and all mineral inputs come from precipitation. The peat continues to accumulate upward in the bog from the growth and deposition of sphagnum moss and other vegetation. Black spruce and several other bog species are sensitive to extended periods of high water, but are able to survive within the bog because the upper levels of peat remain aerated, especially in the middle of summer as the water table drops below the peat surface. The groundwater in the bog tends to be very acidic because there are very few minerals to act as a buffer (Reference (4)).

Sphagnum moss is difficult to establish and will be a limiting component for the restoration of a true bog community. A dense mat of sphagnum is an important component responsible for maintaining the appropriate soil pH, hydrologic, and peat conditions for the coniferous bog community. Coniferous bogs are dominated by black spruce and tamarack trees, though the trees are often stunted and slow-growing and canopy cover is often less than 50 percent. The ground layer is dominated by sphagnum mosses, sedges (*Carex* spp.), and various low ericaceous shrubs such as leather leaf and small cranberry (*Vaccinium oxycoccos*). Restoration of these and other bog dominants is difficult, because the species are difficult to propagate and many are not available commercially.

In order to restore sphagnum, the moss must be harvested from a donor site by shredding and collecting the upper 4 to 6 inches of sphagnum and applying the materials to the restoration site, which is still an unreliable practice. Furthermore, the accumulation of the sphagnum can be slow when applied to a heavily disturbed agricultural site, especially a site in which the soil has been regularly stripped for sod farming.

#### 3.1.2 Coniferous Swamp

Although coniferous bog restoration techniques will be implemented throughout the Site, the development of the bog community is not guaranteed. Therefore, the coniferous swamp community will be the contingency community for development. Coniferous swamps have a poorly developed sphagnum mat and a greater predominance of minerotrophic species than a bog. Furthermore, many species present in a coniferous swamp are available commercially; whereas, bog species are much more difficult to re-introduce.

Coniferous swamp communities occur in peat soils with no direct contact to mineral soil, though mineralrich groundwater contributes some nutrients to the plants and buffers the acidity of the peat. Typically, in large peatland systems, this community type would occur adjacent to mineral-rich discharge or between bog communities and uplands. It generally occurs in areas where the high water table is more stable than that in a bog, leading to longer periods of surface soil saturation.

It is unlikely that mineral-rich groundwater is near the soil surface in the Site because it occurs within such a large complex of deep peat soil. However, there are two reasons a coniferous swamp may be more appropriate for the Site than a bog community. First, farming practices have physically and chemically altered the soil and hydrology and some of the peat topsoil has been stripped as part of the sod farming, thereby lowering the elevation relative to the regional groundwater table. Second, the residual mineral fertilizer is likely to favor species that would not otherwise thrive in a mineral-deficient peat soil. In this geomorphic setting, it is expected that a bog community will develop, but that process is difficult to control because it depends on the groundwater inputs and soil chemistry and may only occur after many years under natural conditions.

#### 3.1.3 Sedge Meadow or Open Bog

The degree of soil moisture may be somewhat variable across the Site, though this is difficult to predict. It is expected that the majority of the Site will have saturated soil throughout most of the year, with

seasonal draw-downs, especially during drought periods. Such hydrology will support black spruce and tamaracks, which tolerate considerable soil moisture, but require some periods of aerobic soil conditions. However, where the soil surface is saturated for the entire growing season, these tree species may not establish or growth will be slow. It is unclear which areas may not support trees, so the sedge meadow or open bog communities are presented as a contingency target community in the event that some areas are better suited for emergent wetland community types. Sphagnum would be a dominant ground cover in an open bog, though this may take many years to develop even with sphagnum introduction.

A community similar to a sedge meadow may develop if the soil and hydrology are more favorable to minerotrophic species and trees are unable to become established. The dominant plants in a sedge meadow include bluejoint grass (*Calamagrostis canadensis*), sedges (*Carex* spp.), and bulrushes (*Scirpus* spp.). Sedge meadows occur in a wide range of soils, including deep peats, though there is usually input from ground or surface water containing dissolved minerals. At the Site such mineral inputs are unlikely, though residual nutrients from fertilizer may provide this condition.

#### 3.1.4 Shallow Open Water

Besides providing soil to restore hydrology and return ditches to natural condition, the open water will provide some additional wildlife habitat on the Site, ideal for waterfowl and amphibians. The ponds will receive full mitigation credit because each occurs in an area that naturally would be wetland. The shallow open water community would be dominated by submergent and floating-leaved plant species. Typical species would include pondweeds (*Potamogeton* spp.), coontail (*Ceratophyllum demersum*), and duckweeds (*Lemna* spp.). The fringes of these ponds would also support species commonly present in deep and shallow marsh communities.

## 3.2 Hydrologic Restoration

Restoration of the original hydrology is the primary goal at the Site. The majority of the internal private ditches on the Site will be filled with soil excavated from elsewhere on the Site. Filling these ditches will eliminate the drainage effects and plug the end of the drain tiles that discharge into the ditches. As a result, groundwater elevations are expected to rise within the fields and runoff from precipitation will no longer drain through subsurface tiles and the ditches. The majority of the water that will saturate the peat will come from precipitation that falls directly on the Site. Some groundwater will also contribute as it flows into the Site well as some groundwater flow from the large peatland complex to the north and east.

Ditches will be filled with soil excavated from areas adjacent to the ditches and from excavations on the Site. Material scraped from the edge of the ditches will not be excavated deeper than 1 foot below the presumed natural grade. Some ditches have shallow mounds from the ditch spoils; these will pushed back into the ditch to recreate the level peatland grade. Because natural hydrology is being restored within the filled ditches and the elimination of the ditches recreates the natural landscape, the ditches will receive partial credit (50 percent).

Mineral and peat soils will be place in appropriate layers within the backfilled ditches. Clay and other mineral soil will be placed in the bottom of the ditch to plug the drain tiles, ensuring that the artificial

drainage will be eliminated. The majority of the mineral soils will come from the deeper portions of the excavations, though some may be present in spoil mounds adjacent to each ditch. Peat soils will be placed in the upper portions of the filled ditches. The peat will also effectively restrict flow and help return a near natural grade to the land. Much of the peat will come from the upper layers in the excavations, but may also be pushed in from the edge of each ditch.

Some ditches within or adjacent to the Site will not be filled because they are public ditches or protect neighboring private property from flooding. For ditches that cannot be filled, the drain tiles that flow into that ditch will be broken and removed near the outlet into the ditch. At least 20 feet of drain tile will be removed near the outlet into the ditch, and additional segments will be removed upslope when necessary. Because most of the tiles are placed in very level fields, removing a single segment should be sufficient for most tiles. Additional information on the tile location, flow, and elevation change will be reviewed prior to removal.

The lateral effect of the open ditches has been calculated to help determine wetland credits. Lateral effects are based on the van Schilfgaarde Equation (Reference (7)) and the results for ditches at varying drainage depths are provided in Appendix D. These drainage effects were calculated for the Greenwood and Wabuse soil series assuming there are no obstructions in the ditches and that they can drain free to the ditch bottom or to the bottom of the nearest downstream culvert. Ditches that remain open will not be eligible for mitigation credit and the adjacent areas drained by the lateral effect of these ditches will be eligible for the upland buffer credit (25 percent).

For wooded areas affected by the drainage system on the Site, hydrologic restoration will be the primary action for mitigation credit. These areas are already forested with coniferous bog or swamp species, but the adjacent drainage system has eliminated wetland hydrology or reduced the period of saturation. For the areas not surrounded by ditches, the lateral effects were calculated to determine how much the area is affected by the existing drainage. Ditch filling will restore these forested wetland areas. Because some portions of these wooded areas are still wetland but partially-drained, mitigation credits are projected based on restoration of partially-drained wetlands (50 percent).

### 3.3 Partially-drained wetlands

Several wooded areas occur within the scope and effect of the existing Zim Sod drainage system. These wooded areas are dominated by wetland trees, including tamaracks and black spruce, but are drained fully or partially by the nearby ditches and subsurface drain tiles. Once the drainage system is disabled, bog hydrology will return to these forests. Also, if necessary, portions of these forests may be managed to control invasive species or to encourage re-colonization by native species. The forests will also be within the area protected by a conservation easement and will be managed to eliminate invasive species. Therefore, these wooded are eligible for restoration of partially-drained wetlands.

### 3.4 Excavated Ponds

In order to fill the ditches, soil will be collected from excavated ponds scattered throughout the Site, which will become shallow open water communities. The ponds will be shallow enough to maintain

rooted vegetation which will be allowed to establish naturally. Each of the ponds will be odd-shaped and have uneven bottom contours to provide some variability and natural character to the ponds. Besides providing soil, the open water will provide some additional wildlife habitat on the Site, ideal for waterfowl and amphibians. The ponds will receive full mitigation credit.

### 3.5 Wetland Preservation

Two forested wetland areas outside the effects of the drainage system will be protected under an easement in order to receive credits for wetland preservation. These areas are currently subject to logging, peat harvest, and drainage, much like nearby sites have been used for peat harvest and logging activities. The preservation area is coniferous bog, which will be protected from potential future degradation by a permanent conservation easement. The preservation areas will also be managed to control invasive species as part of this plan.

### 3.6 Credit Allocation

Mitigation credits are based on acreages shown in Table 1 and Table 2 and in Figure 4 and Figure 5, which were calculated primarily based on the on-site topographic survey and site mapping from aerial photos as verified by on-site assessments. The majority of the credits are proposed from the restoration of drained wetlands that are currently used for sod farming, from which there will be 100 percent credit for the areas restored. Credit from the removal of drainage and subsequent management of the partially-drained forested wetlands currently on the Site is allocated at 50 percent. Filled ditches will also receive 50 percent credit because the ditches will be restored to the natural hydrology regime with native vegetation. Areas near the public ditches will still be drained by the lateral effect of the open ditches; these areas will still be preserved as upland buffer. Thus, the credit allocation within the area of the ditch lateral effect will be based on credits for upland buffers, or 25 percent of the total area. Preservation areas will receive 12.5 percent credit for the areas within the legal easement boundaries.

The summary of the credits is as follows (all numbers are approximate):

- 401.5 credits for drained wetland restoration on 351.5 acres within the North Unit and 50.0 acres within the South Unit;
- 8.3 credits for the excavated ponds: 7.0 acres in the North Unit and 1.3 acre in the South Unit.
- 10.8 credits for filling ditches: 18.3 acres in the North Unit and 3.2 acres in the South Unit;
- 24.1 credits for restoration of partially-drained wooded areas: 43.6 acres in the North Unit and 4.5 acres in the South Unit;
- 5.7 credits for upland buffers in the ditch lateral effect area: 12.3 acres in the North Unit and 10.4 acres in the South Unit; and
- 3.6 credits for preservation of forested wetland areas: 11.6 acres in the North Unit and 17.2 acres in the South Unit.

In addition, ditches that remain open and roads that will be used to maintain access to the Site will not be eligible for credit.

# 4.0 Wetland Restoration Plan

The vegetation and hydrology will be restored to the Site over a one- to two-year construction phase followed by 20 years of management. Coniferous bog or swamp communities will be established using bog restoration methods. The whole site will be treated with similar methods because soil and hydrology are expected to be quite similar throughout. The interior ditches will be filled, raised berms will be leveled, and drain tiles will be disabled to restore wetland hydrology. Native, harvested bog materials will be spread throughout the Site to facilitate the re-introduction of sphagnum mosses and other bog species that cannot be easily re-introduced by seed. Natural re-generation of the herbaceous ground cover, in combination with the addition of bog harvest materials, will be supported by intensive weed management. Tree and shrub seedlings will be installed by hand throughout the Site. The Site will be carefully monitored and managed and supplemental plantings and seeding may be used to encourage development until performance standards are met.

### 4.1 General Site Preparation

At the beginning of the restoration, it is expected that all of the sod will have been recently removed and bare soil will be present throughout the Site. For any areas that are not bare, the vegetation will be removed to bare soil, especially non-native and invasive species. Soils may be cultivated as part of the weed control and for surface preparation for sphagnum spreading. Prior to the start of construction and hydrologic alterations, water levels will be lowered using the existing control structures to provide dry soil for safe machinery access.

## 4.2 Site Grading and Hydrology Restoration

Construction activities on the Site are intended to remove or minimize the effect of the artificial drainage features and return the hydrology to the original conditions. The existing drainage is largely maintained by subsurface drain tiles that lead to a system of ditches. To minimize drainage, the majority of the ditches will be filled with soils obtained from elsewhere on the Site, which will plug the ends of the subsurface drain tiles and prevent flow in the ditches. Some of the ditches cannot be filled because they affect other properties, so any subsurface drain tiles that flow into these ditches will be broken and disabled. The plan for construction activities is shown on the plan sheets in Appendix B.

Restoration activities will be initiated through site grading to fill ditches and break drain tiles. Ditch fill material will be collected from existing spoil banks and from pond excavations identified throughout the restoration area. Some topsoil may be pushed into the ditches from adjacent fields into the ditches, grading down no more than one-foot below existing surface elevation (except on spoil mounds). Mineral soils, preferably clay, will be placed in the bottom of the ditches up to the top of drain tile outlets or higher. Peat soils will be placed on top of the mineral soils, similar to the natural soil horizons. Ditches will be filled to near the existing grade or mounded higher to account for settling. Subsurface drain tiles that flow into ditches that will remain open will be broken and segments removed to prevent drainage into the ditches.

As soon as the ditches are filled and tiles are broken, bog materials will be spread onto the disturbed areas by side-casting as much as possible to minimize compaction. These activities will be performed immediately after the ditches are filled assuming the soil does not become too saturated for machinery access (see detailed bog restoration methods Section 4.3).

## 4.3 Bog Restoration Methods

The sphagnum moss restoration methods planned for the Site have been largely planned based on methods presented in the Peatland Restoration Guide (Reference (8)) and based on information from peatland restoration projects by the Natural Resources Research Institute (NRRI), located near Zim. The study by Johnson, et al. (Reference (9)) to evaluate the effects of planting time, mulch application, and planting of companion *Carex* species on the establishment of sphagnum mosses was evaluated and considered in the development of this plan.

Suitable donor site(s) for bog harvest materials will be selected based on a review of sites on the proposed NorthMet mine (Mine Site) and from other sites near the mitigation Site. A suitable site would have a large area of a sphagnum mat, at least 12 inches thick and with relatively few trees and shrubs. The donor site would also need to be relatively accessible by machinery for harvest and loading the materials for transport. The ideal bog donor site(s) would occur at the proposed Mine Site in bogs that are proposed to be impacted by the mining activity. However, that would require transport of the bog materials from a considerable distance and may require many truckloads of materials. Therefore, sites closer to the mitigation Site would also be reviewed. If sufficient suitable sites are not found on the proposed Mine Site or transportation is considered to be impractical, a donor site closer to the mitigation Site not located on the Mine Site, PolyMet would confer with the USACE and the MDNR before harvest of materials.

The donor site(s) will be characterized in the summer or fall prior to bog material harvest to identify existing cover of plants and mosses. Based on current research, the appropriate amount of sphagnum plant material needed for application at the restoration site is the equivalent of what can be collected from an area approximately 1/10 the size of the restoration area. Therefore, approximately 42 acres will be required to collect sufficient plant material.

Bog restoration would be completed as follows:

- Mitigation site surface preparation
  - Existing vegetation will be removed by mechanical removal or herbicide treatment in the summer and fall prior to spreading bog harvest material in the spring.
  - Loose sod remnants and peat will be removed to form a smooth soil surface.
- Bog harvest material collection

- Plant material will be collected in late fall, winter, or early spring before the frost has melted. Sphagnum fragments and additional materials collected in late fall or winter will be stored over winter for use the following spring.
- The top 4 to 6 inches of the bog surface will be shredded with a Rotovator or other equipment appropriate to shred surface vegetation. Shredded bog vegetation will be windrowed using a dozer or back-scraper and will be loaded in trucks using a front-end loader.
- The plant material will be transported to the restoration site and stockpiled close to the restoration area to minimize multiple hauls.
- Bog material spreading
  - The plant fragments will be spread over the site with a standard box manure spreader, ideally in early spring over frozen ground.
  - The restoration site soil surface will be covered with a uniform 1 to 5 cm thick, fluffy layer of plant fragments.
- Straw spreading
  - Clean, fresh, straw mulch will be applied over plant fragments as soon as possible after plant spreading (the same day) to improve growing conditions for plant fragments by creating a wetter and cooler air layer at the peat surface.
  - Attempts will be made to utilize equipment that allows straw to be spread without traveling on top of plant fragments, such as a sideways straw bale spreader with a mulch pass made after plant spreading from adjacent areas not yet completed.
  - Straw application rate: 2,500 lbs/ac, 10 to 12 4-foot diameter round bales or 7 to 8 5-foot diameter round bales per acre.
- Fertilizer application
  - Slow-release phosphate rock fertilizer (P<sub>2</sub>O<sub>5</sub>) will be applied to approximately one-half of the restoration areas with a conic spreader at 17.5 pounds/acre available phosphate to provide adequate nutrients to favor a rapid establishment of a sphagnum mat. Because current research is not conclusive regarding the benefits of fertilizer, it will only be applied to one-half of the Site to determine the effectiveness of this treatment and the potential for deleterious effects of promoting invasive vegetation establishment. If additional information becomes available prior to restoration this treatment may be eliminated or added to the Site.

• Equipment that allows fertilizer to be spread without traveling on top of plant fragments and straw mulch will be used, such as with a conic spreader pulled behind an all-terrain vehicle, after mulch spreading has been completed.

## 4.4 Tree and Shrub Installation

Approximately, one to three years following bog harvest material installation, tree and shrub seedlings will be planted on the Site. The trees will be installed into the peat soil, through the newly establishing sphagnum and herbaceous community. After three years of monitoring the tree plantings, supplemental plantings may be recommended in certain areas, especially if maintenance activities or invasive species are problematic. Black spruce and tamarack will be the primary trees targeted for the planting, but other species may be considered based on their prevalence in bogs as shown in Table 3.

### 4.5 Excavated Ponds

Several ponds will be excavated to provide fill material for the existing ditches and will become shallow open water communities. Water in the ponds will be less than 6 feet deep, so that these still qualify as wetland communities and will still support rooted vegetation. The slopes within the ponds will be gradual, no steeper than 5:1 slopes (horizontal to vertical), ideally 8:1. The bottoms will be uneven and the shape of each pond will be irregular to maintain natural appearance and structure. The majority of the substrate in the ponds will be mineral soil, primarily clay, though some peat will be returned after the excavation to provide a natural muck layer. However, this layer would likely settle into the deepest portions and could not be maintained evenly throughout the bottom.

The ponds will be managed similar to other portions of the Site except some herbaceous species will be planted to encourage establishment. Some emergent and floating-leaved species will be installed along the edges of the ponds. The majority of the vegetation is expected to colonize naturally and invasive species will be managed, when feasible and appropriate.

## 4.6 Natural Regeneration and Bog Establishment

The general restoration strategy for the majority of the native herbaceous community is to promote natural regeneration during the first two to three years after hydrologic restoration. To the extent practicable, the majority of the weed control will be completed by hand, ATV, or aerial application to minimize the impact on the developing sphagnum and the young trees. The proposed vegetation establishment and maintenance activities anticipated to meet the goals of the plan are listed for the conditions described, as appropriate for the restoration schedule:

• **Presence of invasive species.** Apply appropriate herbicides within wetland restoration areas containing more than 10% areal coverage of reed canary grass or other invasive species. Depending on the density of each species in a given area, selective or broad-spectrum herbicides may be used. A list of invasive species is provided in Table 4. Mowing may also be used to prevent seed set, especially for annuals.

- **Vegetation characterization.** Characterize vegetation in each wetland restoration area twice each year between May and September to determine necessary management and establishment procedures. Vegetation characterization will include documenting problem species present and the approximate areal coverage of each species.
- **Spot treatment.** Spot spray up to three times annually to control reed canary grass and other perennial non-native or invasive species for 10 years or longer following initial restoration. Extensive treatments may not be needed after a sustainable wetland dominated by characteristic native vegetation is established such that the performance standards are achieved.
- **General weed control**. Continue treatments 1, 2, and 3 annually until non-native or invasive species are adequately controlled.

### 4.7 Supplemental Planting and Seeding

Careful monitoring of vegetation development on the Site will be completed annually to determine where problems are occurring and, to the degree possible, to determine the cause of those problems. Beginning in the third growing season after planting, supplemental trees and shrubs may be installed if performance standards are not met. Seed additions may also be used, beginning in the third growing season, if areas are present where suitable native vegetation has not developed. As such, native seed mixes would be used similar to those recommended by the Minnesota Board of Water and Soil Resources (BWSR) and applied after appropriate measures have been taken to control the invasive species.

# 5.0 Wetland Mitigation Performance Standards

Performance standards have been developed for the Site to guide the restoration activities and to measure success. The performance standards are appropriate for either a coniferous bog or swamp community because the conditions for each are generally similar. The performance criteria include measures to evaluate whether or not the hydrology and vegetation meet the plan goals. If the performance standards are not met during the 20-year monitoring period for the forested communities, a proposal will be submitted describing the corrective actions proposed and an implementation schedule or monitoring may continue for a longer duration.

### 5.1 Performance Standards

#### 5.1.1 General

Nearby reference wetlands will be identified prior to monitoring of the restored wetlands. Reference wetlands will be used to provide local context to supplement available information, expertise, and knowledge on natural wetland communities that are similar types as the mitigation wetlands. It is expected that the Site will meet these minimum general performance standards:

- More than 75 percent of the vegetation in each wetland shall be facultative (FAC) or wetter (FACW, OBL).
- Invasive plant species shall not comprise more than 10 percent cumulative areal coverage within any wetland community by the end of the eighth full growing season. Invasive species include those provided in Table 4.
- Vegetative coverage will comprise at least 90 percent areal coverage by the end of the second full growing season to ensure adequate soil coverage, except in shallow open water communities.

#### 5.1.2 Coniferous Bog or Swamp

The coniferous bog or swamp community will meet these minimum performance standards:

- There will be at least 108 living tree stems per acre by the end of the tenth full growing season. The trees will be dominated by tamarack and or black spruce, but other species may be present.
- Invasive plant species shall not comprise more than 10 percent cumulative areal coverage within any wetland community by the end of the eighth full growing season. Invasive species include those provided in Table 4.
- Vegetative coverage will comprise at least 90 percent areal cover by the end of the fifth full growing season to ensure adequate soil coverage, except in shallow open water communities.

#### 5.1.3 Sedge Meadow or Open Bog

In the event that trees do not become well-established in certain portions of the Site and supplemental plantings are not expected to be successful, the target community will be modified to a sedge meadow or

open bog and the new target area will be described and enumerated in the annual monitoring reports. The sedge meadow or open bog community will meet the following performance standard:

- By the end of the fifth full growing season, the herbaceous plant coverage will be comprised of at least 10 native grass, sedge, fern, rush, and/or forb species in sedge meadow communities and 5 native, herbaceous species within open bog communities; or will have a vegetative diversity/integrity rating of high quality using the Minnesota Routine Assessment Method for Evaluating Wetland Functions (MnRAM).
- Hydrology will be similar to that which is recorded in a nearby reference wetland site. This will likely consist of a water table within 12 inches of the soil surface for at least half of the growing season except during growing seasons with precipitation below the range of normal (driest 30 percent of most recent 30-year period of precipitation records).

#### 5.1.4 Shallow Open Water

The ponds will be excavated below the groundwater table and therefore will have standing water throughout most of the area. The edges of the ponds will be more similar to a shallow or deep marsh community, but are not separated here for practical purposes. The majority of the ponds will meet the following performance standard:

- By the end of the fifth full growing season, the plant coverage will be comprised of at least 4 native emergent or floating-leaved species.
- Ponds shall be inundated by at least 36 inches of water (in the deepest part) throughout the growing season except during growing seasons with precipitation below the range of normal (driest 30 percent of most recent 30-year period of precipitation records).

# 6.0 Wetland Restoration and Management Schedule

The following schedule represents a preliminary plan of the expected activities to restore wetlands at the Site. However, with an adaptive management perspective, it should be recognized that the timing of specific establishment and management activities are likely to change as the restoration progresses. The overall schedule for restoration activities is to complete the restoration work within the first 2 years of the Project. Within the first year after permit issuance, the Year 1 restoration work will be completed. The remaining restoration activities will generally follow the conceptual schedule provided below.

The wetlands restored on the Site will require regular management to become established. This is critical in the first 5 to 8 years and should be recognized as integral to the wetland restoration success. Management will include eliminating invasive species, creating ideal conditions for the native plants to flourish, and seeding/planting to supplement natural regeneration. Weed removal and careful monitoring is important during the early stages of the restoration. All management activities described below apply to the management of the entire Site, including areas receiving credit for restoration of drained and partially-drained wetlands, preservation, and upland buffers.

After certification from the permitting agencies that construction was completed as planned, a permanent conservation easement will be recorded and documentation will be provided to the USACE, the WCA administrator, and other appropriate regulatory agencies.

#### 6.1 Preparation – Year 0

#### 6.1.1 Fall and Winter

- Lower existing water control structures to reduce water levels in the ditches prior to being filled with soil.
- Remove all existing sod or other crops from the Site and eliminate all vegetation down to bare soil using herbicide applications, mowing, and cultivation where needed.
- Harvest sphagnum from the donor site, Mine Site or other local site, and store at the Site through the winter.
- Fill ditches and break subsurface drain tiles to restore site hydrology.

## 6.2 Year 1

#### 6.2.1 Early Spring

- Spread donor sphagnum material onto the site prior to melting frost.
- Monitor water levels in restored wetlands.

#### 6.2.2 Spring/Summer

- Assess the presence of potentially problematic weeds and implement appropriate management methods including spot treatments with selective herbicides.
- Complete construction repairs, as needed.

#### 6.2.3 Fall—End of First Full Growing Season

- Complete monitoring report, including documentation of wetland establishment activities during the year in comparison to the plan and recommend actions for the following year.
- Apply herbicides as necessary to control non-native and invasive species in all communities.
- Report on water levels in restored wetlands from the full growing season.
- Prepare as-built survey and report following construction completion and request certification of construction.
- Complete construction repairs, as needed.

## 6.3 Year 2

#### 6.3.1 Spring/Summer

- Monitor water levels in wetlands.
- If hydrologic conditions have stabilized and are appropriate, plant trees and shrubs, otherwise wait until spring of Year 3.
- Apply appropriate herbicides to control invasive species.

#### 6.3.2 Fall—End of Second Full Growing Season

- Complete monitoring report, including documentation of wetland establishment activities completed during the year in comparison to the plan and recommend actions for the following year.
- Apply herbicides as necessary to control invasive species.
- Report on water levels in restored wetlands from the full growing season.

### 6.4 Year 3

#### 6.4.1 Spring/Summer

- Monitor water levels in wetlands.
- Apply appropriate herbicides to control invasive species.

#### 6.4.2 Fall—End of Third Full Growing Season

- Apply herbicides as necessary to control invasive species.
- Complete monitoring report, including documentation of wetland establishment activities completed during the year in comparison to the plan and recommend actions for the following year.
- Report on water levels in restored wetlands from the full growing season. Determine if the hydrology performance standard has been met or if the groundwater has sufficiently stabilized such that no further groundwater monitoring is necessary.
- If large areas of invasive species are still present, those areas should be aggressively controlled and seeding and/or other remedial activities should be planned.
- If trees and shrubs are not meeting performance criteria, re-planting efforts should be planned for next spring. If high groundwater is problematic in certain areas, the target communities in those areas should be altered to sedge meadow or open bog.

### 6.5 Years 4 through 20

Many of the management activities described for Year 3 will be continued in Years 4-20. Monitoring reports will be completed in years 1, 3, 5, 10, and 20, if necessary. Hydrology monitoring wells will be removed from the Site at the end of year 5, assuming the hydrology performance standards are met. The monitoring report completed after the tenth growing season will assess whether or not the restoration is sufficiently complete and, if additional monitoring and reporting are warranted.

# 7.0 Wetland Mitigation Monitoring

The Site will be monitored for 20 years beginning in the first full growing season after completing hydrologic restoration. The purpose of the monitoring is to document the progress and condition of the restored wetland communities. Monitoring reports will be prepared and submitted in Years 1, 2, 3, 5, 10, and 20. The monitoring reports will assess whether or not the restored wetlands are in conformance with performance standards and determine whether continued monitoring is required. Monitoring visits will include review of the areas receiving credit for restoration of partially-drained wetlands and in the preservation areas to identify potential problems with invasive species or other forms of degradation.

Hydrologic parameters will be evaluated in the mitigation areas more intensively during the first two years and then at a level appropriate to the hydrologic characteristics of each area thereafter. Any significant modifications to the monitoring frequency proposed herein will be described in a revised monitoring plan to be submitted for review and approval prior to implementation. In addition to monitoring the restored wetlands, one reference wetland of each wetland restoration community type (if available) will be monitored within the general area of the restoration site in areas with relatively natural hydrologic conditions. A monitoring plan will be submitted for review and approval that will include proposed locations of reference wetlands prior to implementing the monitoring program. Continuous recording wells will be utilized to the extent feasible.

## 7.1 Hydrologic Monitoring

Hydrologic monitoring in these generally saturated wetland communities will be conducted using shallow wells placed throughout the Site sufficient to characterize hydrology through year 5. Water elevations will be recorded at least once per week from May through mid-July and monthly thereafter until the end of the growing season.

## 7.2 Vegetation Monitoring

A detailed vegetation survey will be conducted once per year (typically July-August) in each wetland mitigation community, as well as the reference wetland communities, to evaluate the success of the restoration during the appropriate monitoring period for each community type. At least 10 permanent monitoring points will be established throughout the Site (at least 2 plots in the South Unit). Vegetation sampling at each of these points will be completed based on guidance from the 1987 Wetland Delineation Manual (Reference (10)) and the Northcentral and Northeast Regional Supplement (Reference (11)) or appropriate updated version. Monitoring within the established plots will include a count of living trees and shrubs to estimate survivorship rates. Meander surveys will also be incorporated during the site visits to identify the overall vegetation and the presence of invasive species throughout the Site. Documentation photographs will also be taken during monitoring from fixed reference points around each restored wetland area.

## 7.3 Monitoring Report

A monitoring report will be prepared following growing seasons in years 1, 2, 3, 5, 10, and 20. The report will describe the status of the wetland mitigation and summarize the results of the vegetative and hydrologic monitoring. Additionally, the report will document all management activities and corrective actions conducted during the previous year and describe those activities planned for the following year. The report will be submitted by January 31 of the year following monitoring. The annual report will include the following information at a minimum:

- A brief description of the wetland mitigation areas; including location, size, vegetative and hydrologic monitoring data, current wetland types, and desired wetland types.
- An as-built survey will be provided in the first-year report along with a comparison of the as-built survey to the approved plans.
- A summary of water level measurements taken to date and a determination whether the hydrology in the wetlands meets the design elevations and wetland hydrology criteria as defined in the performance standards.
- Vegetation survey information, including species and percent areal coverage within each restored wetland community and each upland buffer community and a determination of whether the vegetation meets the performance criteria.
- A map of the various plant communities present within the restoration areas will be prepared as distinctly different communities develop.
- Annual color photographs of the wetland mitigation sites taken during vegetation monitoring at designated photo-reference points.
- A summary of management activities and/or corrective actions conducted in the wetlands during the previous year and activities planned for the following year.

# 8.0 References

1. **Minnesota Historical Society.** Minnesota Maps Online: Original Land Survey Maps. *Minnesota Historical Society*. [Online] 1867. [Cited: February 9, 2011.] http://www.mnhs.org/collections/digitalmaps/index.htm.

2. **Marschner, F J.** The original vegetation of Minnesota, a map compiled in 1930 by F.J. Marschner under the direction of M.L. Heinselman of the U.S. Forest Service: St. Paul, Minnesota, Cartography Lab of the Department of Geography, University of Minnesota. *The DNR Data Deli*. [Online] 1974. [Cited: February 9, 2011.]

3. **Natural Resources Conservation Service.** Soil Survey Geographic (SSURGO) database for St. Louis County, Minnesota, Meadowlands Part. *United States Department of Agriculture – Natural Resources Conservation Service. Fort Worth, TX: mn619.* [Online] 2009. http://soildatamart.nrcs.usda.gov/.

4. **Minnesota Department of Natural Resources.** Ecological Classification System. [Online] 2010. [Cited: December 29, 2010.] http://www.dnr.state.mn.us/ecs/index.html.

5. **National Audubon Society.** Important Bird Areas in the U.S: Sax-Zim Bog IBA. *Audubon*. [Online] 2010. [Cited: December 28, 2010.]

6. **Eggers, S.D. and D.M. Reed.** Wetland Plants and Plant Communities of Minnesota and Wisconsin: Second Edition. U.S. Army Corps of Engineers, St. Paul District. 1997.

7. **U.S. Department of Agriculture - Natural Resources Conservation Service.** Hydrology Tools for Wetland Determination. Minnesota Supplement to the National Engineering Handbook. Part 650. Engineering Field Handbook. Chapter 19. 2011.

8. **Quinty, F and Rochefort, L.** *Peatland Restoration Guide*. Second. Quebec : Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy, 2003.

9. Effects of mulch, companion species, and planting time on restoration of post-harvested Minnesota peatlands, U.S.A. Johnson, K W, Maly, C C and Malterer, T J. [ed.] L. Rochefort and J-Y. Daigle. Quebec City, Canada : s.n., August 6-12, 2000. Sustaining our Peatlands: Proceedings of the 11th International Peat Congress. pp. 699-704.

10. **U.S. Army Corps of Engineers, Environmental Laboratory.** Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. 1987.

11. —. Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual. ERDC/EL TR-09-19. Vicksburg, MS: U.S. Army Corps of Engineers: Engineer Research and Development Center, Wetlands Regulatory Assistance Program. 2009. 12. **Minnesota Department of Natural Resources, Ecological Services Division.** Vascular Plants of Minnesota. September 25, 2002.

## **Tables**

Field Number/Feature Type	Area (acres)	Credit
N01	16.1	16.1
N02	17.8	17.8
N03	2.2	2.2
N04	18.8	18.8
N05	21.1	21.1
N06	17.8	17.8
N07	17.6	17.6
N08	21.5	21.5
N09	23.1	23.1
N10	13.6	13.6
N11	19.0	19.0
N12	20.9	20.9
N13	19.2	19.2
N14	22.2	22.2
N15	22.9	22.9
N16	26.1	26.1
N17	21.9	21.9
N18	29.9	29.9
North Unit Drained Fields Total (100% Credit)	351.5	351.5
N03	2.1	2.1
N05	0.3	0.3
N10	2.4	2.4
N16	0.5	0.5
N17	1.7	1.7
North Unit Total Excavations (100% Credit)	7.0	7.0
Wooded areas - partially drained (50% Credit)	43.6	21.8
Ditch fill (50% Credit)	18.3	9.2
Upland Buffer - Ditch Lateral Effect (25% Credit)	12.3	3.1
Preservation areas	11.6	1.4
Open Ditches (0% Credit)	2.3	-
Road (0% Credit)	5.3	-
Additional land - no credits	28.7	-
North Unit Totals	480.6	394.0

#### Table 1 Wetland Mitigation Credits on the North Unit of the Zim Sod Site

Field Number/Feature Type	Area (acres)	Credit (acres)
S01	6.3	6.3
S02	39.6	39.6
S03	4.2	4.2
South Unit Drained Fields Total (100% Credit)	50.0	50.0
S02	1.3	1.3
South Unit Excavations Total (100% Credit)	1.3	1.3
Wooded areas - partially drained (50% Credit)	4.5	2.3
Ditch fill (50% Credit)	3.2	1.6
Upland Buffer - Ditch Lateral Effect (25% Credit)	10.4	2.6
Preservation (12.5% Credit)	17.2	2.2
Open Ditches (0% Credit)	1.5	-
Road (0% Credit)	0.4	-
South Unit Totals	88.5	59.9

#### Table 2Wetland Mitigation Credits on the South Unit of the Zim Sod Site

#### Table 3Potential Tree Species that may be Planted at the Zim Sod Site

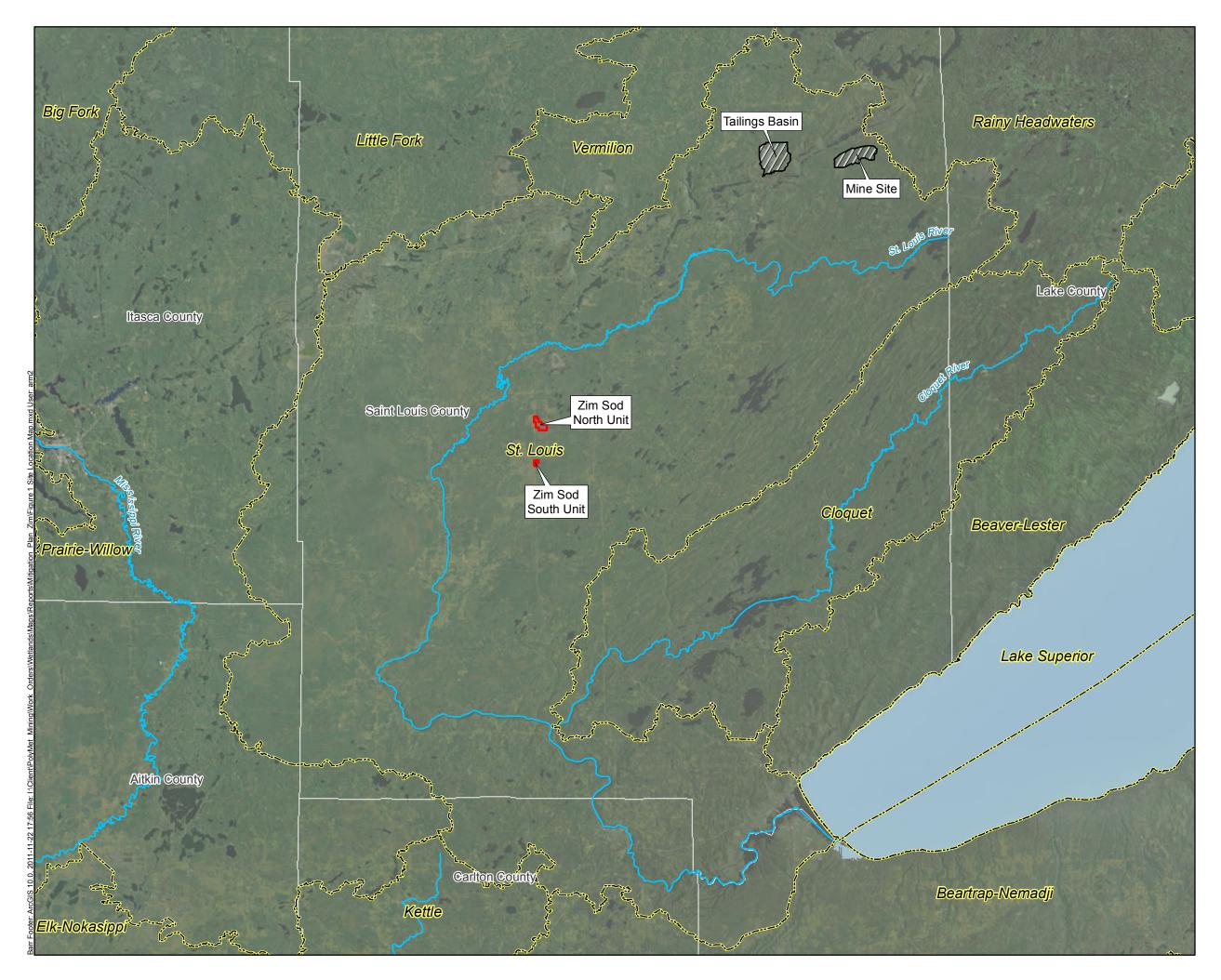
		Expected occurrence in:	
Common Name	Scientific Name	Coniferous Swamp	Coniferous Bogs
Red Maple	Acer rubrum	Infrequent	Rare
Paper Birch	Betula papyrifera	Common	Rare
Black Ash	Fraxinus nigra	Infrequent	Rare
Quaking aspen	Populus tremuloides	Infrequent	Rare
Balsam fir	Abies balsamifera	Common	Rare
Tamarack	Larix laricina	Abundant	Common
Black spruce	Picea nigra	Abundant	Abundant
White cedar	Thuja occidentalis	Common	Rare
Speckled alder	Alnus incana	Common	Rare
Bog birch	Betula pumila	Common	Rare
Juneberries	Amelanchier spp.	Infrequent	Rare

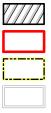
#### Table 4 Potentially Problematic Invasive Species for the Zim Sod Site

Common Name	Scientific Name
Bird's Foot trefoil	Lotus corniculatus
Blue cattail	Typha x glauca
Buckthorns	Rhamnus spp
Canada thistle	Cirsium arvense
Common reed	Phragmites australis
Common tansy	Tanacetum vulgare
Curly dock	Rumex crispus
Flowering rush	Botomus umbellatus
Foxtail	<i>Setaria</i> spp.
Narrowleaf cattail	Typha angustifolia
Perennial sow thistle	Sonchus arvensis
Purple loosestrife	Lythrum salicaria
Reed canary grass	Phalaris arundinacea
Smooth brome grass	Bromus inermis
Sweet clover	Melilotus alba
Yellow iris	Iris pseudacorus

Also includes other non-native species based on Reference (12).

# Figures

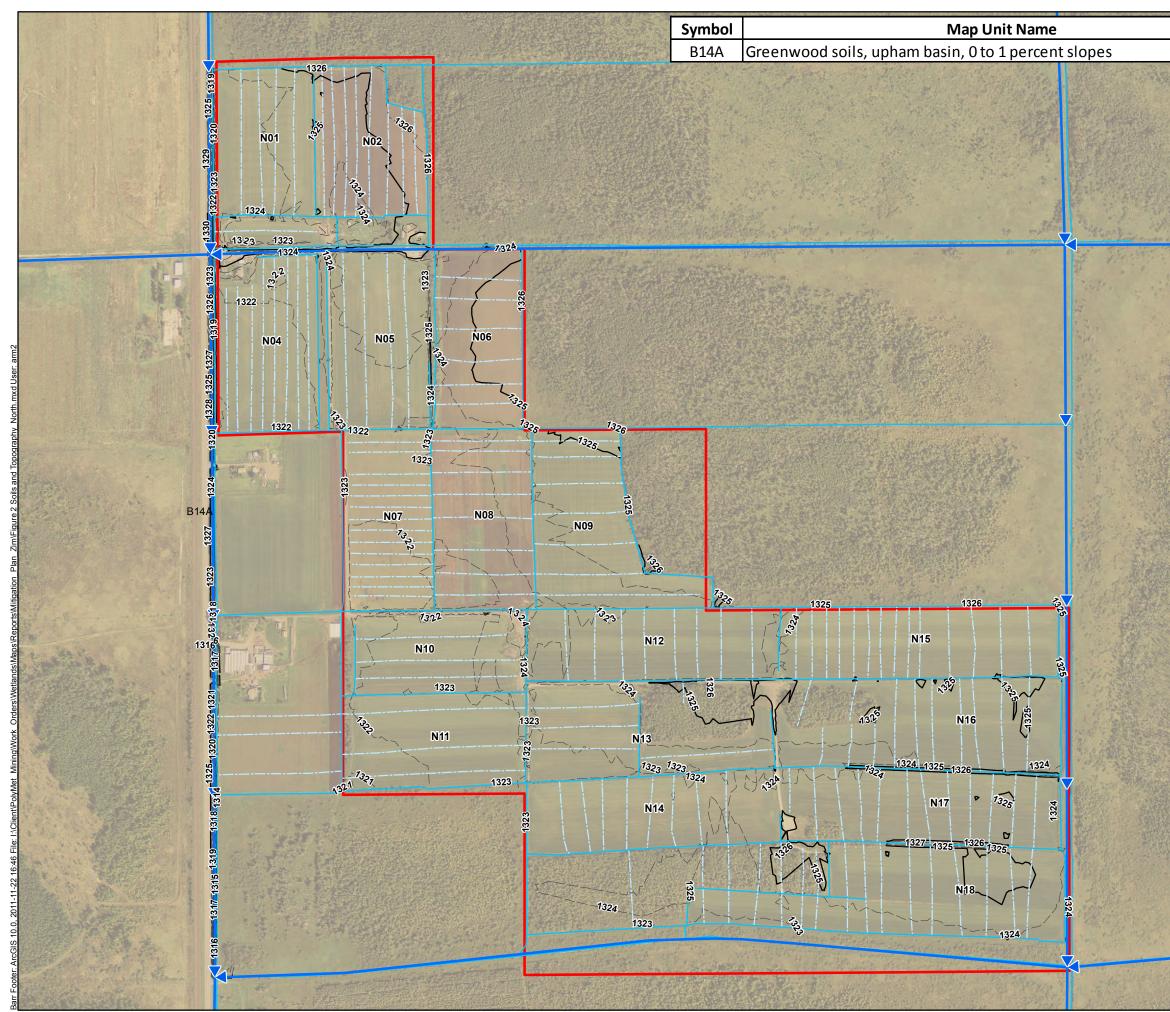




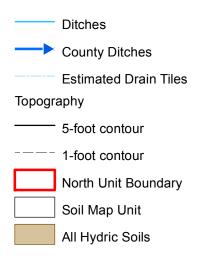
NorthMet Project Areas Zim Sod Property Major Watersheds County Boundaries Major Rivers



Figure 1 ZIM SOD LOCATION MAP NorthMet Project PolyMet Mining, Inc St. Louis County, Minnesota







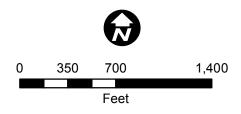
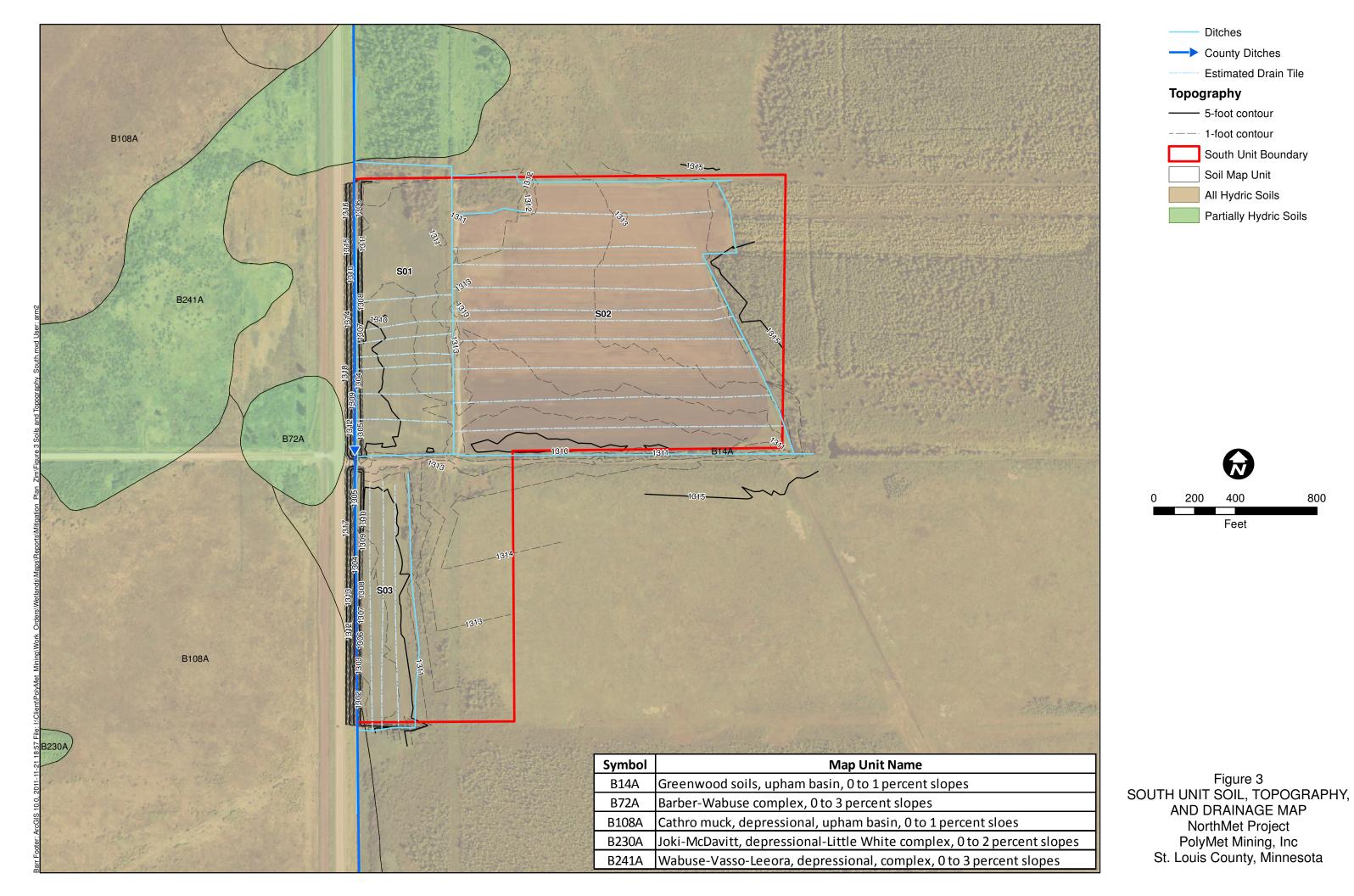
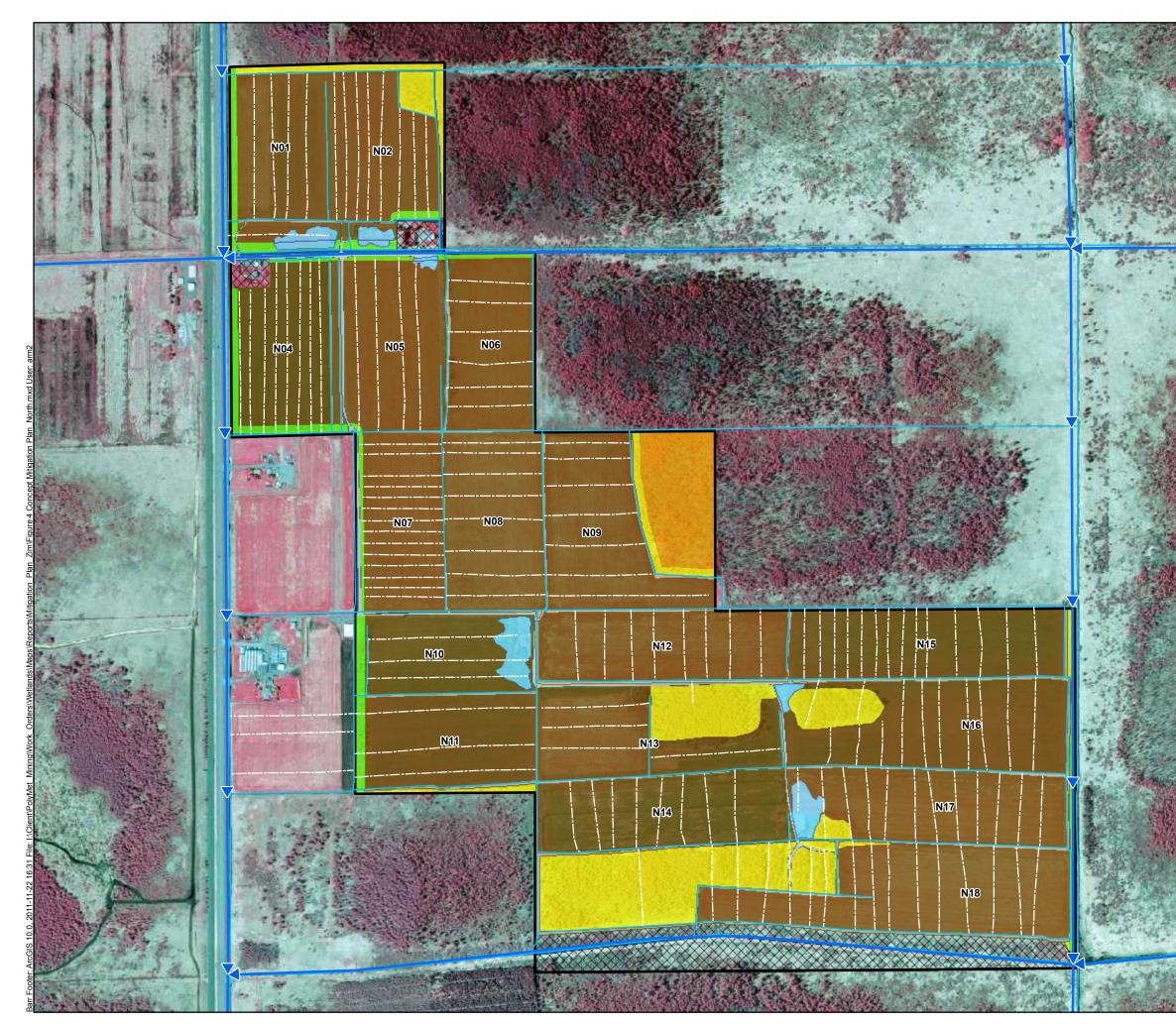


Figure 2 NORTH UNIT SOIL, TOPOGRAPHY, AND DRAINAGE MAP NorthMet Project PolyMet Mining, Inc St. Louis County, Minnesota







#### Ditches

----> County Ditches

Estimated Drain Tiles

North Unit Boundary

#### **Restoration Method**

Restore Drained Fields - 100% Credit

Excavated Ponds - 100% Credit

Filled Ditches - 50% Credit

Restore Partial Drainage - 50% Credit

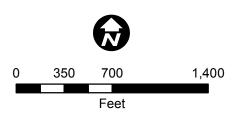
Upland Buffer/Ditch Lateral Effect - 25% Credit

Preservation - 12.5% Credit

Open Ditches - 0% Credit

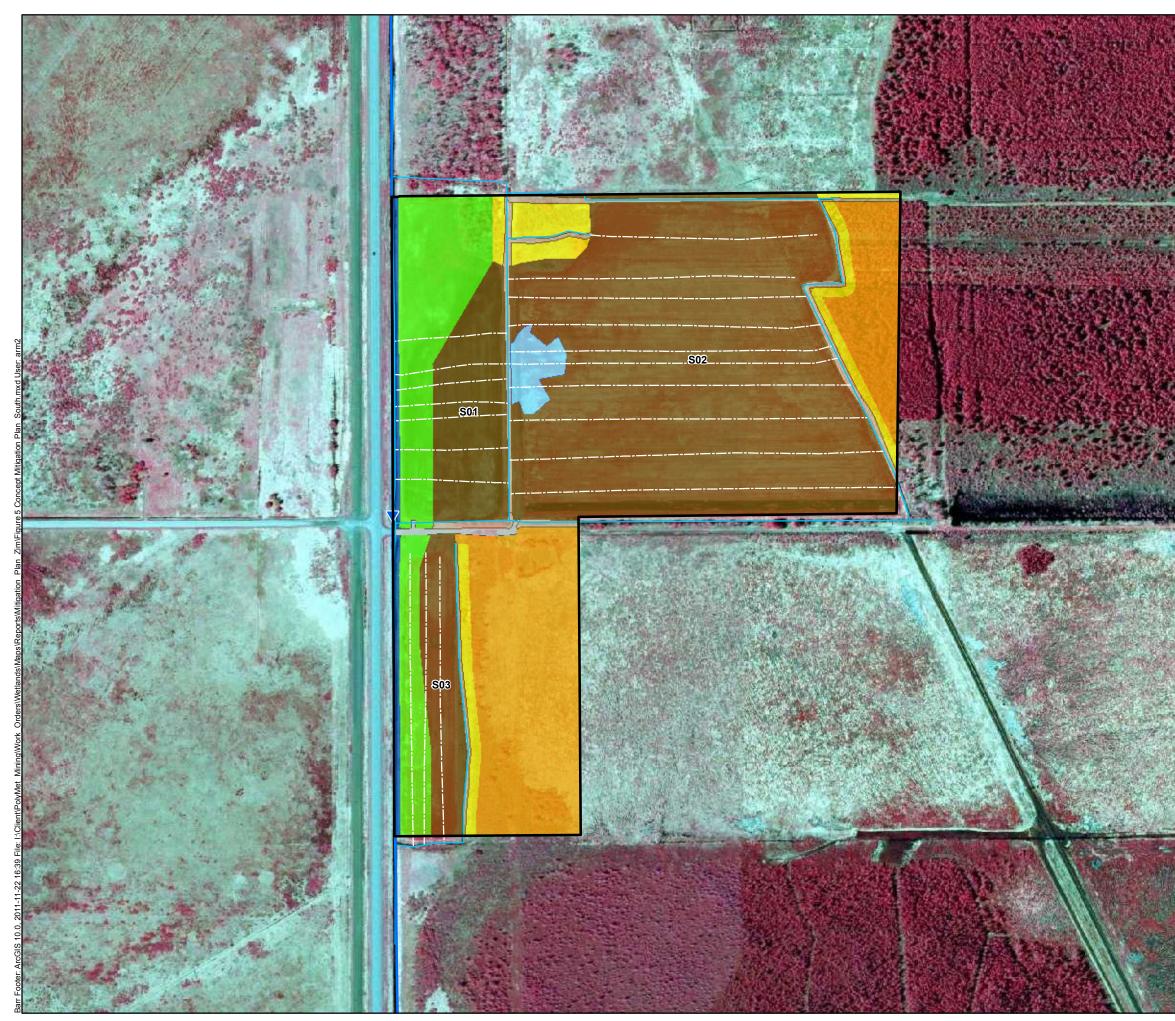
Roads - 0% Credit

0% Credit



#### Figure 4

NORTH UNIT CONCEPTUAL PLAN CREDIT AREAS NorthMet Project PolyMet Mining, Inc St. Louis County, Minnesota







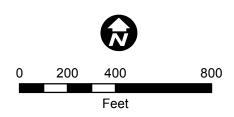


Figure 5 SOUTH UNIT CONCEPTUAL PLAN CREDIT AREAS NorthMet Project PolyMet Mining, Inc St. Louis County, Minnesota

Appendices

# Appendix A

Greenwood Soil Series Official Soil Description

LOCATION GREENWOOD

MI+MA ME MN NH NY WI

Established Series Rev. LWB-WEF-LMC 11/2004

# **GREENWOOD SERIES**

The Greenwood series consists of very deep ,very poorly drained soils formed in organic deposits more than 51 inches thick on outwash plains, till floored lake plains, or lake plains. These soils have moderate or moderately rapid permeability. Slopes range from 0 to 2 percent. Mean annual precipitation is about 29 inches, and mean annual temperature is about 43 degrees F.

TAXONOMIC CLASS: Dysic, frigid Typic Haplohemists

**TYPICAL PEDON:** Greenwood mucky peat - on a 1 percent slope in a forested area. (Colors are for moist soil unless otherwise stated.)

**Oi**--0 to 6 inches; brown (7.5YR 4/4) peat (fibric material); about 95 percent fiber, about 90 percent rubbed; massive; friable; primarily live roots and sphagnum moss; extremely acid; clear smooth boundary.

**Oe1**--6 to 10 inches; very dark brown (10YR 2/2) broken face and rubbed mucky peat (hemic material); about 80 percent fiber, about 20 percent rubbed; massive; friable; primarily herbaceous fibers; extremely acid; gradual smooth boundary.

**Oe2**--10 to 35 inches; dark brown (7.5YR 3/2) broken face and rubbed mucky peat (hemic material); about 80 percent fibers, about 20 percent rubbed; massive; friable; primarily herbaceous fibers; extremely acid; gradual smooth boundary.

**Oe3**--35 to 60 inches; dark brown (7.5YR 3/2) broken face and rubbed mucky peat (hemic material); about 90 percent fibers, about 35 percent rubbed; massive; friable; primarily herbaceous fibers; very strongly acid.

**TYPE LOCATION:** Clare County, Michigan; about 5 miles south and 1 mile west of Temple; 300 feet east and 825 feet south of the northwest corner, sec. 16, T. 18 N., R. 6 W.

**RANGE IN CHARACTERISTICS:** The organic layers are more than 51 inches thick. The surface tier is commonly peat (fibric material) derived from sphagnum moss. In some places, these layers are largely undecomposed sphagnum moss and in others they are stratified muck, mucky peat, and peat derived from both herbaceous plants and sphagnum moss. Muck, mucky peat, and peat types have been recognized. The O layers have hue of 10YR to 5YR, value of 2 to 6, and chroma of 1 to 4; colors become darker upon brief exposure to air. Oi layers have the highest values and chromas. In some pedons, colors after rubbing change from 0.5 to 1 unit in value or chroma or both. The layers in the subsurface and bottom tiers are dominantly mucky peat (hemic material) derived from herbaceous plants. In some pedons, layers of peat or muck have a combined thickness of less than 10 inches in the lower two tiers. These layers have pH of 4.5 or less in 0.01M calcium chloride and commonly range from pH 3.5 to 4.5. Fragments of woody material ranging from about 1 to 8 inches in diameter are throughout the control section. Woody fibers comprise less than 50 percent of the organic volume after

rubbing. There is no mineral soil material recognized in the profile.

**COMPETING SERIES:** There are none. The <u>Burnt Vly</u>, <u>Citypoint</u>, <u>Dawson</u>, <u>Loxley</u> and <u>Pleasant Lake</u> soils are in closely related families. All of these soils are dominantly composed of sapric materials. In addition, the Citypoint series has a lithic or paralithic contact within 60 inches and the Burnt Vly and Dawson soils have sandy mineral soil within 51 inches of the surface.

**GEOGRAPHIC SETTING:** Greenwood soils are in depressions that range in size from small enclosed bogs in moraines to areas of about 1,000 acres in size. The larger areas commonly are on outwash plains, till floored lake plains, or lake plains. The mineral soils in the surrounding upland are generally derived from acid parent materials. Slopes range from 0 to 2 percent. Then mean annual precipitation ranges from about 22 to 35 inches, and the mean annual temperature is about 36 to 45 degrees F. Frost free days range from 88 to 150. Elevation above sea level ranges from 600 to 1,600 feet.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the <u>Dawson</u>, <u>Deford</u>, <u>Kinross</u>, and <u>Roscommon</u> soils. Dawson soils are shallow organic soils in similar landscape positions underlain by sand at a depth of 16 to 50 inches. The Deford, Kinross and Roscommon soils are poorly or very poorly drained sandy mineral soils in slightly higher landscape positions.

**DRAINAGE AND PERMEABILITY:** Very poorly drained. The representative depth to wet soil moisture status is at the surface to 1 foot below the surface at some time throughout the year. The representative depth of ponding is from 0 to 1.0 foot at some time throughout the year. Surface runoff is negligible. Permeability is moderate or moderately rapid.

**USE AND VEGETATION:** Very little use is made of these soils because of the extreme acidity and high water table. Few trees except some black spruce and tamarack grow on these soils. Ground cover is blueberries, bog rosemary, laurel, leatherleaf, and sphagnum mosses.

**DISTRIBUTION AND EXTENT:** Minnesota, Wisconsin, New Hampshire, New York, and the northern Lower Peninsula and Upper Peninsula of Michigan. The soil is of large extent.

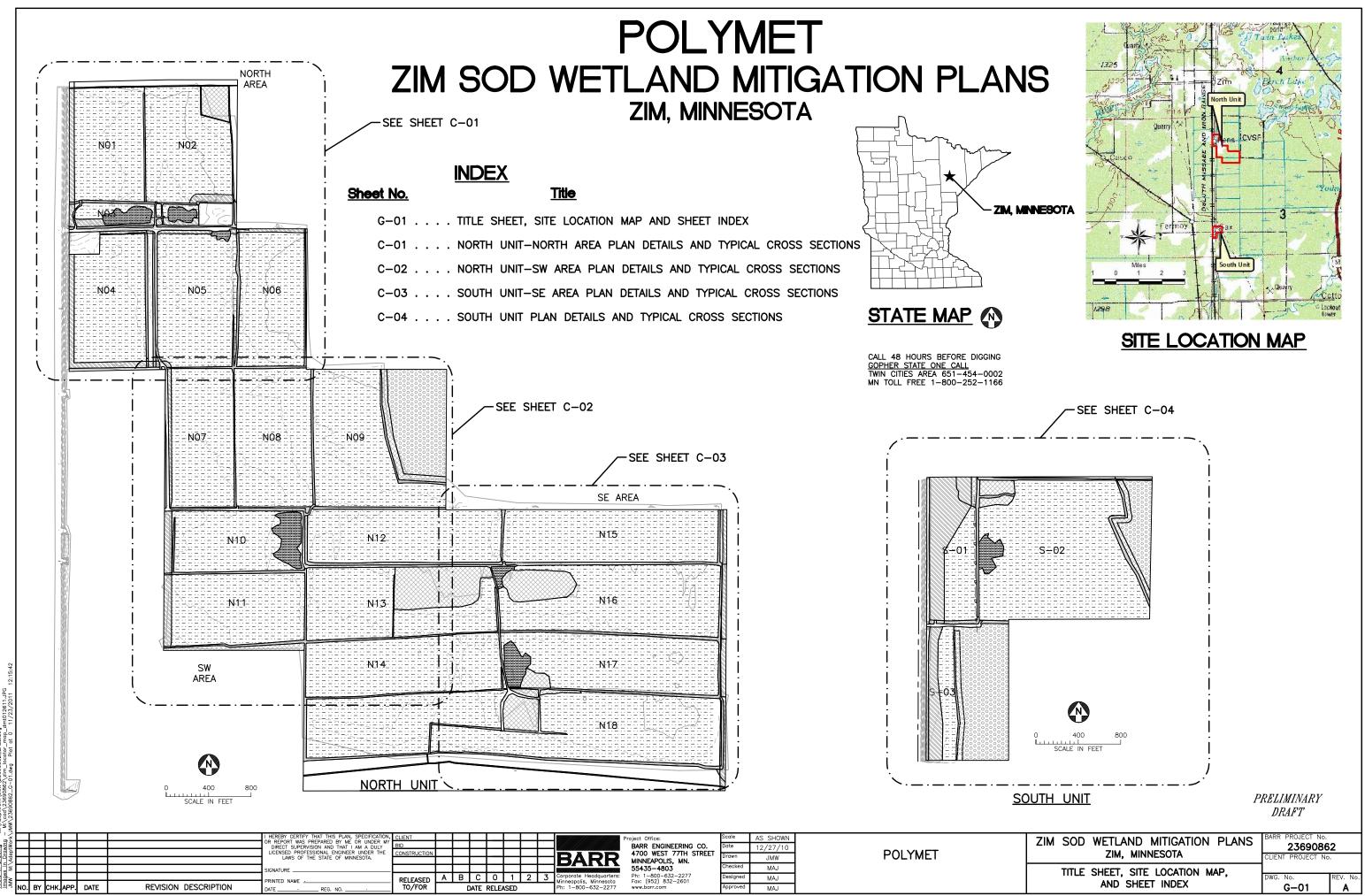
MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: St. Paul, Minnesota

SERIES ESTABLISHED: Ogemaw County, Michigan, 1923.

National Cooperative Soil Survey U.S.A.

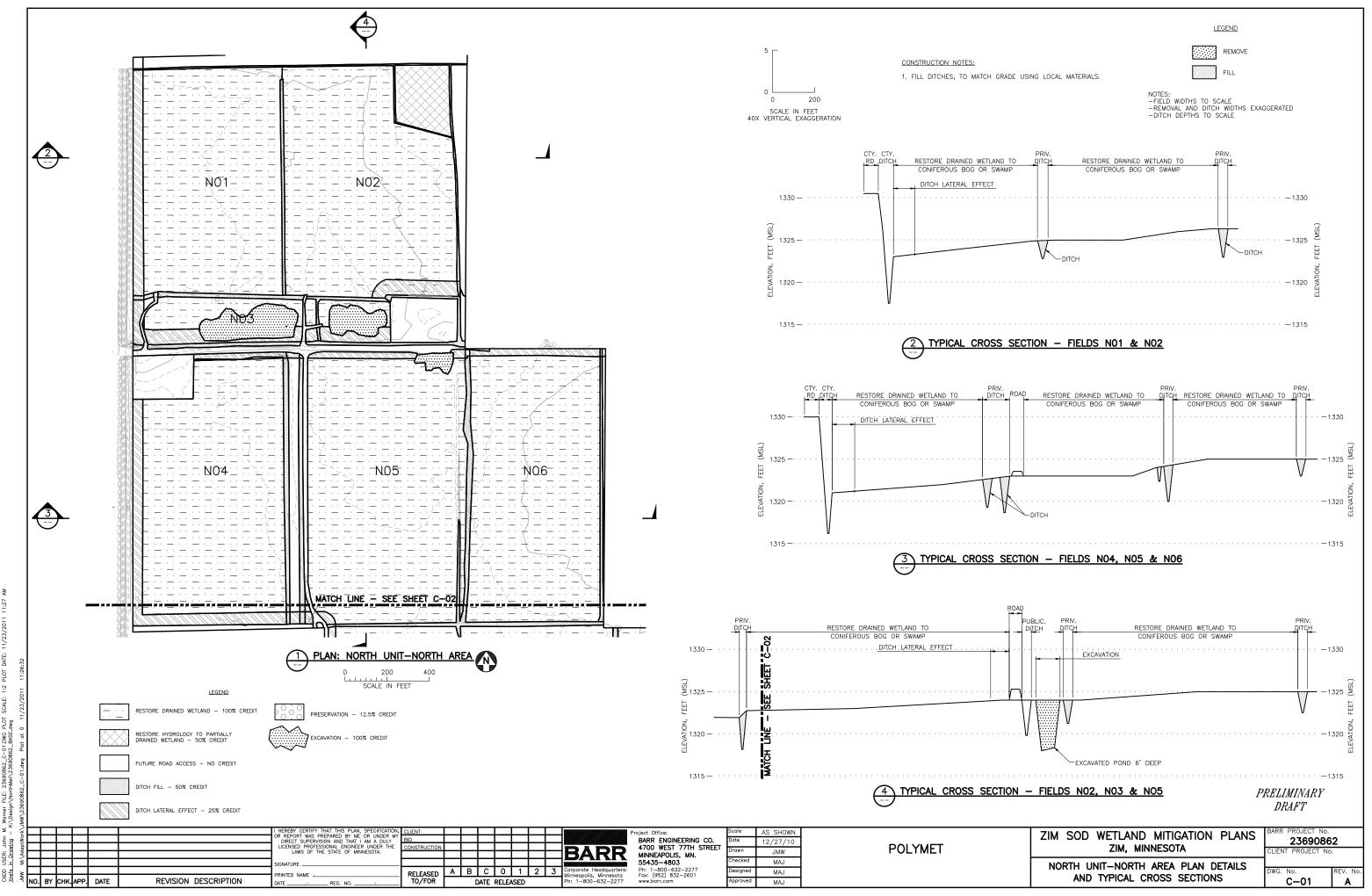
# Appendix B

Wetland Mitigation Plan Drawings

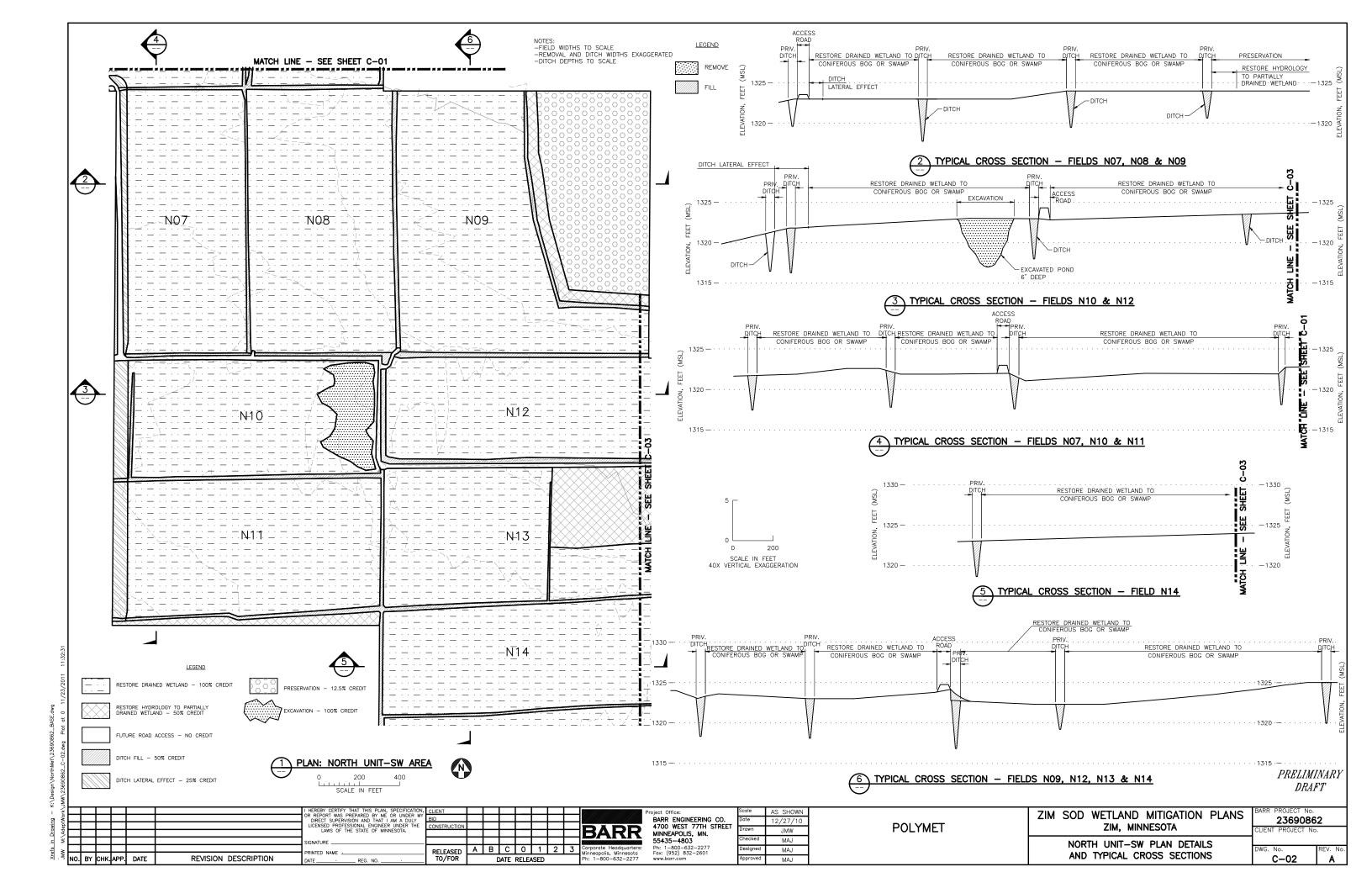


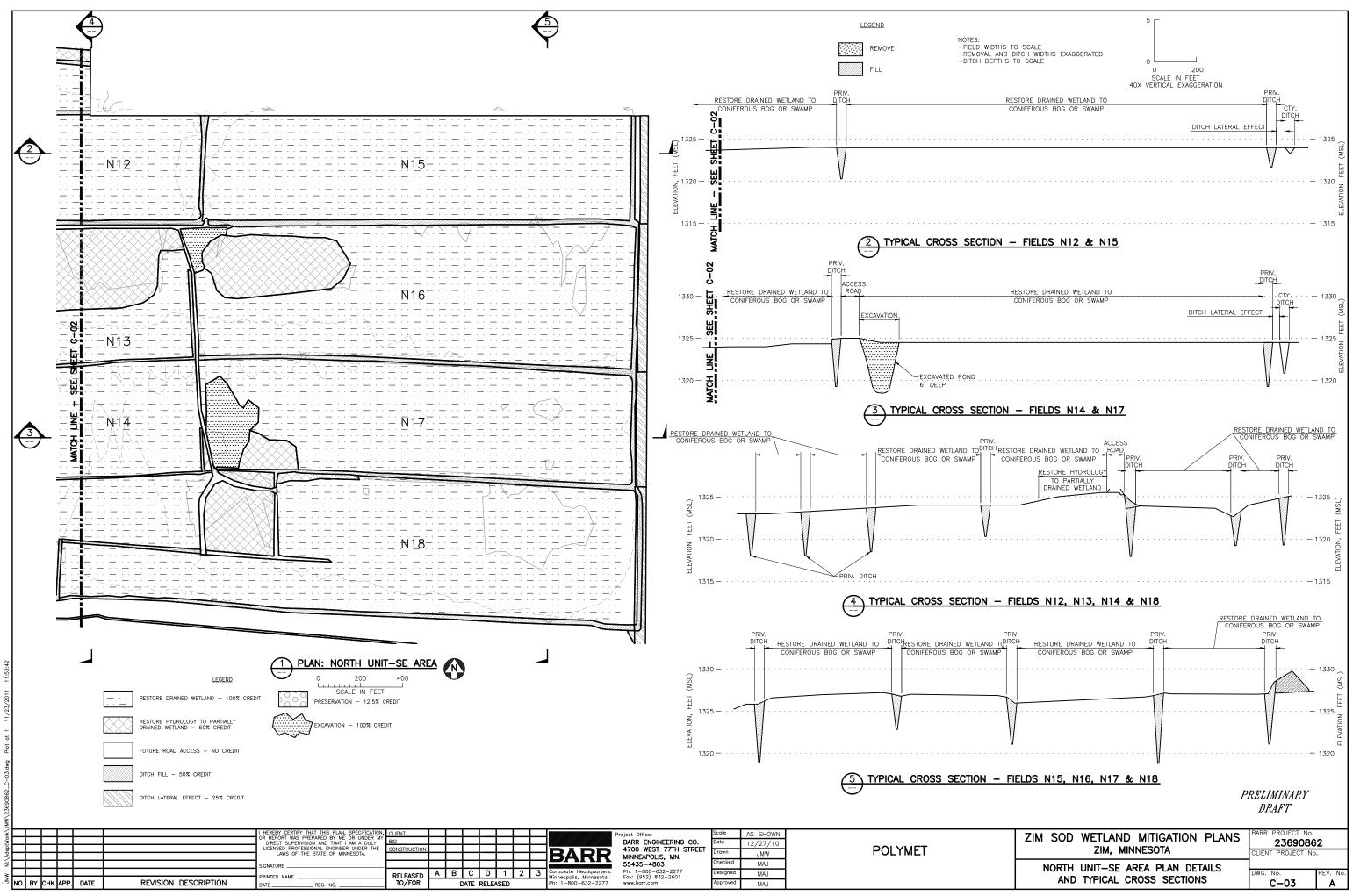
MWV 0862



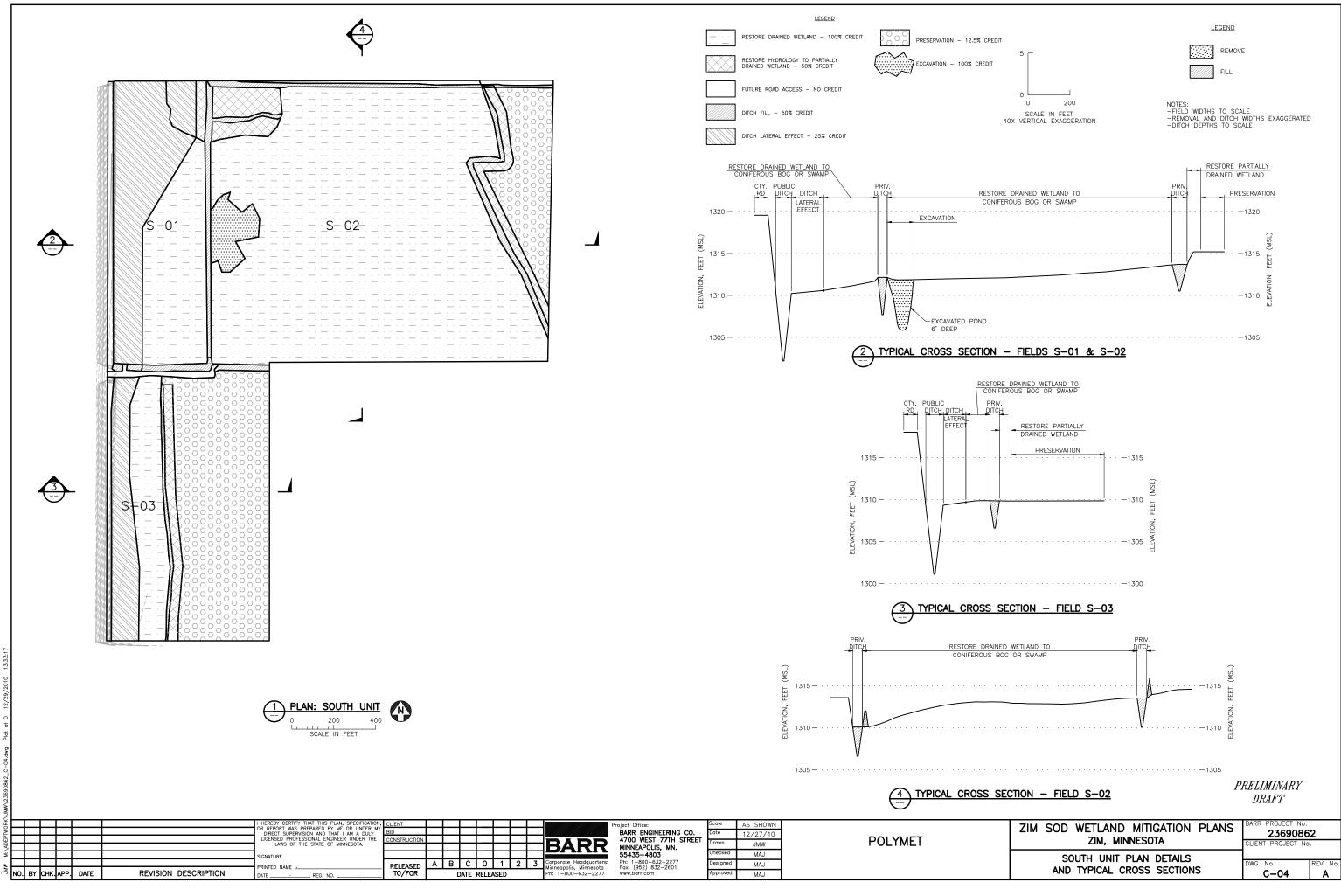


PLO dwg .DWG. BASE. C-01 Warner <:\Desiar × nhol naina USER: in Dro





ADD USER: John M. Warmer FILE: 23690882\_C-0-03.DWC PLOT SCALE: 1:2 PLOT DATE: 11/23/2011 1: Keris in Drawing - K:\Design\NorthMer\\23680982\_BASE.dwg



USER: John M. Worner FILE: 23690862\_C-04.DWG PLOT SCALE: 1:2 PLOT DATE: 11/23/2011 12: <u>in Drowing</u> - M:/AdeptWork/JMWY,23690862\_BASE.dwg

CADD

# Appendix C

Wetland Data Forms

Project/Site:	Zim Sod				Applicant/C	Owner:	Zim Sod	<u>l</u>	City/County: <u>St</u>	Louis		State:	<u>MN</u>	Sam	npling Date:	<u>11/18/10</u>
Investigator(s):	<u>TPT</u>				Section:	<u>35</u>			Township: <u>55</u>			Range:	<u>18</u>	Sarr	npling Point:	<u>#01 S03</u>
Land Form:	Terrace				Local Relie	ef: <u>Nor</u>	<u>ne</u>		Slope %:			Soil Map	o Unit Na	me:	Greenwood	I Soils B14A
Subregion (LRR):	<u>k</u>				Latitude:				Longitude:			Datum:				
NWI/Cowardin Cla	assification	:			Circular 3	9 Class	sification:	<u>up</u>								
Are climatic/hydro	loaic condi	tions o	n the site tv	pical for this	time of vea	r?	Yes	(If no. expl	ain in remarks)		Eggers	& Reed (p	orimary):		<u>Upland</u>	
								V 7 1	,	.,	Eggers	& Reed (s	secondar	y):		
Are vegetation	<u>Yes</u>	Soil	<u>Yes</u>	Hydrology	<u>Yes</u>	signific	cantly distu	irbed?	Are "normal circumstances"	<u>Yes</u>	Eggers	& Reed (t	ertiary):			
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	natura	lly problen	natic?	present?		Eggers	& Reed (a	quaternar	y):		

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present?	<u>Yes</u> <u>Yes</u>	Remarks (explain any answers if needed):	This is a sod field - Owl Field -with a managed drainage system and managed vegetation. Soil sample was taken in the field
Wetland hydrology present? Is the sampled area within a wetland?	<u>No</u> No	lf yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:		<u>Absolute</u> % Cover	<u>Dominant</u> Species?	<u>Indicator</u> Status *	Dominance Test Worksheet:
1.		(1101 3126.	/	0			Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)
2.				0			Total Number of Dominant
3.				0			Species Across All Strata: 1 (B)
4.				0			Percent of Dominant Species
			Total Cover:	<u>0</u>			That Are OBL, FACW or FAC: (A/B)
	Sapling/Shrub Stratum	(Plot Size:	)				Prevalence Index Worksheet:
1.				0			Total % Cover of: Multiply by:
2.				0			
3.				0			
4. 5.				0			
5.			Total Cover:	0			
	Herb Stratum	(Plot Size:	, vital cover.	<u>×</u>			FACU Species         0         X 4         0
		(1 101 0120.	)	00	Vee	540	UPL Species0 X 50
1. 2.	Poa pratensis			99	Yes	FAC	Column Totals:99 (A)297 (B)
2. 3.				0			Prevalence Index = B/A = 3.00
3. 4.				0			
4. 5.				0			Hydrophytic Vegetation Indicators:
6.				0			No Rapid Test for Hydrophytic Vegetation
7.				0			Yes Dominance Test is >50%
8.				0			Yes Prevelance Index ≤ 3.0 [1]
			Total Cover:	99			No Morphological Adaptations [1] (provide supporting data
	Woody Vine Stratum	(Plot Size:	)	_			in vegetation remarks or on a separate sheet)
1.				0			No Problematic Hydrophytic Vegetation [1] (Explain)
2.				0			[1] Indicators of hydric soil & wetland hydrology must be present, unless
			Total Cover:	<u>0</u>	* In USFWS I	Region 3	disturbed or problematic.
							Hydrophytic vegetation present? <u>Yes</u>
	narks: lude photo numbers here o	r on a separate she	Edge of so	od field across of	ditch. Vegetation	across ditch is tar	marack, trembling aspen, willow sp. And reed canary

C	Λ	11
Э	υ	ᇿ

Sampling Point: <u>#01 S03</u>

	(Describe to the depth neede Matrix	ed to document		he abscence ox Features	e of indicato	rs).		
Depth (inches)	Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
					.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
· · ·	0yr 2/1						fibric peat	
2	0yr 2/1						fibric peat	5% had bright fibers
J	0yr 2/1						fibric peat	15% bright fibers
4								
6								
[1] Type: C=Concen	ntration, D=Depletion, RM=Re	duced Matrix, C	S=Covered or Coated Sa	nd Grains	[2] Location	n: PL=Pore	Lining, M=Matrix.	
Hydric Soil Indicator	rs: (applicable to all LRRs, u	nless otherwise	noted)			Indicators fo	or Problematic Hydric So	ils [3]:
V Histosol (A1)		Stripped	Matrix (S6)		[	2 cm Muc	ck (A10) (LRR K, L, MLRA	149B)
Histic Epipedon (A	42)	🗌 Dark Sui	face (S7) (LRR R, MLRA 1	49B)	[	Coast Pra	airie Redox (A16) (LRR K,	L, R)
Black Histic (A3)		Polyvalu	e Below Surface (S8) (LRR	R, MLRA 14	9B) [	5 cm Muc	cky Peat or Peat (S3) (LRF	? K, L, R)
Hydrogen Sulfide	(A4)	Thin Dar	k Surface (S9) (LRR R, ML	RA 149B)	[	Dark Sur	face (S7) (LRR K, L)	
Stratified Layers (	(A5)	Loamy N	lucky Mineral (F1) (LRR K,	L)	[	Polyvalue	e Below Surface (S8) (LRF	? K, L)
Depleted Below D	Dark Surface (A11)	🗌 Loamy G	leyed Matrix (F2)		[	Thin Dark	k Surface (S9) (LRR K, L)	
Thick Dark Surfac	ce (A12)	Depleted	Matrix (F3)		[	Iron-Man	ganese Masses (F12) (LR	R K, L, R)
Sandy Mucky Min	eral (S1)	Redox D	ark Surface (F6)		[	Piedmon	t Floodplain Soils (F19) (M	LRA 149B)
Sandy Gleyed Ma	atrix (S4)	Depleted	Dark Surface (F7)		[	Mesic Sp	odic (TA6) (MLRA 144A, 1	45, 149B)
Sandy Redox (S5)	5)	Redox D	epressions (F8)		[	Red Pare	ent Material (TF2)	Other (explain in soil
[3] Indicators of hydro	phytic vegetation and wetland I	hydrology must b	e present, unless disturbea	l or problema	tic.	Very Sha	llow Dark Surface (TF12)	remarks)
Restrictive Layer (if	present): Type:		Depth (inche	es):		H	ydric soil present?	Yes
Remarks: Soil was m	noist but not saturated.							
HYDROLOGY	,							
Wetland Hydrology I	Indicators:							
Primary Indicators (I	minimum of one required; ch	eck all that appl	y)		Secon	dary Indicato	ors (minimum of two requ	uired)
Surface Water (A	1)	Wate	er-Stained Leaves (B9)		Sul	rface Soil Cra	cks (B6)	FAC-Neutral Test (D5)
High Water Table	(A2)	Aqua	atic Fauna (B13)		Dra	ainage Patteri	ns (B10)	
Saturation (A3)		Marl	Deposits (B15)		Мо	ss Trim Lines	: (B16)	
Water Marks (B1)	1	🗌 Hydi	ogen Sulfide Odor (C1)		Dry	/-Season Wa	ter Table (C2)	
Sediment Deposit	ts (B2)		ized Rhizospheres on Livin re not tilled) (C3)	g Roots	Cra	ayfish Burrows	s (C8)	
Drift Deposits (B3)	)				Sat	turation Visibl	e on Aerial Imagery (C9)	
Algal Mat or Crust	t (B4)	_	ence of Reduced Iron (C4)		Stu	inted or Stres	sed Plants (D1)	
Iron Deposits (B5)	)		ent Iron Reduction in Tilled	Soils (C6)	Ge	omorphic Pos	sition (D2)	
Inundation Visible	e on Aerial Imagery (B7)	_	Muck Surface (C7)		Sha	allow Aquitaro	d (D3)	
	ed Concave Surface (B8)	Othe	r (explain in remarks)		Mic	crotopographi	c Relief (D4)	
Field Observations:								N
Surface water prese	nt?	Surfac	e Water Depth (inches):			Wetlan	nd hydrology present?	<u>No</u>
Water table present?	•	Water	Table Depth (inches):			Descri	be Recorded Data:	
			rubio Dopin (monoo)					
	? (includes capillary fringe)		tion Depth (inches):					
	(includes capillary fringe) ] Aerial Photo 📄 Monitor	Satura	tion Depth (inches): Stream Gauge 🏾 Prev	ious Inspect	tions			

Project/Site:	Zim Sod				Applicant/O	wner: Zim Sod	City/County: St. Louis	<u>8</u>	State:	<u>MN</u>	Sampling Date:	<u>11/18/10</u>
Investigator(s):	<u>TPT</u>				Section:	<u>35</u>	Township: <u>55</u>		Range:	<u>18</u>	Sampling Point:	#02 East of S03
Land Form:	Terrace				Local Relief	None	Slope %:		Soil Ma	o Unit Nar	ne: <u>Greenwood</u>	Soils B14A
Subregion (LRR):	<u>K</u>				Latitude:		Longitude:		Datum:			
NWI/Cowardin Cla	assification	c			Circular 39	Classification: <u>6</u>						
Are climatic/hydro	logic condi	itions o	n the site ty	pical for this	time of year	? <u>Yes</u> (If no, expla	ain in remarks)	Eggers	& Reed (j	orimary):	Shrub-Carr	
Are vegetation	No	Soil	No	Hydrology	No s	ignificantly disturbed?	Are "normal Yes		& Reed (	secondary	):	
Ale vegetation	NO	3011	110	Tryurology	<u>110</u> 3	ignineanity disturbed:	circumstances"	Eggers	& Reed (i	tertiary):		
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u> r	naturally problematic?	present?	Eggers	& Reed (	quaternary	<i>):</i>	

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present?	<u>Yes</u> <u>Yes</u>	Remarks (explain any answers if needed):	Comparable wetland behind Owl field on the back side of the pipeline r/w
Wetland hydrology present?	Yes		
Is the sampled area within a wetland?	Yes	If yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:		<u>Absolute</u> % Cover	<u>Dominant</u> Species?	<u>Indicator</u> Status *	Dominance Test Worksheet:
1.	Larix laricina	(FIOL SIZE.	)	10	Yes	FACW	Number of Dominant Species           That Are OBL, FACW or FAC:         4
2. 3.				0			Total Number of Dominant Species Across All Strata: 4 (B)
4.			Total Cover:	0 10			Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)
	Sapling/Shrub Stratum	(Plot Size:	)	_			Prevalence Index Worksheet:
1.	Betula pumila			15	Yes	OBL	Total % Cover of: Multiply by:
2.	Rubus idaeus ssp. strigosu	IS		20	Yes	FACW	OBL Species         15         X 1         15
3. 4.				0			FACW Species         45         X 2         90
5.				0			FACTOr Species         0         X 3         0           FAC Species         0         X 3         0
			Total Cover:	<u>35</u>			FACU Species         0         X 4         0
	Herb Stratum	(Plot Size:	)				UPL Species 0 × 5 0
1.	Phalaris arundinacea			15	Yes	FACW	Column Totals: <u>60</u> (A) <u>105</u> (B)
2. 3.				0			Prevalence Index = B/A =1.75
4. 5.				0			Hydrophytic Vegetation Indicators:
5. 6.				0			Yes Rapid Test for Hydrophytic Vegetation
7.				0			Yes Dominance Test is >50%
8.				0			Yes Prevelance Index ≤ 3.0 [1]
	Woody Vine Stratum	(Plot Size:	Total Cover: )	<u>15</u>			No Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
1.				0			No Problematic Hydrophytic Vegetation [1] (Explain)
2.			Total Cover:	0	* 1= 110514/01		[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
				ž	* In USFWS I	xegion 3	Hydrophytic vegetation present? <u>Yes</u>
	narks: lude photo numbers here o	r on a separate shee	et)				

C	0	11
Э	υ	ᇿ

Sampling Point: <u>#02 East of S03</u>

Depth	Matrix	nent the indicator or confirm the a Redox F		of indicato	ors).		
	or (moist) %	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1. $0 - 4$ $10yr 2/1$ 2 $4 - 9$ $10yr 2/1$						Fibric peat Fibric peat	saturated to surface
2. <u>4-9</u> <u>10912/1</u> 3							
4							
5							
6							
		rix, CS=Covered or Coated Sand (	Grains [	-			
Hydric Soil Indicators: (applicab					_	r Problematic Hydric Soi	
Histosol (A1)		oped Matrix (S6)			_	ck (A10) (LRR K, L, MLRA	,
Histic Epipedon (A2)		k Surface (S7) (LRR R, MLRA 149B				airie Redox (A16) (LRR K,	,
✓ Black Histic (A3)		rvalue Below Surface (S8) (LRR R, I		3)		cky Peat or Peat (S3) (LRR	' K, L, R)
Hydrogen Sulfide (A4)		Dark Surface (S9) (LRR R, MLRA	149B)			face (S7) (LRR K, L)	
Stratified Layers (A5)		my Mucky Mineral (F1) (LRR K, L)				Below Surface (S8) (LRR	K, L)
Depleted Below Dark Surface (		my Gleyed Matrix (F2)			_	Surface (S9) (LRR K, L)	
Thick Dark Surface (A12)	Dep	leted Matrix (F3)				ganese Masses (F12) (LRI	
Sandy Mucky Mineral (S1)		lox Dark Surface (F6)			_	Floodplain Soils (F19) (M	,
Sandy Gleyed Matrix (S4)		leted Dark Surface (F7)				odic (TA6) (MLRA 144A, 1	45, 149B)
Sandy Redox (S5)	Rec	lox Depressions (F8)			_	nt Material (TF2)	Other (explain in soil
[3] Indicators of hydrophytic vegeta	tion and wetland hydrology m	ust be present, unless disturbed or p	problematic		Very Sha	llow Dark Surface (TF12)	remarks)
Restrictive Layer (if present):	Type:	Depth (inches):	-		H	ydric soil present?	Yes
Remarks: Peat has brightly colored fi	ibers 15% 10yr 5/8 below 4 inches						
HYDROLOGY							
Wetland Hydrology Indicators:							
Primary Indicators (minimum of o							
	one required; check all that	apply)		Secon	dary Indicate	ors (minimum of two requ	iired)
Surface Water (A1)	one required; check all that	<b>apply)</b> Water-Stained Leaves (B9)			<b>dary Indicato</b> rface Soil Cra		ired)
<ul> <li>✓ Surface Water (A1)</li> <li>☐ High Water Table (A2)</li> </ul>				Su	-	cks (B6)	
		Water-Stained Leaves (B9)		Su Dra	rface Soil Cra	cks (B6) ns (B10)	
High Water Table (A2)		Water-Stained Leaves (B9) Aquatic Fauna (B13)		Su Dra	rface Soil Cra ainage Patterr	cks (B6) ns (B10) (B16)	
<ul> <li>☐ High Water Table (A2)</li> <li>✓ Saturation (A3)</li> </ul>		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Ro	pots	Su Dra Mo	rface Soil Cra ainage Patterr oss Trim Lines	cks (B6) ns (B10) (B16) ter Table (C2)	
<ul> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> </ul>		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Ro (where not tilled) (C3)	pots	Su Dra Mo Dr Dr Cra	rface Soil Cra ainage Pattern ss Trim Lines y-Season Wat ayfish Burrows	cks (B6) ns (B10) (B16) ter Table (C2)	
<ul> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> </ul>		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Ro (where not tilled) (C3) Presence of Reduced Iron (C4)		Su Dra Mo Dr Cra Sa	rface Soil Cra ainage Pattern Iss Trim Lines y-Season Wat ayfish Burrows turation Visibl	cks (B6) ns (B10) (B16) ter Table (C2) s (C8)	
<ul> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> <li>Drift Deposits (B3)</li> </ul>		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Ro (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soil		Su Dra Mo Dr Cra Sa Stu	rface Soil Cra ainage Pattern Iss Trim Lines y-Season Wat ayfish Burrows turation Visibl	cks (B6) ns (B10) (B16) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1)	
<ul> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> <li>Drift Deposits (B3)</li> <li>Algal Mat or Crust (B4)</li> <li>Iron Deposits (B5)</li> </ul>		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Ro (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soil Thin Muck Surface (C7)		Su Dra Moo Dr Cra Sa Stu Ge	rface Soil Cra ainage Pattern ws Trim Lines y-Season Wai ayfish Burrow turation Visibl unted or Stres	cks (B6) ns (B10) (B16) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2)	
<ul> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> <li>Drift Deposits (B3)</li> <li>Algal Mat or Crust (B4)</li> </ul>	agery (B7)	Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Ro (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soil		Su Dra Ma Dr Dr Cr Sa Stu Gee Sh	rface Soil Cra ainage Pattern iss Trim Lines y-Season Wai ayfish Burrows turation Visibl unted or Stres omorphic Pos	cks (B6) ns (B10) (B16) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) f (D3)	
<ul> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> <li>Drift Deposits (B3)</li> <li>Algal Mat or Crust (B4)</li> <li>Iron Deposits (B5)</li> <li>Inundation Visible on Aerial Ima Sparsely Vegetated Concave S</li> <li>Field Observations:</li> </ul>	agery (B7)	Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Ro (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soil Thin Muck Surface (C7)		Su Dra Ma Dr Dr Cr Sa Stu Gee Sh	rface Soil Cra ainage Pattern iss Trim Lines y-Season Wai ayfish Burrows turation Visibl inted or Stres omorphic Pos allow Aquitarc crotopographi	cks (B6) cks (B10) (B16) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) f (D3) c Relief (D4)	FAC-Neutral Test (D5)
<ul> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> <li>Drift Deposits (B3)</li> <li>Algal Mat or Crust (B4)</li> <li>Iron Deposits (B5)</li> <li>Inundation Visible on Aerial Ima Sparsely Vegetated Concave S</li> <li>Field Observations: Surface water present?</li> </ul>	agery (B7)	Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Ro (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soil Thin Muck Surface (C7)		Su Dra Ma Dr Dr Cr Sa Stu Gee Sh	rface Soil Cra ainage Pattern iss Trim Lines y-Season Wai ayfish Burrows turation Visibl inted or Stres omorphic Pos allow Aquitarc crotopographi	cks (B6) ns (B10) (B16) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) f (D3)	
<ul> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> <li>Drift Deposits (B3)</li> <li>Algal Mat or Crust (B4)</li> <li>Iron Deposits (B5)</li> <li>Inundation Visible on Aerial Ima Sparsely Vegetated Concave S</li> <li>Field Observations:</li> </ul>	agery (B7) Surface (B8)	Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Ro (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soil Thin Muck Surface (C7) Other (explain in remarks)		Su Dra Ma Dr Dr Cr Sa Stu Gee Sh	rface Soil Cra ainage Pattern ss Trim Lines y-Season Wai ayfish Burrows turation Visibl unted or Stres omorphic Pos allow Aquitarc crotopographi Wetlar	cks (B6) cks (B10) (B16) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) f (D3) c Relief (D4)	FAC-Neutral Test (D5)
<ul> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> <li>Drift Deposits (B3)</li> <li>Algal Mat or Crust (B4)</li> <li>Iron Deposits (B5)</li> <li>Inundation Visible on Aerial Ima Sparsely Vegetated Concave S</li> <li>Field Observations: Surface water present?</li> </ul>	agery (B7) Surface (B8)	Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Re (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soil Thin Muck Surface (C7) Other (explain in remarks)		Su Dra Ma Dr Dr Cr Sa Stu Gee Sh	rface Soil Cra ainage Pattern ss Trim Lines y-Season Wai ayfish Burrows turation Visibl unted or Stres omorphic Pos allow Aquitarc crotopographi Wetlar	cks (B6) ns (B10) (B16) fer Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) f (D3) c Relief (D4) d hydrology present?	FAC-Neutral Test (D5)
<ul> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> <li>Drift Deposits (B3)</li> <li>Algal Mat or Crust (B4)</li> <li>Iron Deposits (B5)</li> <li>Inundation Visible on Aerial Ima Sparsely Vegetated Concave S</li> <li>Field Observations: Surface water present?</li> <li>Water table present?</li> </ul>	agery (B7) Surface (B8) ■ apillary fringe) ✓ S to _ Monitoring Well	Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Ro (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soil Thin Muck Surface (C7) Other (explain in remarks) urface Water Depth (inches): 	s (C6)	Su Dra Mo Dr Cra Sa Stu Ge Sh Mid	rface Soil Cra ainage Pattern ss Trim Lines y-Season Wai ayfish Burrows turation Visibl unted or Stres omorphic Pos allow Aquitarc crotopographi Wetlar	cks (B6) ns (B10) (B16) fer Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) f (D3) c Relief (D4) d hydrology present?	FAC-Neutral Test (D5)

Project/Site:	Zim Sod				Applicant/O	wner: Zim Sod	City/County: <u>St. Lo</u>	uis	State:	<u>MN</u>	Sampling Date:	<u>11/18/10</u>
Investigator(s):	<u>TPT</u>				Section:	<u>26</u>	Township: <u>55</u>		Range:	<u>18</u>	Sampling Point:	#03 East of S02
Land Form:	Terrace				Local Relief	: <u>None</u>	Slope %:		Soil Ma	o Unit Nar	ne: <u>Greenwood</u>	d Soils B14A
Subregion (LRR):	<u>K</u>				Latitude:		Longitude:		Datum:			
NWI/Cowardin Cla	assification	:			Circular 39	Classification: <u>7</u>						
Are climatic/hydro	logic condi	tions of	n the site ty	pical for this	time of year	? <u>Yes</u> (If no, expla	ain in remarks)	00	s & Reed (j		Coniferous S	<u>Swamp</u>
Are vegetation	No	Soil	No	Hydrology	No	significantly disturbed?	Are "normal Y	Eggers es	s & Reed (s	secondary	):	
-	110	001		, ,,		significantiy alocarboa.	circumstances"	Eggers	s & Reed (t	ertiary):		
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	naturally problematic?	present?	Eggers	s & Reed (	quaternary	ı):	

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present? Wetland hydrology present?	<u>Yes</u> <u>Yes</u> Yes	Remarks (explain any answers if needed):	There is some ditching within 100 feet of this sample.
Is the sampled area within a wetland?	Yes	If yes, optional Wetland	Site ID:

	<b>T O</b> ( <i>i</i> )			<u>Absolute</u> % Cover	<u>Dominant</u> Species?	<u>Indicator</u> Status *	Dominance Test Worksheet:			
	<u>Tree Stratum</u>	(Plot Size:	)				Number of Dominant Species That Are OBL, FACW or FAC:	3	(A)	
1.	Larix laricina			90	Yes	FACW				
2.	Picea mariana			3	No	FACW	Total Number of Dominant	4	(B)	
3.				0			Species Across All Strata:		(-)	
4.				0			Percent of Dominant Species	75.00%	(A/B)	
			Total Cover:	<u>93</u>			That Are OBL, FACW or FAC:		( )	
	<u>Sapling/Shrub Stratum</u>	(Plot Size:	)				Prevalence Index Worksheet:			
1.	Ledum groenlandicum			50	Yes	OBL			Kala ka	
2.	Rubus idaeus ssp. strigosu	S		15	Yes	FACW	Total % Cover of:		ltiply by:	
3.				0			OBL Species 50	X 1	50	
4.				0			FACW Species 108	X 2	216	
5.				0			FAC Species 0	Х З	0	
			Total Cover:	<u>65</u>			FACU Species 0	X 4	0	
	<u>Herb Stratum</u>	(Plot Size:	)				UPL Species 0	X 5	0	
1.	Sphagnum sp.			90	Yes		Column Totals: 158	(A)	266	(B)
2.				0			Prevalence Index =		1.68	
3.				0			Prevalence index -	D/A -	1.00	
4.				0			Hydrophytic Vegetation Indicators:			
5.				0			Yes Rapid Test for Hydroph		n	
6. 7.				0			Yes Dominance Test is >509			
7. 8.				0			Yes Prevelance Index ≤ 3.0			
•.			Total Cover:	90			Morphological Adoptati		de europartina	a data
	Woody Vine Stratum	(Plot Size:	)	<u>90</u>			No in vegetation remarks o			juala
1.				0			No Problematic Hydrophyt	ic Vegetation [	1] (Explain)	
2.				0			[1] Indicators of hydric soil & wetland hy	drology must be	present, unless	5
			Total Cover:	<u>0</u>	* In USFWS I	Region 3	disturbed or problematic.		-	
						(ogion o	Hydrophytic vegetation present?	Yes		
	narks: lude photo numbers here o	r on a separate sheet	;)				\$*			

C		
Э	UIL	

Sampling Point: #03 East of S02

Profile Description: (Describe to the depth need Depth Matrix	led to document		ie abscence x Features	of indicat	tors).		
(inches) Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1. 0 - 18 10yr 2/1 2						Fibric peat	
3					· ·		
5							
6 [1] Type: C=Concentration, D=Depletion, RM=R	educed Matrix(	S=Covered or Coated San	d Grains	[2] Locati	on: PI=Pore I ir	ning M=Matrix	
Hydric Soil Indicators: (applicable to all LRRs, u			u orunio	[2] 20044		Problematic Hydric So	ile [2]:
✓ Histosol (A1)		Matrix (S6)			_	(A10) (LRR K, L, MLRA	
Histic Epipedon (A2)	_	rface (S7) (LRR R, MLRA 14	(9B)			e Redox (A16) (LRR K,	,
Black Histic (A3)		e Below Surface (S8) (LRR I		9R)		Peat or Peat (S3) (LRF	
U Hydrogen Sulfide (A4)		rk Surface (S9) (LRR R, MLF				e (S7) (LRR K, L)	, _, . ,
Stratified Layers (A5)	_	lucky Mineral (F1) (LRR K, L	· · · · ·			elow Surface (S8) (LRR	? K. L)
Depleted Below Dark Surface (A11)	_ `	Gleyed Matrix (F2)	7			urface (S9) (LRR K, L)	, _/
Thick Dark Surface (A12)	_ ·	d Matrix (F3)				nese Masses (F12) (LR	R K. L. R)
Sandy Mucky Mineral (S1)	_ `	Park Surface (F6)				loodplain Soils (F19) (M	
Sandy Gleyed Matrix (S4)		d Dark Surface (F7)				ic (TA6) (MLRA 144A, 1	
Sandy Redox (S5)		epressions (F8)			_ `	Material (TF2)	Other (explain in soil
[3] Indicators of hydrophytic vegetation and wetland			or problema	tic		w Dark Surface (TF12)	remarks)
Restrictive Layer (if present): Type:		Depth (inches			Hyd	ric soil present?	Yes
Remarks: Saturated at 6" below surface		<b>x</b> ``	·			•	
IYDROLOGY							
Wetland Hydrology Indicators:							
Primary Indicators (minimum of one required; cl	neck all that app	ly)		Seco	ndary Indicators	(minimum of two requ	uired)
Surface Water (A1)	Wat	er-Stained Leaves (B9)		S	urface Soil Crack	s (B6)	FAC-Neutral Test (D5)
High Water Table (A2)	🗌 Aqu	atic Fauna (B13)		D	rainage Patterns	(B10)	
Saturation (A3)	Mar	l Deposits (B15)		M	loss Trim Lines (E	316)	
Water Marks (B1)	Hyd	rogen Sulfide Odor (C1)			ry-Season Water	Table (C2)	
Sediment Deposits (B2)		lized Rhizospheres on Living	Roots	C	rayfish Burrows (	C8)	
Drift Deposits (B3)	(who	ere not tilled) (C3)		<b>S</b>	aturation Visible c	on Aerial Imagery (C9)	
Algal Mat or Crust (B4)	Pres	sence of Reduced Iron (C4)		S	tunted or Stresse	d Plants (D1)	
Iron Deposits (B5)	Rec	ent Iron Reduction in Tilled S	Soils (C6)	G	eomorphic Positio	on (D2)	
	Thir	Muck Surface (C7)		<b>S</b>	hallow Aquitard (L	03)	
Inundation Visible on Aerial Imagery (B7) Sparsely Vegetated Concave Surface (B8)	Oth	er (explain in remarks)		M	licrotopographic F	Relief (D4)	
Field Observations:							
Surface water present?	Surfa	ce Water Depth (inches):			Wetland	hydrology present?	Yes
Water table present?	Water	Table Depth (inches):			Describe	Recorded Data:	
Saturation present? (includes capillary fringe)	✓ Satur	ation Depth (inches):	6				
Recorded Data: Aerial Photo Monito	ring Well	Stream Gauge 🔄 Previ	ous Inspect	ions			
Hydrology Remarks: There was a ditch approximate	ely 100' away.				<b>i</b>		

Project/Site:	Zim Sod				Applicant/C	Owner:	Zim Sod	<u>l</u>	City/County: <u>St</u>	Louis		State:	<u>MN</u>	Sam	npling Date:	<u>11/18/10</u>
Investigator(s):	<u>TPT</u>				Section:	<u>26</u>			Township: <u>55</u>			Range:	<u>18</u>	Sarr	npling Point:	<u>#04 S01</u>
Land Form:	Terrace				Local Relie	ef: <u>Nor</u>	<u>ne</u>		Slope %:			Soil Ma	o Unit Na	me:	Greenwood	soils B14A
Subregion (LRR):	<u>K</u>				Latitude:				Longitude:			Datum:				
NWI/Cowardin Cla	assification	:			Circular 3	9 Class	sification:	<u>up</u>								
Are climatic/hydro	loaic cond	itions o	n the site tv	pical for this	time of vea	r?	Yes	(If no. expl	ain in remarks)		Eggers	& Reed (µ	orimary):		<u>Upland</u>	
	°								,	.,	Eggers	& Reed (s	secondar	y):		
Are vegetation	<u>Yes</u>	Soil	<u>Yes</u>	Hydrology	Yes	signific	cantly distu	irbed?	Are "normal circumstances"	<u>Yes</u>	Eggers	& Reed (t	ertiary):			
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	natura	lly problen	natic?	present?		Eggers	& Reed (d	quaternar	y):		

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present? Wetland hydrology present?	<u>Yes</u> <u>Yes</u> <u>No</u>	Remarks (explain any answers if needed):	Tile drained sod field
Is the sampled area within a wetland?		If yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:	)	<u>Absolute</u> <u>% Cover</u>	<u>Dominant</u> Species?	<u>Indicator</u> Status *		nce Test W				
1.			,	0				of Dominal OBL, FAC			1 <i>(A)</i>	
2. 3.								mber of Do Across All			1 <i>(B)</i>	
4.			Total Cover:	0				of Dominai OBL, FAC		100.00	)% (A/B)	
	Carling/Church Churchan		Total Cover:	<u>0</u>								
	Sapling/Shrub Stratum	(Plot Size:	)		[]		<u>Prevalen</u>	ce Index W	/orksheet:			
1.				0			- 7	otal % Cov	er of:		Multiply by:	
2. 3.				0			OBL Spe	ecies	0	X 1	0	)
3. 4.				0			FACWS		0	X 2	0	)
5.				0			FAC Spe		99	Х 3	297	,
	L		Total Cover:	<u>0</u>			FACU S		0	X 4	0	-
	<u>Herb Stratum</u>	(Plot Size:	)				UPL Spe		0	X 5	0	)
1.	Poa pratensis			99	Yes	FAC	Column		99	(A)	297	- (B)
2.				0				_	alence Index =	R/A =	3.00	-
3.				0				1100		B/A		
4.				0			Hydrophy	tic Vegeta	tion Indicators:			
5. 6.				0			No	Rapid Te	st for Hydroph	ytic Vegeta	ation	
7.				0			Yes	Dominan	nce Test is >50%	%		
8.				0			Yes	Prevelan	ce Index ≤ 3.0	[1]		
			Total Cover:	<u>99</u>			No		ogical Adaptati ation remarks o		rovide supporti arate sheet)	ng data
	Woody Vine Stratum	(Plot Size:	)	,	]		No	- č			on [1] (Explain)	
1. 2.				0				-		•	t be present, unle	
			Total Cover:	<u>0</u>	* In USFWS I	Pagion 3	disturbed o	or problemati	ic.		···· , ····	
				_	11 031 1131	Negion 5	Hydrophyl	tic vegetatio	n present?	Yes		
	emarks: Include photo numbers here or on a separate sheet) Vegetation adjacent to field - 30% populus trem. With aspen understory 30%, willow sp15% and rubus sp15%. Reed canarygrass 30%									%. Reed cana	arygrass 30%	

C	0	11
Э	υ	ᇿ

Sampling Point: <u>#04 S01</u>

Depth	Matrix	ed to docur	nent the indicator or confirm the Redox	abscence Features	of indicator	rs).				
(inches)	Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks		
	4.0 0/0									
$\begin{array}{c} 1. & 0 - 9 \\ 2 & 9 - 20 \end{array}$	10yr 2/2 10yr 4/2		10yr 4/6	30			loamy sand sandy loam			
2. <u>9 - 20</u> 3										
5										
6. [1] Type: C=Cond	centration, D=Depletion, RM=Re	duced Mat	rix, CS=Covered or Coated Sand	Grains	[2] Location	n: PL=Pore	Lining, M=Matrix.			
Hydric Soil Indica	ntors: (applicable to all LRRs, u	nless other	wise noted)		1	Indicators fo	or Problematic Hydric Soi	ls [3]:		
Histosol (A1)		Strij	oped Matrix (S6)			2 cm Mu	ck (A10) (LRR K, L, MLRA	149B)		
Histic Epipedor	n (A2)	🗌 Dar	k Surface (S7) (LRR R, MLRA 149E	3)		Coast Pra	airie Redox (A16) (LRR K,	L, R)		
🗌 Black Histic (A3	3)	Pol	rvalue Below Surface (S8) (LRR R,	MLRA 149	9В) [	5 cm Mu	cky Peat or Peat (S3) (LRR	K, L, R)		
Hydrogen Sulfi	ide (A4)	🗌 Thii	n Dark Surface (S9) (LRR R, MLRA	149B)		Dark Sur	face (S7) (LRR K, L)			
Stratified Layer	rs (A5)	Loa	my Mucky Mineral (F1) (LRR K, L)			Polyvalue	e Below Surface (S8) (LRR	K, L)		
Depleted Below	w Dark Surface (A11)	Loa	my Gleyed Matrix (F2)			Thin Darl	k Surface (S9) (LRR K, L)			
Thick Dark Sur	face (A12)	🖌 Dep	leted Matrix (F3)		[	Iron-Man	ganese Masses (F12) (LRF	R K, L, R)		
Sandy Mucky N	Mineral (S1)	Red	lox Dark Surface (F6)			Piedmon	t Floodplain Soils (F19) (Mi	LRA 149B)		
Sandy Gleyed	Matrix (S4)	Dep	leted Dark Surface (F7)			Mesic Sp	odic (TA6) (MLRA 144A, 1	45, 149B)		
Sandy Redox (S5) Redox Depressions (F8) Red Parent Material (TF2) Other (explain in soil										
[3] Indicators of hyd	drophytic vegetation and wetland	hydrology m	ust be present, unless disturbed or	problemat	ic.	Very Sha	llow Dark Surface (TF12)	remarks)		
Restrictive Layer	(if present): Type:		Depth (inches):	-		H	ydric soil present?	Yes		
Remarks:										
HYDROLOG	γ									
Wetland Hydrolog										
Duine any India atom	gy Indicators:									
Primary Indicators (minimum of one required; check all that apply) Secondary Indicators (minimum of two required)										
Surface Water	s (minimum of one required; ch		Water-Stained Leaves (B9)		Sur	face Soil Cra	cks (B6)	ired) FAC-Neutral Test (D5)		
	s (minimum of one required; ch (A1)				Sun	face Soil Cra inage Patteri	cks (B6) ns (B10)	_		
Surface Water	s (minimum of one required; ch (A1) ble (A2)		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15)		Sur Dra Mos	face Soil Cra inage Patteri ss Trim Lines	cks (B6) ns (B10) : (B16)	_		
Surface Water High Water Tal	<b>(A1)</b> (A1) ble (A2)		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1)		Sun Dra Mos	face Soil Cra inage Patteri ss Trim Lines -Season Wa	cks (B6) ns (B10) : (B16) ter Table (C2)	_		
<ul> <li>Surface Water</li> <li>High Water Tai</li> <li>Saturation (A3)</li> </ul>	s (minimum of one required; ch (A1) ble (A2) ) B1)		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living R	oots	Suri Dra Mos Dry Cra	face Soil Cra inage Patteri ss Trim Lines -Season Wa yfish Burrow.	cks (B6) ns (B10) : (B16) ter Table (C2) s (C8)	_		
<ul> <li>Surface Water</li> <li>High Water Tai</li> <li>Saturation (A3)</li> <li>Water Marks (E</li> </ul>	r <mark>s (minimum of one required; ch</mark> (A1) ble (A2) ) B1) osits (B2)		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living R (where not tilled) (C3)	oots	Suri Dra Mos Dry Cra Satu	face Soil Cra inage Patteri ss Trim Lines -Season Wa yfish Burrow. uration Visibl	cks (B6) ns (B10) : (B16) ter Table (C2) s (C8) e on Aerial Imagery (C9)	_		
Surface Water High Water Tai Saturation (A3) Water Marks (E Sediment Depo	s (minimum of one required; ch (A1) ble (A2) ) B1) osits (B2) (B3)		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living R (where not tilled) (C3) Presence of Reduced Iron (C4)		Suri Suri Dra Mos Dry Cra Satu	face Soil Cra inage Patteri ss Trim Lines -Season Wa yfish Burrow uration Visibl nted or Stres	cks (B6) ns (B10) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1)	_		
Surface Water High Water Tai Saturation (A3) Water Marks (E Sediment Depo	rs (minimum of one required; ch (A1) ble (A2) ) B1) osits (B2) (B3) rust (B4)		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living R (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soi		Sur Dra Dra Dry Cra Satu Stu	face Soil Cra inage Patteri ss Trim Lines -Season Wa yfish Burrow. uration Visibl nted or Stres omorphic Pos	cks (B6) ns (B10) : (B16) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2)	_		
Surface Water High Water Tai Saturation (A3) Water Marks (E Sediment Depo Drift Deposits ( Algal Mat or Cr Inron Deposits (	rs (minimum of one required; ch (A1) ble (A2) ) B1) osits (B2) (B3) rust (B4)		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living R (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soi Thin Muck Surface (C7)		Suri Suri Dra Mos Dry Cra Satu Stu Geo Stu	face Soil Cra inage Patteri ss Trim Lines -Season Wa yfish Burrow uration Visibl nted or Stres pmorphic Pos	cks (B6) ns (B10) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) d (D3)	_		
Surface Water High Water Tai Saturation (A3) Water Marks (E Sediment Depo Drift Deposits ( Algal Mat or Cr Iron Deposits ( Inundation Visi	rs (minimum of one required; ch (A1) ble (A2) ) B1) osits (B2) (B3) rust (B4) (B5)		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living R (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soi		Suri Suri Dra Mos Dry Cra Satu Stu Geo Stu	face Soil Cra inage Patteri ss Trim Lines -Season Wa yfish Burrow. uration Visibl nted or Stres omorphic Pos	cks (B6) ns (B10) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) d (D3)	_		
Surface Water High Water Tai Saturation (A3) Water Marks (E Sediment Depo Drift Deposits ( Algal Mat or Cr Iron Deposits ( Sparsely Veget Field Observation	s (minimum of one required; ch (A1) ble (A2) ) B1) osits (B2) (B3) rust (B4) (B5) ible on Aerial Imagery (B7) tated Concave Surface (B8)		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living R (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soi Thin Muck Surface (C7) Other (explain in remarks)		Suri Suri Dra Mos Dry Cra Satu Stu Geo Stu	face Soil Cra inage Patteri ss Trim Lines -Season Wa yfish Burrow uration Visibl nted or Stres pmorphic Pos allow Aquitare rotopographi	cks (B6) ns (B10) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) d (D3) c Relief (D4)	FAC-Neutral Test (D5)		
Surface Water High Water Tai Saturation (A3) Water Marks (E Sediment Depo Drift Deposits ( Algal Mat or Cr Iron Deposits ( Inundation Visi Sparsely Vege Field Observation Surface water pre	(A1) (A1) ble (A2) ) B1) osits (B2) (B3) rust (B4) B5) ible on Aerial Imagery (B7) tated Concave Surface (B8) <b>15:</b> <b>25:</b>		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living R (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soi Thin Muck Surface (C7) Other (explain in remarks) urface Water Depth (inches):		Suri Suri Dra Mos Dry Cra Satu Stu Geo Stu	face Soil Cra inage Patteri ss Trim Lines -Season Wa yfish Burrow uration Visibi nted or Stres pomorphic Pos allow Aquitard rotopographi Wetlar	cks (B6) ns (B10) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) d (D3) c Relief (D4) ad hydrology present?	_		
Surface Water High Water Tai Saturation (A3) Water Marks (E Sediment Depo Drift Deposits ( Algal Mat or Cr Iron Deposits ( Inundation Visi Sparsely Vege Field Observation Surface water pre Water table prese	s (minimum of one required; ch (A1) ble (A2) ) B1) osits (B2) (B3) rust (B4) B5) ible on Aerial Imagery (B7) tated Concave Surface (B8) Is: psent?		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living R (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soi Thin Muck Surface (C7) Other (explain in remarks) urface Water Depth (inches): /ater Table Depth (inches):		Suri Suri Dra Mos Dry Cra Satu Stu Geo Stu	face Soil Cra inage Patteri ss Trim Lines -Season Wa yfish Burrow uration Visibi nted or Stres pomorphic Pos allow Aquitard rotopographi Wetlar	cks (B6) ns (B10) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) d (D3) c Relief (D4)	FAC-Neutral Test (D5)		
Surface Water High Water Tai Saturation (A3) Water Marks (E Sediment Depo Drift Deposits ( Algal Mat or Cr Inon Deposits () Inundation Visi Sparsely Veget Field Observation Surface water prese Water table present	s (minimum of one required; ch (A1) ble (A2) ) B1) osits (B2) (B3) rust (B4) B5) ible on Aerial Imagery (B7) tated Concave Surface (B8) ns: esent? ent? nt? (includes capillary fringe)		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living R (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soi Thin Muck Surface (C7) Other (explain in remarks) urface Water Depth (inches):		Suri Suri Dra Mos Dry Cra Satu Stu Geo Stu	face Soil Cra inage Patteri ss Trim Lines -Season Wa yfish Burrow uration Visibi nted or Stres pomorphic Pos allow Aquitard rotopographi Wetlar	cks (B6) ns (B10) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) d (D3) c Relief (D4) ad hydrology present?	FAC-Neutral Test (D5)		
Surface Water High Water Tai Saturation (A3) Water Marks (E Sediment Depo Drift Deposits ( Algal Mat or Cr Iron Deposits ( Inundation Visi Sparsely Vege) Field Observation Surface water prese Water table prese	s (minimum of one required; ch (A1) ble (A2) ) B1) osits (B2) (B3) rust (B4) B5) ible on Aerial Imagery (B7) tated Concave Surface (B8) ns: esent? ent? it? (includes capillary fringe) Aerial Photo Monitor		Water-Stained Leaves (B9) Aquatic Fauna (B13) Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living R (where not tilled) (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soi Thin Muck Surface (C7) Other (explain in remarks) urface Water Depth (inches): /ater Table Depth (inches): aturation Depth (inches):		Sur Dra Mos Dry Cra Satu Stuu Geo Sha Mic	face Soil Cra inage Patteri ss Trim Lines -Season Wa yfish Burrow uration Visibi nted or Stres pomorphic Pos allow Aquitard rotopographi Wetlar	cks (B6) ns (B10) ter Table (C2) s (C8) e on Aerial Imagery (C9) sed Plants (D1) sition (D2) d (D3) c Relief (D4) ad hydrology present?	FAC-Neutral Test (D5)		

Project/Site:	Zim Sod				Applicant/0	Owner:	Zim Sod		City/County: <u>St</u>	Louis		State:	<u>MN</u>	Sam	pling Date:	<u>11/18/10</u>
Investigator(s):	<u>TPT</u>				Section:	<u>26</u>			Township: <u>55</u>			Range:	<u>18</u>	Sam	pling Point:	<u>#05 S01</u>
Land Form:					Local Relie	əf:			Slope %:			Soil Map	o Unit Na	me:	Greenwood	l soils B14A
Subregion (LRR):	<u>K</u>				Latitude:				Longitude:			Datum:				
NWI/Cowardin Cla	assification	:			Circular 3	9 Class	ification:	<u>up</u>								
Are climatic/hydro	loaic cond	itions o	n the site tv	pical for this	time of vea	ar?	Yes	(If no. expla	ain in remarks)		Eggers	& Reed (p	orimary):	-	<u>Upland</u>	
	U				· · · ·				,	.,	Eggers	& Reed (s	secondar	y):		
Are vegetation	<u>Yes</u>	Soil	<u>Yes</u>	Hydrology	<u>Yes</u>	signific	antly distu	rbed?	Are "normal circumstances"	<u>Yes</u>	Eggers	& Reed (t	ertiary):			
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	natural	lly problem	natic?	present?		Eggers	& Reed (d	quaternai	y):		

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present?	<u>Yes</u> Yes	Remarks (explain any answers if needed):	Tile drained sod field
Wetland hydrology present?	No		
Is the sampled area within a wetland?		If yes, optional Wetland	Site ID:

	Tree Official		,	<u>Absolute</u> <u>% Cover</u>	<u>Dominant</u> Species?	<u>Indicator</u> Status *	Dominance Test Works	<u>sheet:</u>			
1.	<u>Tree Stratum</u>	(Plot Size:	)				Number of Dominant S That Are OBL, FACW of		1	(A)	
2.				0			Total Number of Domin	nant			
3.				0			Species Across All Str		1	<b>(B)</b>	
4.				0			Percent of Dominant S		100.000/	(4/D)	
			Total Cover:	<u>0</u>			That Are OBL, FACW of	r FAC:	100.00%	(A/B)	
	Sapling/Shrub Stratum	(Plot Size:	)				Prevalence Index Work	sheet.			
1.				0			Total % Cover of			ultiply by:	
2.				0				0	X 1	0	
3.				0			OBL Species		-	0	-
4.				0			FACW Species	0	X 2 _		_
5.			Total Cover:	0			FAC Species	99	× 3 –	297	-
			Total Cover:	<u>0</u>			FACU Species	0	X 4 _	0	-
	Herb Stratum	(Plot Size:	)				UPL Species	0	X 5	0	-
1.	Poa pratensis			99	Yes	FAC	Column Totals:	99	(A)	297	<u>(</u> B)
2.				0			Prevaler	nce Index =	B/A =	3.00	)
3. 4.				0					-		
4. 5.				0			Hydrophytic Vegetation	Indicators:			
6.				0			No Rapid Test f	or Hydroph	ytic Vegetatic	on	
7.				0			Yes Dominance	Test is >50%	%		
8.				0			Yes Prevelance	Index ≤ 3.0	[1]		
			Total Cover:	99					ons [1] (prov		ng data
	Woody Vine Stratum	(Plot Size:	)				in vegetation	n remarks o	r on a separa	te sheet)	
1.				0			No Problematic	Hydrophyti	ic Vegetation	[1] (Explain)	
2.				0			[1] Indicators of hydric soil	& wetland hy	drology must be	e present, unles	ss
			Total Cover:	<u>0</u>	* In USFWS I	Region 3	disturbed or problematic.				
						-	Hydrophytic vegetation pl	resent?	Yes		
	narks: lude photo numbers here o	r on a separate she	eet)				-				

C	Λ	
J	U	

Г

Sampling Point: <u>#05 S01</u>

Depth Matrix	needed to document the indicator or confirm Re	edox Features	cators).		
(inches) Color (moist)	% Color (moist)	% Туре	[1] Loc [2]	Texture	Remarks
0 - 16 10yr 2/1				Fibric peat	
-	· · ·				
Type: C=Concentration, D=Depletion, R	M=Reduced Matrix, CS=Covered or Coated S	and Grains [2] Loc	ation: PL=Pore I	Lining, M=Matrix.	
dric Soil Indicators: (applicable to all LR	Rs, unless otherwise noted)		Indicators fo	r Problematic Hydric Sc	ils [3]:
Histosol (A1)	Stripped Matrix (S6)		2 cm Muc	k (A10) (LRR K, L, MLRA	149B)
Histic Epipedon (A2)	airie Redox (A16) (LRR K,	L, R)			
Black Histic (A3)	Polyvalue Below Surface (S8) (LR	RR R, MLRA 149B)	5 cm Muc	ky Peat or Peat (S3) (LRI	R K, L, R)
Hydrogen Sulfide (A4)	Thin Dark Surface (S9) (LRR R, M	/LRA 149B)	Dark Surl	ace (S7) (LRR K, L)	
Stratified Layers (A5)	🗌 Loamy Mucky Mineral (F1) (LRR K	<, L)	Polyvalue	Below Surface (S8) (LRI	R K, L)
Depleted Below Dark Surface (A11)	Loamy Gleyed Matrix (F2)		Thin Dark	Surface (S9) (LRR K, L)	
Thick Dark Surface (A12)	Depleted Matrix (F3)		Iron-Man	ganese Masses (F12) (LR	PR K, L, R)
Sandy Mucky Mineral (S1)	Redox Dark Surface (F6)		Piedmont	Floodplain Soils (F19) (N	ILRA 149B)
Sandy Gleyed Matrix (S4)	Depleted Dark Surface (F7)			odic (TA6) (MLRA 144A,	145, 149B)
Sandy Redox (S5)	Redox Depressions (F8)		Red Pare	nt Material (TF2)	Other (explain in soi
Indicators of hydrophytic vegetation and we	tland hydrology must be present, unless disturbe	ed or problematic.	Very Sha	llow Dark Surface (TF12)	remarks)
strictive Layer (if present): Type:	Depth (incl	hes):	H	vdric soil present?	<u>Yes</u>
emarks:					
DROLOGY					
tland Hydrology Indicators:					
mary Indicators (minimum of one require	əd; check all that apply)	Se	condary Indicato	ors (minimum of two req	uired)
Surface Water (A1)	Water-Stained Leaves (B9)		Surface Soil Cra	cks (B6)	FAC-Neutral Test (L
High Water Table (A2)	Aquatic Fauna (B13)		Drainage Patterr	ns (B10)	
Saturation (A3)	Marl Deposits (B15)		Moss Trim Lines	(B16)	
Water Marks (B1)	Hydrogen Sulfide Odor (C1)		Dry-Season Wat	er Table (C2)	
Sediment Deposits (B2)	Oxidized Rhizospheres on Livi (where not tilled) (C3)	ring Roots	Crayfish Burrows		
Drift Deposits (B3)			Saturation Visible	e on Aerial Imagery (C9)	
Algal Mat or Crust (B4)	Presence of Reduced Iron (C4	·	Stunted or Stres	sed Plants (D1)	
Iron Deposits (B5)	Recent Iron Reduction in Tilled	d Soils (C6)	Geomorphic Pos	ition (D2)	
Inundation Visible on Aerial Imagery (B7)	Thin Muck Surface (C7)		Shallow Aquitarc	I (D3)	
Sparsely Vegetated Concave Surface (B8)	) Other (explain in remarks)		Microtopographi	c Relief (D4)	
ld Observations:	Dente a Materi Dente (Color)		Wetlan	d hydrology present?	No
rface water present?	Surface Water Depth (inches):	:			<u></u>
ater table present?	Water Table Depth (inches):		Descri	be Recorded Data:	
turation present? (includes capillary frin					
	onitoring Well 🔄 Stream Gauge 🔄 Pre	evious Inspections			
drology Remarks: Tile Drained field					

Project/Site:	Zim Sod				Applicant/	Owner:	Zim Soc	<u>d</u>	City/County: <u>St.</u>	Louis		State:	<u>MN</u>	Samp	oling Date:	<u>11/18/10</u>
Investigator(s):	<u>TPT</u>				Section:	<u>11</u>			Township: <u>55</u>			Range:	<u>18</u>	Samp	oling Point:	<u>#06 N18_in</u> Tamaracks
Land Form:					Local Relie	ef:			Slope %:			Soil Ma	o Unit Nai	me: <u>(</u>	Greenwood	<u>d soils B14A</u>
Subregion (LRR):	<u>K</u>				Latitude:				Longitude:			Datum:				
NWI/Cowardin Cla	assification	:			Circular 3	9 Class	sification:	<u>7</u>								
Are climatic/hydro	logic condi	tions o	n the site ty	oical for this	time of yea	r?	Yes	(If no, expla	ain in remarks)			& Reed (j & Reed (j	orimary): secondary		oniferous	<u>Swamp</u>
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	signific	cantly dist	urbed?	Are "normal circumstances"	Yes	00	& Reed (i		,,.		
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	No	natura	lly probler	matic?	present?		Eggers	& Reed (d	quaternar	y):		

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present? Wetland hydrology present?	<u>Yes</u> <u>Yes</u> Yes	Remarks (explain any answers if needed):	Tamarack island west end of Elk field
Is the sampled area within a wetland?	Yes	If yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:	Absolute % Cover	<u>Dominant</u> Species?	<u>Indicator</u> Status <u>*</u>	Dominance Test Worksheet:
1.	Larix laricina	(11010)20.	30	Yes	FACW	Number of Dominant Species           That Are OBL, FACW or FAC:         3
2. 3.			0			Total Number of Dominant Species Across All Strata: 3 (B)
4.		Total Cov	0			Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)
	Sapling/Shrub Stratum	(Plot Size:	)			Prevalence Index Worksheet:
1.	Larix laricina		30	Yes	FACW	
2.	Cornus sericea ssp. sericea	a	30	Yes	FACW	
3.	Rubus idaeus ssp. strigosu	S	15	Yes	FACW	OBL Species         0         X 1         0
4.			0			FACW Species         105         X 2         210
5.			0			<b>FAC Species</b> 0 X 3 0
		Total Cove	er: <u>75</u>			FACU Species         0         X 4         0
	<u>Herb Stratum</u>	(Plot Size:	)			UPL Species 0 X 5 0
1.			0			Column Totals: 105 (A) 210 (B)
2.			0			
3.			0			Prevalence Index = B/A = 2.00
4.			0			Hydrophytic Vegetation Indicators:
5.			0			Yes Rapid Test for Hydrophytic Vegetation
6. 7			0			Yes Dominance Test is >50%
7. 8.			0			$\frac{1}{Y_{es}} = \frac{1}{Prevelance index \le 3.0 [1]}$
0.		Total Cove				
	Woody Vine Stratum	(Plot Size:	er: <u>0</u> )			No Morphological Adaptations [1] (provide supporting dat in vegetation remarks or on a separate sheet)
1.			0			No Problematic Hydrophytic Vegetation [1] (Explain)
2.		Total Cove	0 er: <u>0</u>			[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.
			<u>•</u>	* In USFWS I	Region 3	Hydrophytic vegetation present? Yes
	narks: lude photo numbers here o	r on a separate sheet)				

SOIL

Sampling Point: #06 N18 in Tamaracks

Profile Description: (Describe to the depth nee Depth Matrix	ded to document		he abscence ox Features	e of indicat	fors).						
(inches) Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks				
1. 0 - 16 10yr 2/1 2						Fibric peat	Saturated at 12"				
3											
4 5											
6											
[1] Type: C=Concentration, D=Depletion, RM=F	Reduced Matrix, (	CS=Covered or Coated Sar	nd Grains	[2] Locati	on: PL=Pore	Lining, M=Matrix.					
Hydric Soil Indicators: (applicable to all LRRs,	unless otherwis	e noted)			Indicators fo	or Problematic Hydric Soil	s [3]:				
Histosol (A1)	Strippec	Matrix (S6)			2 cm Mu	ck (A10) (LRR K, L, MLRA 1	49B)				
Histic Epipedon (A2)	🗌 Dark Sı	rface (S7) (LRR R, MLRA 14	49B)		Coast Pra	airie Redox (A16) (LRR K, L	, R)				
Black Histic (A3)	Polyvalı	R, MLRA 14	9B)	5 cm Mu	cky Peat or Peat (S3) (LRR	K, L, R)					
Hydrogen Sulfide (A4)	🗌 Thin Da	rk Surface (S9) (LRR R, MLI	RA 149B)		Dark Sur	face (S7) (LRR K, L)					
Stratified Layers (A5)	🗌 Loamy I	Nucky Mineral (F1) (LRR K, I	L)		Polyvalue	e Below Surface (S8) (LRR	K, L)				
Depleted Below Dark Surface (A11)	Loamy (	Gleyed Matrix (F2)			Thin Darl	k Surface (S9) (LRR K, L)					
Thick Dark Surface (A12)	Deplete	d Matrix (F3)			Iron-Man	ganese Masses (F12) (LRR	K, L, R)				
Sandy Mucky Mineral (S1)	Redox L		Piedmon	t Floodplain Soils (F19) (ML	RA 149B)						
Sandy Gleyed Matrix (S4) Depleted Dark Surface (F7) Mesic Spodic (TA6) (MLRA 144A, 145, 149B)											
Sandy Redox (S5) Redox Depressions (F8) Red Parent Material (TF2) Other (explain in soil											
[3] Indicators of hydrophytic vegetation and wetland	d hydrology must i	be present, unless disturbed	or problema	tic.	Very Sha	llow Dark Surface (TF12)	remarks)				
Restrictive Layer (if present): Type:		Depth (inche	s):		H	ydric soil present?	Yes				
Remarks:											
HYDROLOGY											
Wetland Hydrology Indicators:											
Primary Indicators (minimum of one required; o	check all that app	ly)		Seco	ndary Indicate	ors (minimum of two requi	red)				
Surface Water (A1)	Wat	er-Stained Leaves (B9)		<u> </u>	urface Soil Cra	cks (B6)	FAC-Neutral Test (D5)				
High Water Table (A2)	🗌 Aqu	atic Fauna (B13)		<u>D</u>	rainage Patteri	ns (B10)					
Saturation (A3)	Mar	l Deposits (B15)		M	loss Trim Lines	; (B16)					
Water Marks (B1)	🗌 Hyd	rogen Sulfide Odor (C1)			ry-Season Wa	ter Table (C2)					
Sediment Deposits (B2)		lized Rhizospheres on Living	g Roots	<u> </u>	rayfish Burrow	s (C8)					
Drift Deposits (B3)		ere not tilled) (C3)		S	aturation Visibl	e on Aerial Imagery (C9)					
Algal Mat or Crust (B4)		sence of Reduced Iron (C4)		S	tunted or Stres	sed Plants (D1)					
Iron Deposits (B5)	Rec	ent Iron Reduction in Tilled S	Soils (C6)	G	eomorphic Pos	sition (D2)					
Inundation Visible on Aerial Imagery (B7)		Muck Surface (C7)		S	hallow Aquitaro	d (D3)					
Sparsely Vegetated Concave Surface (B8)	Oth	er (explain in remarks)		M	licrotopographi	c Relief (D4)					
Field Observations:							N/				
Surface water present?	Surfa	ce Water Depth (inches):			Wetlar	nd hydrology present?	Yes				
Water table present?	Water	Table Depth (inches):			Descri	be Recorded Data:					
Saturation present? (includes capillary fringe)	U	ation Depth (inches):	12	-							
			ous Inspec	tions							
Hydrology Remarks: This stand may be affected b	y tile drainage in adja	cent sod fields.									

Project/Site:	Zim Sod				Applicant/C	Dwner: <u>Zim S</u>	Sod	City/County: <u>St</u> .	<u>Louis</u>		State:	<u>MN</u>	Sampling Date:	<u>11/18/10</u>
Investigator(s):	MAJ				Section:	<u>11</u>		Township: <u>55</u>			Range:	<u>18</u>	Sampling Point:	#07 Center of N09
Land Form:	Terrace				Local Relie	ef:		Slope %:			Soil Map	o Unit Nar	me: <u>Greenwoo</u>	<u>d B14A</u>
Subregion (LRR):	<u>k</u>				Latitude:			Longitude:			Datum:			
NWI/Cowardin Cla	assification	: <u>up</u>	land		Circular 3	9 Classification	n: <u>upland</u>							
Are climatic/hydrol	logic condi	tions of	n the site ty	pical for this	time of yea	r? <u>Yes</u>	(If no, expla	ain in remarks)		Eggers &			Upland	
Are vegetation	Yes	Soil	Yes	Hydrology	Yes	significantly d	isturbed?	Are "normal	Yes	Eggers &	& Reed (s	secondary	):	
						0 ,		circumstances"		Eggers &	& Reed (t	ertiary):		
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	No	naturally prob	lematic?	present?		Eggers &	& Reed (a	quaternary	/):	

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present? Wetland hydrology present?	<u>Yes</u> <u>Yes</u> No	Remarks (explain any answers if needed):	Tile drained sod field. Middle of Bear Paw field.
Is the sampled area within a wetland?	No	If yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:		<u>Absolute</u> <u>% Cover</u>	<u>Dominant</u> Species?	<u>Indicator</u> Status <u>*</u>	<u>Dominanc</u>	e Test Worksheet:			
1.	<u></u>	1. 101 0120.	/	0				f Dominant Species OBL, FACW or FAC:	1	(A)	
2. 3.				0				ber of Dominant cross All Strata:	1	(B)	
4.			Total Cover:	0			Percent of	f Dominant Species OBL, FACW or FAC:	100.00%	(A/B)	
	Sapling/Shrub Stratum	(Plot Size:		<u>v</u>							
	Saping/Shrub Stratum	(FIOL 3126.	)				Prevalence	e Index Worksheet:			
1.				0			То	tal % Cover of:	Ми	ltiply by:	
2. 3.				0			OBL Spec	ies 0	X 1	0	
4.				0			FACW Sp	0	X 2	0	
5.				0			FAC Spec		х з —	285	'
	L		Total Cover:	<u>0</u>			FACU Spec	0	X 4	0	,
	Herb Stratum	(Plot Size:	)				'		X 5	0	•
1.	Poa pratensis		,	95	Yes	FAC	UPL Spec	105	(A)	285	•
2.				0			Column T				• • •
3.				0				Prevalence Index =	B/A =	3.00	
4.				0			Hydrophyt	ic Vegetation Indicators.			
5. 6.				0			No	Rapid Test for Hydroph	ytic Vegetatio	n	
7.				0			Yes	Dominance Test is >50	%		
8.				0			Yes	Prevelance Index $\leq 3.0$	[1]		
	Woody Vine Stratum	(Plot Size:	Total Cover:	<u>95</u>			No	Morphological Adaptati in vegetation remarks of			ıg data
	woody vine Stratum	(11010120.	/				No No	Problematic Hydrophyt	ic Vegetation	[1] (Explain)	
1. 2.			Total Cover:	0 0 <u>0</u>			[1] Indicators disturbed or	s of hydric soil & wetland hy problematic.		· · · · /	
				<u>-</u>	* In USFWS I	region s	Hydrophytic	vegetation present?	Yes		
	narks: lude photo numbers here c	or on a separate shee	t)								

C		
Э	UIL	

Sampling Point: #07 Center of N09

Profile Description: (Describe to the depth need Depth Matrix	led to document		e abscence x Features	of indicate	ors).						
(inches) Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks				
1. 0 - 10 10yr2/1 2 10 - 32 10yr2/1						hemic peat fibric peat	woody frags at 18"				
$\begin{array}{c} 2. \\ 3. \end{array} \begin{array}{c} 10 + 32 \\ \hline 32 + 36 \end{array} \begin{array}{c} 10 y_{12} / 1 \\ \hline 10 y_{12} / 1 \end{array}$						hemic peat	moist at 36" not sat				
4											
5											
6											
[1] Type: C=Concentration, D=Depletion, RM=R	educed Matrix, C	S=Covered or Coated San	d Grains	[2] Locatio	n: PL=Pore	Lining, M=Matrix.					
Hydric Soil Indicators: (applicable to all LRRs,	unless otherwise	noted)			Indicators fo	or Problematic Hydric So	ils [3]:				
✓ Histosol (A1)	Stripped	Matrix (S6)			2 cm Muc	ck (A10) (LRR K, L, MLRA	149B)				
Histic Epipedon (A2)	Dark Sul	face (S7) (LRR R, MLRA 14	9B)		Coast Pra	airie Redox (A16) (LRR K,	L, R)				
Black Histic (A3)	Polyvalu	e Below Surface (S8) (LRR I	R, MLRA 14	9B)	5 cm Mu	cky Peat or Peat (S3) (LRF	R K, L, R)				
Hydrogen Sulfide (A4)	Thin Dai	k Surface (S9) (LRR R, MLR	RA 149B)		Dark Sur	face (S7) (LRR K, L)					
Stratified Layers (A5)	Loamy N		Polyvalue	e Below Surface (S8) (LRF	R K, L)						
Depleted Below Dark Surface (A11)	🗌 Loamy G	leyed Matrix (F2)			Thin Dark	k Surface (S9) (LRR K, L)					
Thick Dark Surface (A12) Depleted Matrix (F3) Iron-Manganese Masses (F12) (LRR											
Sandy Mucky Mineral (S1) Redox Dark Surface (F6) Piedmont Floodplain Soils (F19) (MLRA 149B)											
Sandy Gleyed Matrix (S4)       Depleted Dark Surface (F7)       Mesic Spodic (TA6) (MLRA 144A, 145, 149B)											
Sandy Redox (S5) Redox Depressions (F8) Red Parent Material (TF2) Other (explain in soil											
[3] Indicators of hydrophytic vegetation and wetland	l hydrology must k	e present, unless disturbed o	or problema	tic.	Very Sha	llow Dark Surface (TF12)	remarks)				
Restrictive Layer (if present): Type:		Depth (inches	;):		H	ydric soil present?	Yes				
Remarks: not saturated											
HYDROLOGY											
Wetland Hydrology Indicators:											
Primary Indicators (minimum of one required; c	heck all that app	<b>y</b> )		Secon	dary Indicato	ors (minimum of two req	uired)				
Surface Water (A1)	Wate	er-Stained Leaves (B9)		🗌 Su	rface Soil Cra	cks (B6)	FAC-Neutral Test (D5)				
High Water Table (A2)	Aqui	atic Fauna (B13)		Dr	ainage Patteri	ns (B10)					
Saturation (A3)	Marl	Deposits (B15)		Mo	oss Trim Lines	: (B16)					
Water Marks (B1)	Hydi	ogen Sulfide Odor (C1)		Dr	y-Season Wa	ter Table (C2)					
Sediment Deposits (B2)		ized Rhizospheres on Living	Roots	Cr	ayfish Burrows	s (C8)					
Drift Deposits (B3)	(whe	re not tilled) (C3)		Sa	turation Visibl	e on Aerial Imagery (C9)					
Algal Mat or Crust (B4)		ence of Reduced Iron (C4)		St	unted or Stres	sed Plants (D1)					
Iron Deposits (B5)		ent Iron Reduction in Tilled S	oils (C6)	Ge	eomorphic Pos	sition (D2)					
Inundation Visible on Aerial Imagery (B7)	Thin	Muck Surface (C7)		Sh	allow Aquitaro	d (D3)					
Sparsely Vegetated Concave Surface (B8)	Othe	r (explain in remarks)		Mi	crotopographi	c Relief (D4)					
Field Observations:					147.41	al hadra la compañía de	N.				
Surface water present?	Surfac	e Water Depth (inches):			Wetlan	nd hydrology present?	No				
Water table present?	Water	Table Depth (inches):			Descri	be Recorded Data:					
Saturation present? (includes capillary fringe)	Satura	tion Depth (inches):									
	- L	Stream Gauge 🔄 Previo	ous Inspect	ions							
Hydrology Remarks: Soil moist at 34-36 but not sat	urated.										

Project/Site:	Zim Sod				Applicant/	Owner: <u>Z</u>	im Sod	City/County: <u>St</u> .	Louis		State:	<u>MN</u>	Sarr	npling Date:	<u>11/18/10</u>
Investigator(s):	<u>TPT</u>				Section:	<u>11</u>		Township: <u>55</u>			Range:	<u>18</u>	Sarr	npling Point:	#08 N16 west end
Land Form:	Terrace				Local Relie	əf:		Slope %:			Soil Ma	o Unit Nar	me:	<u>Greenwood</u>	l soils B14A
Subregion (LRR):	<u>k</u>				Latitude:			Longitude:			Datum:				
NWI/Cowardin Cla	assification	:			Circular 3	9 Classific	ation: <u>7</u>								
Are climatic/hydro	logic condi	itions o	n the site ty	pical for this	s time of yea	r? <u>Y</u>	i <u>es</u> (If no, exp	lain in remarks)			& Reed (µ			Coniferous S	<u>Swamp</u>
Are vegetation	No	Soil	No	Hydrology	No	significant	tly disturbed?	Are "normal	Yes			secondary	/):		
-		0						circumstances"		Eggers	& Reed (t	ertiary):			
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	naturally p	problematic?	present?		Eggers	& Reed (d	quaternary	y):		

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present?	<u>Yes</u> <u>Yes</u>	Remarks (explain any answers if needed):	West end of Moosehorn field.
Wetland hydrology present? Is the sampled area within a wetland?	<u>Yes</u> Yes	If yes, optional Wetland	Site ID:

	<u>Tree Stratum</u>	(Plot Size:	Absolute % Cover	Dominant Species?	<u>Indicator</u> Status *	Dominance Test Worksheet:		
1.	Larix laricina	(FIOL 5128.	30	Yes	FACW	Number of Dominant Species That Are OBL, FACW or FAC:	2	(A)
2.			0	100	17.00	Total Number of Dominant	2	(B)
3.			0			Species Across All Strata:	2	
4.			0			Percent of Dominant Species	100.00%	(A/B)
		Total Cover:	<u>30</u>			That Are OBL, FACW or FAC:		(**=)
	Sapling/Shrub Stratum	(Plot Size:	)			Prevalence Index Worksheet:		
1.	Larix laricina		80	Yes	FACW	Total % Cover of:		timbe beer
2.	Picea mariana		10	No	FACW			tiply by:
3.	Chamaedaphne calyculata		5	No	OBL	OBL Species 5	X 1	5
4.			0			FACW Species 120	X 2	240
5.			0			FAC Species 0	Х З	0
		Total Cover:	<u>95</u>			FACU Species 0	X 4	0
	Herb Stratum	(Plot Size:	)			UPL Species 0	X 5	0
1.			0			105	(A)	245 (B)
2.			0					
3.			0			Prevalence Index =	B/A =	1.96
4.			0					
5.			0			Hydrophytic Vegetation Indicators:		
6.			0			Yes Rapid Test for Hydroph		
7.			0			Yes Dominance Test is >509	6	
8.			0			Yes <b>Prevelance Index</b> ≤ 3.0	[1]	
		Total Cover: (Plot Size:	<u>0</u>			No Morphological Adaptati in vegetation remarks o	ons [1] (provid r on a separate	le supporting data
	Woody Vine Stratum	(Plot Size.				No Problematic Hydrophyti		
1.			0				• •	· · · ·
2.		Total Cover:	0 0	* In USFWS	Bagian 2	[1] Indicators of hydric soil & wetland hydric soil & wetland hydric disturbed or problematic.	Irology must be p	resent, unless
			-	" IN USFWS I	Region 3	Hydrophytic vegetation present?	Yes	
	narks: lude photo numbers here or	on a separate sheet)				*		

C	Λ	11
J	υ	ᇿ

Sampling Point: #08 N16 west end

Profile Description: (Describe to the depth needed Depth Matrix		abscence of indi Features	cators).		
(inches) Color (moist)	% Color (moist)	% Туре	[1] Loc [2]	Texture	Remarks
· · · · · · · · · · · · · · · · · · ·		· · <u></u> · · <u></u> ·			
$\begin{array}{cccc} 1. & \underline{0-6} \\ 2 & 6-21 \end{array} & \begin{array}{c} 10 \text{ yr } 2/1 \\ \hline 10 \text{ yr } 2/1 \end{array}$				Fibric peat Fibric peat	moist saturated
2. <u>0-21</u> <u>109/2/1</u> 3		· ·			Saturateu
4					
5					
6		· ·			
[1] Type: C=Concentration, D=Depletion, RM=Re		Grains [2] Loc		-	
Hydric Soil Indicators: (applicable to all LRRs, u			_	or Problematic Hydric Soi	
✓ Histosol (A1)	Stripped Matrix (S6)			ck (A10) (LRR K, L, MLRA	
Histic Epipedon (A2)	Dark Surface (S7) (LRR R, MLRA 149			airie Redox (A16) (LRR K, I	
Black Histic (A3)	Polyvalue Below Surface (S8) (LRR R,			cky Peat or Peat (S3) (LRR	K, L, R)
Hydrogen Sulfide (A4)	Thin Dark Surface (S9) (LRR R, MLRA	149B)		face (S7) (LRR K, L)	
Stratified Layers (A5)	Loamy Mucky Mineral (F1) (LRR K, L)			e Below Surface (S8) (LRR	K, L)
Depleted Below Dark Surface (A11)	Loamy Gleyed Matrix (F2)			k Surface (S9) (LRR K, L)	
Thick Dark Surface (A12)	Depleted Matrix (F3)			ganese Masses (F12) (LRF	
Sandy Mucky Mineral (S1)	Redox Dark Surface (F6)			t Floodplain Soils (F19) (MI	
Sandy Gleyed Matrix (S4)	Depleted Dark Surface (F7)			odic (TA6) (MLRA 144A, 1	45, 149B)
Sandy Redox (S5)	Redox Depressions (F8)			ent Material (TF2)	Other (explain in soil
[3] Indicators of hydrophytic vegetation and wetland	hydrology must be present, unless disturbed or	problematic.	Very Sha	llow Dark Surface (TF12)	remarks)
Restrictive Layer (if present): Type:	Depth (inches).	:	H	ydric soil present?	Yes
Remarks: Saturated at -6"					
HYDROLOGY					
Wetland Hydrology Indicators:					
Primary Indicators (minimum of one required; ch	eck all that apply)	Se	econdary Indicato	ors (minimum of two requ	ired)
Surface Water (A1)	Water-Stained Leaves (B9)		Surface Soil Cra	cks (B6)	FAC-Neutral Test (D5)
High Water Table (A2)	Aquatic Fauna (B13)		Drainage Patterr	ns (B10)	
Saturation (A3)	Marl Deposits (B15)		Moss Trim Lines	(B16)	
Water Marks (B1)	Hydrogen Sulfide Odor (C1)		Dry-Season Wa	ter Table (C2)	
Sediment Deposits (B2)	Oxidized Rhizospheres on Living F (where not tilled) (C3)	Roots	Crayfish Burrows	s (C8)	
Drift Deposits (B3)				e on Aerial Imagery (C9)	
Algal Mat or Crust (B4)	Presence of Reduced Iron (C4)	(DC)	Stunted or Stres		
Iron Deposits (B5)	Recent Iron Reduction in Tilled So.	lis (C6)	Geomorphic Pos	sition (D2)	
Inundation Visible on Aerial Imagery (B7)	Thin Muck Surface (C7)		Shallow Aquitard		
Sparsely Vegetated Concave Surface (B8)	Other (explain in remarks)		Microtopographi	c Relief (D4)	
Field Observations:			Wotlan	nd hydrology present?	Yes
Surface water present?	Surface Water Depth (inches):				<u></u>
Water table present?	Water Table Depth (inches):		Descri	be Recorded Data:	
Saturation present? (includes capillary fringe)	Saturation Depth (inches):	6			
	ing Well 🔄 Stream Gauge 🗌 Previou	is Inspections			
Hydrology Remarks: Saturated at -6"					

Project/Site:	Zim Sod				Applicant/0	Owner:	Zim Sod		City/County:	<u>St. Louis</u>		State:	<u>MN</u>	Sam	pling Date:	<u>11/18/10</u>
Investigator(s):	<u>TPT</u>				Section:	<u>11</u>			Township: <u>55</u>			Range:	<u>18</u>	Sam	pling Point:	<u>#09 N16</u>
Land Form:	Terrace				Local Relie	əf:			Slope %:			Soil Map	o Unit Na	me:	Greenwood	<u>l soils B14A</u>
Subregion (LRR):	<u>k</u>				Latitude:				Longitude:			Datum:				
NWI/Cowardin Cla	assification	:			Circular 3	9 Class	ification:	<u>up</u>								
Are climatic/hydro	logic condi	tions o	n the site ty	oical for this	time of yea	r?	Yes	(If no. expla	ain in remarks)		Eggers	& Reed (p	orimary):	<u> </u>	<u>Upland</u>	
	V.	0"	Mar	11 . 1 1	Mark				A II	Maa	Eggers	& Reed (s	secondary	y):		
Are vegetation	<u>Yes</u>	Soil	<u>Yes</u>	Hydrology	Yes	signific	antly distu	irbea?	Are "normal circumstances"	<u>Yes</u>	Eggers	& Reed (t	ertiary):			
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	natural	lly problerr	natic?	present?		Eggers	& Reed (d	quaternar	y):		

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present? Wetland hydrology present?	<u>Yes</u> <u>Yes</u> <u>No</u>	Remarks (explain any answers if needed):	Tile drained sod field - in Moosehorn field
Is the sampled area within a wetland?		If yes, optional Wetland	Site ID:

				<u>Absolute</u> % Cover	<u>Dominant</u> Species?	<u>Indicator</u> Status *	<u>Dominance</u>	Test Worksheet:			
1.	<u>Tree Stratum</u>	(Plot Size:	)				Number of That Are Ol	Dominant Species BL, FACW or FAC:	1	(A)	
2.				0			Total Numb	er of Dominant			
3.				0				ross All Strata:	1	<b>(B)</b>	
4.				0			Percent of I	Dominant Species			
			Total Cover:	<u>0</u>				BL, FACW or FAC:	100.00%	(A/B)	
	Sapling/Shrub Stratum	(Plot Size:	)								
1.		•	,	0				Index Worksheet:			
2.				0			Tota	I % Cover of:	Ми	ıltiply by:	
3.				0			OBL Specie	<b>s</b> 0	X 1	0	
4.				0			FACW Spec	cies 0	X 2	0	
5.				0			FAC Specie		Х 3	297	
			Total Cover:	<u>0</u>			FACU Spec	8	X 4	0	
	Herb Stratum	(Plot Size:	)				· · · ·	8	X 5	0	
1.	Poa pratensis		,	99	Yes	FAC	UPL Specie	s	(A)	297 (E	3)
2.				0			Column To			<u> </u>	)
3.				0			-11	Prevalence Index =	B/A =	3.00	
4.				0			II doub to	Maria (alla alla di alla di a			
5.				0				Vegetation Indicators:			
6.				0			<u>No</u>	Rapid Test for Hydroph	ytic Vegetatio	n	
7.				0			Yes [	ominance Test is >50%	6		
8.				0			Yes F	Prevelance Index ≤ 3.0 [	[1]		
			Total Cover:	<u>99</u>			No A	Iorphological Adaptati	ons [1] (prov	ide supporting d	lata
	Woody Vine Stratum	(Plot Size:	)				ii	n vegetation remarks o	r on a separa	te sheet)	
1.				0			No F	Problematic Hydrophyti	c Vegetation	[1] (Explain)	
2.				0				of hydric soil & wetland hyd	drology must be	present, unless	
			Total Cover:	<u>0</u>	* In USFWS I	Reaion 3	disturbed or p	roblematic.			
						• • •	Hydrophytic v	regetation present?	Yes		
	narks: lude photo numbers here c	or on a separate shee	et)								

C	0	П	
Э	υ	IL	

Sampling Point: <u>#09 N16</u>

Profile Description Depth	n: (Describe to the depth neede Matrix	ed to document the		he abscence ox Features	e of indicator	s).		
(inches)	Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
	10yr 2/1						Fibric peat	very moist @ 12"
6							. <u> </u>	
[1] Type: C=Conce	entration, D=Depletion, RM=Re	duced Matrix, CS=	Covered or Coated Sar	nd Grains	[2] Location	: PL=Pore	Lining, M=Matrix.	
Hydric Soil Indicat	tors: (applicable to all LRRs, u	nless otherwise no	ted)		I	ndicators fo	or Problematic Hydric So	bils [3]:
✓ Histosol (A1)		Stripped Ma	trix (S6)			2 cm Mu	ck (A10) (LRR K, L, MLRA	149B)
Histic Epipedon	(A2)	Dark Surfac	e (S7) (LRR R, MLRA 14	49B)		Coast Pra	airie Redox (A16) (LRR K	, L, R)
Black Histic (A3,	)	Polyvalue B	elow Surface (S8) (LRR	R, MLRA 14	9B)	5 cm Mu	cky Peat or Peat (S3) (LR	R K, L, R)
Hydrogen Sulfid	le (A4)	Thin Dark S	urface (S9) (LRR R, ML	RA 149B)		Dark Sur	face (S7) (LRR K, L)	
Stratified Layers	s (A5)	Loamy Much	ky Mineral (F1) (LRR K, I	L)		Polyvalue	e Below Surface (S8) (LR	R K, L)
Depleted Below	v Dark Surface (A11)	Loamy Gley	ed Matrix (F2)			Thin Darl	k Surface (S9) (LRR K, L)	
Thick Dark Surfa	ace (A12)	Depleted Ma	atrix (F3)			Iron-Man	ganese Masses (F12) (LF	RR K, L, R)
Sandy Mucky M	lineral (S1)	Redox Dark	Surface (F6)			Piedmon	t Floodplain Soils (F19) (N	ILRA 149B)
Sandy Gleyed N	Matrix (S4)	Depleted Da	rk Surface (F7)			Mesic Sp	odic (TA6) (MLRA 144A,	145, 149B)
Sandy Redox (S	S5)	Redox Depr	essions (F8)			Red Pare	ent Material (TF2)	Other (explain in soil
[3] Indicators of hyd	rophytic vegetation and wetland I	hydrology must be p	resent, unless disturbed	or problema	tic.	Very Sha	llow Dark Surface (TF12)	remarks)
Restrictive Layer (	(if present): Type:		Depth (inche	s):		H	ydric soil present?	Yes
Remarks: Very moi	ist at 12" but not saturated				•			
HYDROLOG	Ŷ							
Wetland Hydrology	y Indicators:							
Primary Indicators	(minimum of one required; ch	eck all that apply)			Second	lary Indicate	ors (minimum of two req	uired)
🔲 Surface Water (	(A1)	Water-S	tained Leaves (B9)		Surf	face Soil Cra	cks (B6)	FAC-Neutral Test (D5)
🗌 High Water Tab	le (A2)	Aquatic	Fauna (B13)		🗌 Drai	inage Patteri	ns (B10)	
Saturation (A3)		Marl De	posits (B15)		Mos	s Trim Lines	: (B16)	
Water Marks (B	1)	Hydroge	en Sulfide Odor (C1)		Dry-	-Season Wa	ter Table (C2)	
Sediment Depo	sits (B2)		d Rhizospheres on Living	g Roots	Cray	fish Burrow	s (C8)	
🗌 Drift Deposits (E	33)		not tilled) (C3)		Satu	uration Visibl	e on Aerial Imagery (C9)	
Algal Mat or Cru	ıst (B4)		e of Reduced Iron (C4)		Stur	nted or Stres	sed Plants (D1)	
🔲 Iron Deposits (B	35)		Iron Reduction in Tilled	Soils (C6)	Geo	morphic Pos	sition (D2)	
Inundation Visib	ble on Aerial Imagery (B7)		ick Surface (C7)		Sha	llow Aquitaro	d (D3)	
	ated Concave Surface (B8)	Other (e	explain in remarks)		Micr	rotopographi	c Relief (D4)	
Field Observations	s:							
Surface water pres	sent?	Surface V	Vater Depth (inches):			Wetlar	nd hydrology present?	<u>No</u>
Materials and a later service and a service se						Decer	I. C. D. C. C. M. M. D. M.	
Water table presen		Water Tal	ble Depth (inches):			Descri	be Recorded Data:	
	nt? t? (includes capillary fringe)		ble Depth (inches): n Depth (inches):			Descri	be Recorded Data:	
	t? (includes capillary fringe)	Saturatio	n Depth (inches):	ious Inspect	ions	Desch	be Recorded Data:	

Project/Site:	Zim Sod				Applicant/0	Owner:	Zim Sod		City/County:	<u>St. Louis</u>		State:	<u>MN</u>	Sarr	npling Date:	<u>11/18/10</u>
Investigator(s):	<u>TPT</u>				Section:	<u>11</u>			Township: <u>55</u>			Range:	<u>18</u>	Sarr	npling Point:	<u>#10 N07</u>
Land Form:	Terrace				Local Relie	əf:			Slope %:			Soil Map	o Unit Na	me:	Greenwood	d soils B14A
Subregion (LRR):	<u>k</u>				Latitude:				Longitude:			Datum:				
NWI/Cowardin Cla	assification	:			Circular 3	9 Class	ification:	<u>up</u>								
Are climatic/hydro	logic condi	tions o	n the site ty	oical for this	time of yea	r?	Yes (	lf no. expla	ain in remarks)		Eggers	& Reed (p	orimary):		<u>Upland</u>	
	N	0"	Mar	11 . 1 1	Mark			110	A II	Maa	Eggers	& Reed (s	econdar	y):		
Are vegetation	Yes	Soil	<u>Yes</u>	Hydrology	Yes	signific	antly distu	rbea?	Are "normal circumstances	<u>Yes</u>	Eggers	& Reed (t	ertiary):			
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	natural	lly problem	atic?	present?		Eggers	& Reed (q	juaternar	y):		

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present?	<u>Yes</u> Yes	Remarks (explain any answers if needed):	Tile Drained Field (Otter field) with a managed drainage system and managed vegetation.
Wetland hydrology present?	No		
Is the sampled area within a wetland?	No	If yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:	,	<u>Absolute</u> <u>% Cover</u>	<u>Dominant</u> Species?	<u>Indicator</u> Status *	<u>Dominar</u>	nce Test V	<u>Vorksheet:</u>			
1.		(11010120.	,	0					ant Species CW or FAC:		1 (A)	
2.				0				mber of D Across A			1 <i>(B)</i>	
3. ₄				0							_	
4.			Total Cover:	0					ant Species CW or FAC:	100.009	% <mark>(A/B)</mark>	
	Sapling/Shrub Stratum	(Plot Size:		ž								
	Saping/Shrub Stratum	(FIOL 3128.	)		[]		Prevalen	ce Index I	Norksheet:			
1.				0			т	otal % Co	ver of:	I	Multiply by:	
2. 3.				0			OBL Spe	ecies	0	X 1	C	)
3. 4.				0			FACWS		0	X 2	C	- )
5.				0			FAC Spe		99	Х З	297	7
			Total Cover:	<u>0</u>			FACU SI		0	X 4	C	- )
	Herb Stratum	(Plot Size:	)				UPL Spe		0	X 5	C	- )
1.	Poa pratensis			99	Yes	FAC	Column		99	(A)	297	- 7 (B)
2.				0					valence Index =	R/A =	3.00	-
3.				0				Fie		D/A -	3.00	
4.				0			Hydrophy	tic Veget	ation Indicators:			
5. 6.				0			No		est for Hydroph		tion	
o. 7.				0			Yes	_	nce Test is >509			
8.				0			Yes	- Prevela	nce Index ≤ 3.0	[1]		
			Total Cover:	99			No	– Morpho	logical Adaptati	ons [1] (pro	ovide supporti	ing data
	Woody Vine Stratum	(Plot Size:	)	_				in vege	tation remarks o	r on a sepa	rate sheet)	•
1.				0			No	Problem	natic Hydrophyt	ic Vegetatio	n [1] (Explain)	l.
2.				0			[1] Indicato	- ors of hydrid	c soil & wetland hy	drology must	be present, unle	ss
			Total Cover:	<u>0</u>	* In USFWS I	Region 3	disturbed o	or problema	tic.			
						• • •	Hydrophyt	tic vegetati	ion present?	Yes		
	narks: lude photo numbers here o	or on a separate sh	eet)									

C	0	
Э	U	L

Sampling Point: <u>#10 N07</u>

Profile Description: (Describe to the depth need Depth Matrix	ed to docume		ie abscence x Features	e of indicate	ors).				
(inches) Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks		
1.     0 - 12     10yr 2/1       2.     12 - 20     10yr 2/1       3.     -			 			Fibric peat Fibric peat	bright fibers10%		
<ul> <li>4</li></ul>	nless otherw Stripp Dark Polyw Thin I Loam Loam Redo: Deple		19B) R, MLRA 14 RA 149B)		Indicators fo 2 cm Muc Coast Pra 5 cm Muc Dark Sum Polyvalue Thin Dark Iron-Man Piedmoni Mesic Sp	Lining, M=Matrix. or Problematic Hydric So ck (A10) (LRR K, L, MLRA airie Redox (A16) (LRR K, cky Peat or Peat (S3) (LRF face (S7) (LRR K, L) e Below Surface (S8) (LRF k Surface (S9) (LRR K, L) ganese Masses (F12) (LR t Floodplain Soils (F19) (M odic (TA6) (MLRA 144A, 1 ent Material (TF2)	149B) L, R) R K, L, R) R K, L, R) ILRA 149B) 145, 149B) ○ Other (explain in soil		
[3] Indicators of hydrophytic vegetation and wetland			or problema	tic.	_	llow Dark Surface (TF12)	remarks)		
Restrictive Layer (if present): Type:	· · · · · · · · · · · · · · · · · · ·	Depth (inches			Н	ydric soil present?	Yes		
Remarks:									
HYDROLOGY									
Wetland Hydrology Indicators:									
Primary Indicators (minimum of one required; ch						ors (minimum of two req			
<ul> <li>Surface Water (A1)</li> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> </ul>	A M H 0	'ater-Stained Leaves (B9) quatic Fauna (B13) 'arl Deposits (B15) ydrogen Sulfide Odor (C1) xidized Rhizospheres on Living rhere not tilled) (C3)	n Roots	Dr Ma Di Cr	Surface Soil Cracks (B6)       FAC-Neutral Test (D5)         Drainage Patterns (B10)       Moss Trim Lines (B16)         Dry-Season Water Table (C2)       Crayfish Burrows (C8)         Schweigen Visible on Action Process (C0)				
Drift Deposits (B3)       Infore inclusion (co)       Saturation Visible on Aerial Imagery (C9)         Algal Mat or Crust (B4)       Presence of Reduced Iron (C4)       Stunted or Stressed Plants (D1)         Iron Deposits (B5)       Recent Iron Reduction in Tilled Soils (C6)       Geomorphic Position (D2)         Inundation Visible on Aerial Imagery (B7)       Thin Muck Surface (C7)       Shallow Aquitard (D3)         Sparsely Vegetated Concave Surface (B8)       Other (explain in remarks)       Microtopographic Relief (D4)									
Field Observations:					Matte	nd hudrologu procest?	No		
Surface water present? Water table present? Saturation present? (includes capillary fringe) Recorded Data: Aerial Photo Monitor	Wa	face Water Depth (inches): ter Table Depth (inches): uration Depth (inches): Stream Gauge Previo	ous Inspect	tions		nd hydrology present? be Recorded Data:	No		
Hydrology Remarks: Tile drained field									

Project/Site:	Zim Sod				Applicant/C	)wner.	: <u>Zim So</u>	<u>d</u>	City/County:	<u>St. Louis</u>		State:	<u>MN</u>	Sam	pling Date:	<u>11/18/10</u>
Investigator(s):	<u>TPT</u>				Section:	<u>11</u>			Township: <u>55</u>	5		Range:	<u>18</u>	Sam	pling Point:	#11East of N06
Land Form:	Terrace				Local Relie	f:			Slope %:			Soil Ma	o Unit Nai	me:	Greenwood	l soils B14A
Subregion (LRR):	<u>k</u>				Latitude:				Longitude:			Datum:				
NWI/Cowardin Cla	assification	:			Circular 3	9 Clas	sification:	<u>8</u>								
Are climatic/hydro	logic condi	itions o	n the site ty	pical for this	time of yea	r?	Yes	(If no, expla	ain in remarks)		00	& Reed (µ		-	Coniferous I	Bog
Are vegetation	No	Soil	No	Hydrology	No	sianifi	icantly dist	turbed?	Are "normal	Yes	Eggers	& Reed (s	secondary	y):		
-				, ,,		Ū			circumstances		Eggers	& Reed (t	ertiary):			
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	No	natura	ally proble	matic?	present?		Eggers	& Reed (d	quaternar	y):		

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present? Wetland hydrology present?	<u>Yes</u> <u>Yes</u> Yes	Remarks (explain any answers if needed):	East of Mallard field
Is the sampled area within a wetland?		If yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:	,	<u>Absolute</u> % Cover	<u>Dominant</u> Species?	<u>Indicator</u> Status *	Dominance Test Worksheet:		
1.	Larix laricina	(11010126.	,	30	Yes	FACW	Number of Dominant Species That Are OBL, FACW or FAC:	6	(A)
2. 3.				0			Total Number of Dominant Species Across All Strata:	7	(B)
4.			Total Cover:	0 <u>30</u>			Percent of Dominant Species That Are OBL, FACW or FAC:	85.71%	(A/B)
	Sapling/Shrub Stratum	(Plot Size:	)				Prevalence Index Worksheet:		
1.	Larix laricina			10	Yes	FACW	Total % Cover of:		
2.	Picea mariana			10	Yes	FACW			Itiply by:
3.	Betula pumila			10	Yes	OBL	OBL Species 35	X 1	35
4.	Ledum groenlandicum			25	Yes	OBL	FACW Species 60	X 2	120
5.	Rubus idaeus ssp. strigos	us		10	Yes	FACW	FAC Species 0	Х 3	0
			Total Cover:	<u>65</u>			FACU Species 0	X 4	0
	<u>Herb Stratum</u>	(Plot Size:	)				UPL Species 0	X 5	0
1.	Sphagnum sp.			30	Yes		Column Totals: 95	(A)	155 (B)
2.				0			Prevalence Index =		
3.				0			Prevalence index -	B/A -	1.63
4.				0			Hydrophytic Vegetation Indicators:		
5. 6.				0			Yes Rapid Test for Hydroph	-	n
o. 7.				0			Yes Dominance Test is >509	%	
8.				0			Yes Prevelance Index ≤ 3.0	[1]	
•			Total Cover:	30			Morphological Adopteti		ide supporting dat
	Woody Vine Stratum	(Plot Size:	)	<u>50</u>			No in vegetation remarks o		
1.				0			No Problematic Hydrophyt	ic Vegetation [	[1] (Explain)
2.				0			[1] Indicators of hydric soil & wetland hy	drology must be	present, unless
			Total Cover:	<u>0</u>	* In USFWS I	Region 3	disturbed or problematic.		
						•	Hydrophytic vegetation present?	Yes	
	marks: clude photo numbers here o	or on a separate sh	eet)						

SOIL

Sampling Point: #11East of N06

Profile Description: (Describe to the depth neede Depth Matrix		e abscence of in Features	ndicators).			
(inches) Color (moist)	% Color (moist)		pe [1]	Loc [2]	Texture	Remarks
1. 0 - 12 10yr 2/1					Fibric peat	saturated at 4"
2. <u>12 - 18</u> <u>10yr 2/1</u>					Fibric peat	10% bright fibers
3						
4						
6						
[1] Type: C=Concentration, D=Depletion, RM=Red	luced Matrix, CS=Covered or Coated Sand	l Grains [2] L	ocation: I	PL=Pore L	.ining, M=Matrix.	
Hydric Soil Indicators: (applicable to all LRRs, un	less otherwise noted)		Ind	icators fo	r Problematic Hydric So	ils [3]:
Histosol (A1)	Stripped Matrix (S6)			2 cm Muc	k (A10) (LRR K, L, MLRA	149B)
Histic Epipedon (A2)	Dark Surface (S7) (LRR R, MLRA 149	9B)		Coast Pra	iirie Redox (A16) (LRR K,	L, R)
Black Histic (A3)	Polyvalue Below Surface (S8) (LRR R	, MLRA 149B)		5 cm Muc	ky Peat or Peat (S3) (LRF	R K, L, R)
Hydrogen Sulfide (A4)	Thin Dark Surface (S9) (LRR R, MLR)	A 149B)		Dark Surf	ace (S7) (LRR K, L)	
Stratified Layers (A5)	Loamy Mucky Mineral (F1) (LRR K, L)			Polyvalue	Below Surface (S8) (LRF	? K, L)
Depleted Below Dark Surface (A11)	Loamy Gleyed Matrix (F2)			Thin Dark	Surface (S9) (LRR K, L)	
Thick Dark Surface (A12)	Depleted Matrix (F3)			Iron-Mang	ganese Masses (F12) (LR	R K, L, R)
Sandy Mucky Mineral (S1)	Redox Dark Surface (F6)			Piedmont	Floodplain Soils (F19) (M	LRA 149B)
Sandy Gleyed Matrix (S4)	Depleted Dark Surface (F7)			Mesic Sp	odic (TA6) (MLRA 144A, :	(45, 149B)
Sandy Redox (S5)	Redox Depressions (F8)			Red Pare	nt Material (TF2)	Other (explain in soil
[3] Indicators of hydrophytic vegetation and wetland h	ydrology must be present, unless disturbed o	r problematic.		Very Shai	low Dark Surface (TF12)	remarks)
Restrictive Layer (if present): Type:	Depth (inches)	):	_	Hj	vdric soil present?	Yes
Remarks:						
HYDROLOGY						
Wetland Hydrology Indicators:						
Primary Indicators (minimum of one required; che	eck all that apply)		Secondar	y Indicato	rs (minimum of two req	ıired)
Surface Water (A1)	Water-Stained Leaves (B9)		Surfac	e Soil Cra	cks (B6)	FAC-Neutral Test (D5)
High Water Table (A2)	Aquatic Fauna (B13)		Draina	ge Pattern	s (B10)	
Saturation (A3)	Marl Deposits (B15)		Moss 7	rim Lines	(B16)	
Water Marks (B1)	Hydrogen Sulfide Odor (C1)		Dry-Se	ason Wat	er Table (C2)	
Sediment Deposits (B2)	Oxidized Rhizospheres on Living	Roots	Crayfis	h Burrows	: (C8)	
Drift Deposits (B3)	(where not tilled) (C3)		Satura	tion Visible	e on Aerial Imagery (C9)	
Algal Mat or Crust (B4)	Presence of Reduced Iron (C4)		Stunte	d or Stress	sed Plants (D1)	
Iron Deposits (B5)	Recent Iron Reduction in Tilled So	oils (C6)	Geomo	orphic Pos	ition (D2)	
Inundation Visible on Aerial Imagery (B7)	Thin Muck Surface (C7)		Shallov	v Aquitaro	(D3)	
Sparsely Vegetated Concave Surface (B8)	Other (explain in remarks)		Microto	pographic	: Relief (D4)	
Field Observations:				Matter	d hudrologu procest?	Vac
Surface water present?	Surface Water Depth (inches):				d hydrology present?	Yes
Water table present?	Water Table Depth (inches):			Descril	be Recorded Data:	
Saturation present? (includes capillary fringe)	Saturation Depth (inches):	4		4		
Recorded Data: Aerial Photo Monitoria Hydrology Remarks: Saturation at -4"	ng Well 🔄 Stream Gauge 🔄 Previo	us Inspections				
nyarology nemana. Oddradil at 4						

Project/Site:	Zim Sod				Applicant/	Owne	r: Zim Sod		City/County: <u>St.</u>	Louis		State:	<u>MN</u>	Samp	ling Date:	<u>11/18/10</u>
Investigator(s):	pr(s): <u>TPT</u>				Section: <u>3</u>			Township: <u>55</u>			Range:	<u>18</u>	Samp	ling Point.	#12 N of N01	
Land Form:	Terrace				Local Relie	əf:			Slope %:			Soil Ma	o Unit Nai	me: <u>(</u>	Greenwoo	d soils B14A
Subregion (LRR):	<u>k</u>				Latitude:				Longitude:			Datum:				
NWI/Cowardin Cla	assification	:			Circular 3	89 Cla	ssification:	<u>8</u>								
Are climatic/hydro	logic condi	tions o	n the site ty	pical for this	time of yea	ar?	<u>Yes</u> (	(If no, expla	ain in remarks)		Eggers	& Reed (J	orimary):	<u>C</u>	oniferous	Bog
Are vegetation	No	Soil	No	Hydrology	No	ciani	ficantly distu	rhod?	Are "normal	Voc	Eggers	& Reed (s	secondary	y):		
Ale vegetation	<u>No</u>	3011	110	riyuruluyy	<u>No</u>	siyili	ilcantiy ulstu	ibeu?	circumstances"	<u>Yes</u>	Eggers	& Reed (t	ertiary):			
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	No	natu	rally problem	natic?	present?		Eggers	& Reed (d	quaternar	y):		

#### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present? Wetland hydrology present?	<u>Yes</u> <u>Yes</u> Yes	Remarks (explain any answers if needed):	North of Bald eagle field
Is the sampled area within a wetland?	Yes	If yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:	)	<u>Absolute</u> <u>% Cover</u>	<u>Dominant</u> Species?	<u>Indicator</u> <u>Status *</u>	<u>Dominance Test V</u>				
1.	Picea mariana			60	Yes	FACW	Number of Domin That Are OBL, FA		5	(A)	
2.	Larix laricina			40	Yes	FACW	Total Number of D	ominant			
3.				0			Species Across A	ll Strata:	6	(B)	
4.				0			Percent of Domina		83.33%	(A/B)	
			Total Cover:	<u>100</u>			That Are OBL, FA	CW or FAC:	00.00 /8	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	Sapling/Shrub Stratum	(Plot Size:	)				Prevalence Index	Worksheet:			
1.	Salix sp.			15	Yes	FAC	Total % Co		Μ,	ultiply by:	
2.	Ledum groenlandicum			35	Yes	OBL					
3.	Rubus idaeus ssp. strigosu	S		15	Yes	FACW	OBL Species	35	X 1 _	35	-
4.				0			FACW Species	115	X 2	230	-
5.				0			FAC Species	15	Х 3	45	_
			Total Cover:	<u>65</u>			FACU Species	0	X 4	0	1
	Herb Stratum	(Plot Size:	)				UPL Species	0	X 5	0	1
1.	Sphagnum sp.			20	Yes		Column Totals:	165	(A)	310	(B)
2.				0				valence Index =		1.88	
3.				0			110		-	1.00	
4.				0			Hydrophytic Veget	ation Indicators:			
5. 6.				0				est for Hydroph		n	
0. 7.				0			Yes Domina	nce Test is >509	6		
8.				0			Yes Prevela	nce Index ≤ 3.0	[1]		
			Total Cover:	20			Morpho	ological Adaptati	ons [1] (prov	ide supportir	na data
	Woody Vine Stratum	(Plot Size:	)					tation remarks o			.9
1.		•		0			No Problem	natic Hydrophyt	ic Vegetation	[1] (Explain)	
2.				0			[1] Indicators of hydrid	c soil & wetland hv	drology must be	nresent unles	
-			Total Cover:	<u>0</u>	* In USFWS I	Deview 2	disturbed or problema		anology much se	procont, amo	~
				-	111 035 113 1	Kegion 5	Hydrophytic vegetat	ion present?	Yes		
	arks: lude photo numbers here o	r on a separate sh	eet)				· · · · ·				

SOIL

Sampling Point: #12 N of N01

Profile Description: (Describe to the depth need Depth Matrix	led to document		e abscence x Features	e of indicat	ors).		
(inches) Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
0 10 10							
1. <u>0 - 18</u> <u>10yr 2/1</u> 2. <u>-</u>						Fibric peat	sat to surface
3							
4							
5					· . <u></u>		
[1] Type: C=Concentration, D=Depletion, RM=R	educed Matrix, (	S=Covered or Coated San	d Grains	[2] Locati	on: PL=Pore	Lining, M=Matrix.	
Hydric Soil Indicators: (applicable to all LRRs, u	Inless otherwise	e noted)			Indicators fo	r Problematic Hydric Sol	ls [3]:
Histosol (A1)	Stripped	Matrix (S6)			2 cm Muc	ck (A10) (LRR K, L, MLRA	149B)
Histic Epipedon (A2)	🗌 Dark Su	rface (S7) (LRR R, MLRA 14	9B)		Coast Pra	airie Redox (A16) (LRR K,	L, R)
Black Histic (A3)	🗌 Polyvalu	e Below Surface (S8) (LRR I	R, MLRA 14	9B)	5 cm Muc	ky Peat or Peat (S3) (LRR	K, L, R)
Hydrogen Sulfide (A4)	🗌 Thin Da	rk Surface (S9) (LRR R, MLF	RA 149B)		Dark Surf	face (S7) (LRR K, L)	
Stratified Layers (A5)	Loamy N	lucky Mineral (F1) (LRR K, L	)		Polyvalue	Below Surface (S8) (LRR	K, L)
Depleted Below Dark Surface (A11)	Loamy (	Gleyed Matrix (F2)			Thin Dark	surface (S9) (LRR K, L)	
Thick Dark Surface (A12)	Depleted	d Matrix (F3)			Iron-Man	ganese Masses (F12) (LRI	R K, L, R)
Sandy Mucky Mineral (S1)	Redox D	oark Surface (F6)			Piedmont	Floodplain Soils (F19) (M	LRA 149B)
Sandy Gleyed Matrix (S4)	Depleted	d Dark Surface (F7)			Mesic Sp	odic (TA6) (MLRA 144A, 1	45, 149B)
Sandy Redox (S5)	Redox D	Pepressions (F8)			Red Pare	nt Material (TF2)	Other (explain in soil
[3] Indicators of hydrophytic vegetation and wetland	hydrology must l	pe present, unless disturbed	or problema	tic.	Very Sha	llow Dark Surface (TF12)	remarks)
Restrictive Layer (if present): Type:		Depth (inches	s):		H	ydric soil present?	Yes
Remarks:							
HYDROLOGY							
Wetland Hydrology Indicators:							
Primary Indicators (minimum of one required; cl	neck all that app	ly)		Seco	ndary Indicato	ors (minimum of two requ	ired)
Surface Water (A1)	🗌 Wat	er-Stained Leaves (B9)		<u> </u>	urface Soil Cra	cks (B6)	FAC-Neutral Test (D5)
High Water Table (A2)	🗌 Aqu	atic Fauna (B13)		<u>D</u>	rainage Patterr	ns (B10)	
Saturation (A3)	Mar	l Deposits (B15)		M	loss Trim Lines	(B16)	
Water Marks (B1)	🗌 Hyd	rogen Sulfide Odor (C1)		<u> </u>	ry-Season Wat	ter Table (C2)	
Sediment Deposits (B2)		lized Rhizospheres on Living ere not tilled) (C3)	Roots	C	rayfish Burrows	s (C8)	
Drift Deposits (B3)						e on Aerial Imagery (C9)	
Algal Mat or Crust (B4)		sence of Reduced Iron (C4) ent Iron Reduction in Tilled S				sed Plants (D1)	
Iron Deposits (B5)		Geomorphic Position (D2)					
□ Inundation Visible on Aerial Imagery (B7)	Thir.		hallow Aquitaro				
Sparsely Vegetated Concave Surface (B8)		er (explain in remarks)		<i>M</i>	licrotopographi	c Reliet (D4)	
Field Observations:					Wotlan	d hydrology present?	Ves
Surface water present?		ce Water Depth (inches):					Yes
Water table present?		Table Depth (inches):			Descri	be Recorded Data:	
Saturation present? (includes capillary fringe)	L.	ation Depth (inches):	0				
	ring Well	Stream Gauge 🔄 Previo	ous Inspect	tions			
Hydrology Remarks: Saturated to surface							

Project/Site:         Zim Sod         Applicant/Owner:         Zim Sod         City/County:         St. Louis         State:         MN	Sampling Date: <u>11/18/10</u>
Investigator(s): <u>TPT</u> Section: <u>11</u> Township: <u>55</u> Range: <u>18</u>	Sampling Point: #13 E of N02
Land Form:         Terrace         Local Relief:         Slope %:         Soil Map Unit Name	ne: Greenwood soils B14A
Subregion (LRR):kLatitude:Longitude:Datum:	
NWI/Cowardin Classification:         Circular 39 Classification: <u>7</u>	
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)	Coniferous Swamp
Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal Yes	):
Are vegetation <u>No</u> Soil <u>No</u> Hydrology <u>No</u> significantly disturbed? Are "normal <u>Yes</u> circumstances" Eggers & Reed (tertiary):	
Are vegetation         No         Soil         No         Hydrology         No         naturally problematic?         present?         Eggers & Reed (quaternary	<i>ı</i> ):

#### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present? Wetland hydrology present?	<u>Yes</u> <u>Yes</u> Yes	Remarks (explain any answers if needed):	East of Osprey field
Is the sampled area within a wetland?		If yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:	)	<u>Absolute</u> <u>% Cover</u>	<u>Dominant</u> <u>Species?</u>	<u>Indicator</u> <u>Status *</u>	<u>Dominance Test M</u> Number of Domina				
1.	Picea mariana			90	Yes	FACW	That Are OBL, FAC		5	(A)	
2.				0			Total Number of D		c		
3.				0			Species Across Al	l Strata:	6	<b>(B)</b>	
4.				0			Percent of Domina That Are OBL, FAC		83.33%	(A/B)	
			Total Cover:	<u>90</u>			That Are OBE, I AC	WOTAC.			
	Sapling/Shrub Stratum	(Plot Size:	)				Prevalence Index V	Vorksheet:			
1.	Ledum groenlandicum			25	Yes	OBL	Total % Co	ver of:	Ми	ıltiply by:	
2.	Chamaedaphne calyculata			10	Yes	OBL		45	X 1	45	
3.	Cornus sericea ssp. sericea			10	Yes	FACW	OBL Species	100	X2 -	200	-
4. 5.	Betula pumila			10	163	OBL	FACW Species		×2 _		-
э.			Total Cover:	55			FAC Species	0	_	0	-
	Hards Ofmation	(Plot Size:	Total Cover.	<u>55</u>			FACU Species	0	X 4 _	0	-
	<u>Herb Stratum</u>	(FIOL SIZE.	)				UPL Species	0	X 5	0	-
1.	Sphagnum sp.			30	Yes		Column Totals:	145	(A)	245	(B)
2.				0			Prev	valence Index =	B/A =	1.69	J
3. 4.				0							
4. 5.				0			Hydrophytic Vegeta	ation Indicators:			
6.				0			Yes Rapid T	est for Hydroph	ytic Vegetatio	n	
7.				0			Yes Domina	nce Test is >50%	6		
8.				0			Yes Prevela	nce Index $\leq 3.0$	[1]		
			Total Cover:	30			No Morpho	logical Adaptati	ons [1] (prov	ide supportir	ng data
	Woody Vine Stratum	(Plot Size:	)					ation remarks o			•
1.				0			No Problem	natic Hydrophyti	ic Vegetation	[1] (Explain)	
2.				0			[1] Indicators of hydric	soil & wetland hy	drology must be	present, unles	ss
			Total Cover:	<u>0</u>	* In USFWS I	Region 3	disturbed or problema				
						(egion e	Hydrophytic vegetati	on present?	Yes		
	arks: lude photo numbers here or	on a separate sh	eet)								

C	0	11
Э	υ	ᇿ

Sampling Point: #13 E of N02

	on: (Describe to the depth need	ed to documen			of indicato	ors).				
Depth (inches)	Matrix Color (moist)			x Features	Turne Id 1	1 00 [2]	Texture	Pomorko		
(inches)	Color (moist)	<u>%</u>	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks		
1 0 - 12	10yr 2/1						Fibric peat			
2. 12 - 22	10yr 2/2						Fibric peat			
3										
-										
5 6										
	centration, D=Depletion, RM=Re	duced Matrix,	CS=Covered or Coated Sand	d Grains	[2] Locatio	n: PL=Pore	Lining, M=Matrix.			
Hydric Soil Indica	ators: (applicable to all LRRs, u	nless otherwis	e noted)			Indicators fo	r Problematic Hydric So	ils [3]:		
✓ Histosol (A1)		Stripped	l Matrix (S6)			2 cm Muc	k (A10) (LRR K, L, MLRA	149B)		
Histic Epipedor	n (A2)	🗌 Dark Sι	rface (S7) (LRR R, MLRA 14	9 <b>B</b> )		Coast Pra	airie Redox (A16) (LRR K,	L, R)		
Black Histic (A	3)	Polyvalı	ie Below Surface (S8) (LRR F	R, MLRA 149	9B)	5 cm Muc	ky Peat or Peat (S3) (LRF	? K, L, R)		
🗌 Hydrogen Sulfi	ïde (A4)	🗌 Thin Da	rk Surface (S9) (LRR R, MLR	A 149B)		Dark Surl	ace (S7) (LRR K, L)			
Stratified Layer	rs (A5)	🗌 Loamy I	Mucky Mineral (F1) (LRR K, L)	)		Polyvalue	Below Surface (S8) (LRR	? K, L)		
Depleted Below	w Dark Surface (A11)	Loamy	Gleyed Matrix (F2)			Thin Dark	s Surface (S9) (LRR K, L)			
Thick Dark Sur	rface (A12)	Deplete	d Matrix (F3)			Iron-Man	ganese Masses (F12) (LR	R K, L, R)		
Sandy Mucky N	Mineral (S1)	Redox I	Dark Surface (F6)			Piedmont	Floodplain Soils (F19) (M	LRA 149B)		
Sandy Gleyed	Matrix (S4)	Deplete	d Dark Surface (F7)			Mesic Sp	odic (TA6) (MLRA 144A, 1	45, 149B)		
Sandy Redox (	(S5)	Redox I	Depressions (F8)			Red Pare	nt Material (TF2)	Other (explain in soil		
[3] Indicators of hyd	drophytic vegetation and wetland	hydrology must	be present, unless disturbed c	or problemat	ic.	Very Sha	llow Dark Surface (TF12)	remarks)		
Restrictive Layer	(if present): Type:		Depth (inches	):		H	vdric soil present?	Yes		
Remarks: Saturate	ted to surface									
HYDROLOG	Ϋ́									
Wetland Hydrolog	gy Indicators:									
Primary Indicator	rs (minimum of one required; ch	eck all that app	ly)		Secon	dary Indicato	ors (minimum of two requ	ıired)		
Surface Water	· (A1)	🗌 Wa	ter-Stained Leaves (B9)		Su	rface Soil Cra	cks (B6)	FAC-Neutral Test (D5)		
—	ble (A2)	🗌 Αqι	atic Fauna (B13)		Dra	ainage Patterr	ns (B10)			
Saturation (A3)		Mai	l Deposits (B15)		Mc	oss Trim Lines	(B16)			
Water Marks (E		🗌 Нус	rogen Sulfide Odor (C1)		Dr.	y-Season Wat	er Table (C2)			
Sediment Depo	,	🗆 Oxi	lized Rhizospheres on Living	Roots	Crayfish Burrows (C8)					
Drift Deposits (		(wh	ere not tilled) (C3)				e on Aerial Imagery (C9)			
<ul> <li>Drift Deposits (</li> <li>Algal Mat or Cr</li> </ul>	(B3)	(wh	ere not tilled) (C3) sence of Reduced Iron (C4)		🗌 Sa	turation Visibl	e on Aerial Imagery (C9) sed Plants (D1)			
	(B3) rust (B4)	(wh	ere not tilled) (C3)	oils (C6)	🗌 Sa 🗌 Stu	turation Visibl	sed Plants (D1)			
Algal Mat or Cr	(B3) rust (B4) (B5)	(wh	ere not tilled) (C3) sence of Reduced Iron (C4)	oils (C6)	☐ Sa ☐ Stu ☐ Ge	turation Visibl	sed Plants (D1) ition (D2)			
Algal Mat or Cr	(B3) rust (B4)	(wh	ere not tilled) (C3) sence of Reduced Iron (C4) ent Iron Reduction in Tilled S	oils (C6)	☐ Sa ☐ Stu ☐ Ge ☐ Sh	turation Visibl unted or Stres comorphic Pos	sed Plants (D1) ition (D2) I (D3)			
Algal Mat or Cr	(B3) rust (B4) (B5) ible on Aerial Imagery (B7) etated Concave Surface (B8)	(wh	ere not tilled) (C3) sence of Reduced Iron (C4) ent Iron Reduction in Tilled S n Muck Surface (C7)	oils (C6)	☐ Sa ☐ Stu ☐ Ge ☐ Sh	turation Visibl unted or Stres: comorphic Pos allow Aquitarc crotopographi	sed Plants (D1) ition (D2) I (D3) c Relief (D4)			
Algal Mat or Cr Iron Deposits (i Inundation Visi Sparsely Vege	(B3) rust (B4) (B5) ible on Aerial Imagery (B7) etated Concave Surface (B8) <b>ns:</b>	(wh Pre Rec Thin Oth	ere not tilled) (C3) sence of Reduced Iron (C4) ent Iron Reduction in Tilled S n Muck Surface (C7)	oils (C6)	☐ Sa ☐ Stu ☐ Ge ☐ Sh	turation Visibl unted or Stres: comorphic Pos allow Aquitarc crotopographi	sed Plants (D1) ition (D2) I (D3)	Yes		
Algal Mat or Cr Alga Mat or Cr Iron Deposits (i Inundation Visi Sparsely Vege Field Observation	(B3) rust (B4) (B5) ible on Aerial Imagery (B7) itated Concave Surface (B8) ns: esent?	(wh Pre Rec DThin Oth	ere not tilled) (C3) sence of Reduced Iron (C4) ent Iron Reduction in Tilled S n Muck Surface (C7) er (explain in remarks)	oils (C6)	☐ Sa ☐ Stu ☐ Ge ☐ Sh	turation Visibl unted or Stres comorphic Pos allow Aquitarc crotopographi Wetlan	sed Plants (D1) ition (D2) I (D3) c Relief (D4)	<u>Yes</u>		
Algal Mat or Cr Iron Deposits ( Drundation Visi Sparsely Veger Field Observation Surface water pre Water table prese	(B3) rust (B4) (B5) ible on Aerial Imagery (B7) itated Concave Surface (B8) ns: esent?	(wh Pre Rec United Oth Surfa	ere not tilled) (C3) sence of Reduced Iron (C4) ent Iron Reduction in Tilled S n Muck Surface (C7) er (explain in remarks) <b>ce Water Depth (inches):</b>	oils (C6)	☐ Sa ☐ Stu ☐ Ge ☐ Sh	turation Visibl unted or Stres comorphic Pos allow Aquitarc crotopographi Wetlan	sed Plants (D1) ition (D2) I (D3) c Relief (D4) d hydrology present?	Yes		
Algal Mat or Cr Iron Deposits ( Drundation Visi Sparsely Veger Field Observation Surface water pre Water table prese	(B3) rust (B4) (B5) ible on Aerial Imagery (B7) itated Concave Surface (B8) ns: essent? ent? int? (includes capillary fringe) Aerial Photo Monitor	(wh □ Pre □ Rec □ Thin □ Oth □ Surfa □ Wate. ▼ Satur	ere not tilled) (C3) sence of Reduced Iron (C4) ent Iron Reduction in Tilled S n Muck Surface (C7) er (explain in remarks) ce Water Depth (inches): r Table Depth (inches): ation Depth (inches):		☐ Sa ☐ Stu ☐ Ge ☐ Sh ☐ Miu	turation Visibl unted or Stres comorphic Pos allow Aquitarc crotopographi Wetlan	sed Plants (D1) ition (D2) I (D3) c Relief (D4) d hydrology present?	Yes		

Project/Site:	Zim Sod				Applicant/	<i>Owner:</i> <u>Zim Sod</u>	City/County: <u>St.</u>	Louis		State:	<u>MN</u>	Sampling Date	<u>11/18/10</u>
Investigator(s):	<u>TPT</u>				Section:	<u>11</u>	Township: <u>55</u>			Range:	<u>18</u>	Sampling Point	: <u>#14 E of N13</u>
Land Form:	Terrace				Local Relie	ief:	Slope %:			Soil Ma	o Unit Nai	me: <u>Greenwoo</u>	od soils B14A
Subregion (LRR):	<u>K</u>				Latitude:		Longitude:			Datum:			
NWI/Cowardin Cla	assification	:			Circular 3	39 Classification: <u>7</u>							
Are climatic/hydro	logic condi	itions o	n the site ty	pical for this	time of yea	ar? <u>Yes</u> (If no, expl	lain in remarks)		Eggers	& Reed (j	orimary):	<u>Coniferous</u>	Swamp
Are up aptation	No	Seil	No	Lludrologu	No	aignificantly disturbed?	Are "normal	Vaa	Eggers	& Reed (	secondary	ı):	
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	significantly disturbed?	Are "normal circumstances"	Yes	Eggers	& Reed (t	ertiary):		
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	naturally problematic?	present?		Eggers	& Reed (	quaternar	/):	

#### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Tree Stratum	(Plot Size:	)	<u>Absolute</u> <u>% Cover</u>	<u>Dominant</u> Species?	<u>Indicator</u> <u>Status *</u>	Dominance Test Worksheet:		
1.	Larix laricina			40	Yes	FACW	Number of Dominant Species That Are OBL, FACW or FAC:	3	(A)
2.				0			Total Number of Dominant	•	<b>(D)</b>
3.				0			Species Across All Strata:	3	(B)
4.		-		0			Percent of Dominant Species That Are OBL, FACW or FAC:	100.00%	(A/B)
			otal Cover:	<u>40</u>					
	Sapling/Shrub Stratum	(Plot Size:	)				Prevalence Index Worksheet:		
1.	Larix laricina			60	Yes	FACW	Total % Cover of:	Ми	ltiply by:
2.	Rubus idaeus ssp. strigosu	IS		15	Yes	FACW	OBL Species 0	X 1	0
3. 4.				0			FACW Species 115	X 2	230
5.				0			FAC Species 0	Х 3	0
		Т	otal Cover:	<u>75</u>			FACU Species 0	X 4	0
	Herb Stratum	(Plot Size:	)				UPL Species 0	X 5	0
1.				0			Column Totals: 115	(A)	230 (B)
2.				0			Prevalence Index =		2.00
3.				0			Prevalence index - I	D/A -	2.00
4.				0			Hydrophytic Vegetation Indicators:		
5. 6.				0			Yes Rapid Test for Hydroph	ytic Vegetatio	n
0. 7.				0			Yes Dominance Test is >50%	6	
8.				0			Yes Prevelance Index ≤ 3.0	[1]	
		Т	otal Cover:	<u>0</u>			No Morphological Adaptati		
	Woody Vine Stratum	(Plot Size:	)				in vegetation remarks of	r on a separat	e sheet)
1.				0			No Problematic Hydrophyti	c Vegetation [	1] (Explain)
2.				0			[1] Indicators of hydric soil & wetland hyd	Irology must be	present, unless
		Те	otal Cover:	<u>0</u>	* In USFWS I	Region 3	disturbed or problematic.		
						-	Hydrophytic vegetation present?	Yes	
	narks: lude photo numbers here o	or on a separate sheet)							

C	Λ	11
J	υ	ᇿ

Sampling Point: #14 E of N13

Profile Description: Depth	(Describe to the depth need Matrix	ed to document		he abscence ox Features	of indicato	ors).		
(inches)	Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
	0yr 2/1						Fibric peat	
Z	0yr 2/1						Fibric peat	Saturated to 8"
3								
6								
[1] Type: C=Concen	tration, D=Depletion, RM=Re	duced Matrix, C	S=Covered or Coated Sar	nd Grains	[2] Locatio	n: PL=Pore l	Lining, M=Matrix.	
Hydric Soil Indicator	s: (applicable to all LRRs, u	nless otherwise	noted)			Indicators fo	r Problematic Hydric Soi	ls [3]:
<ul><li>Histosol (A1)</li></ul>		Stripped	Matrix (S6)			2 cm Muc	ck (A10) (LRR K, L, MLRA	149B)
Histic Epipedon (A	12)	Dark Su	face (S7) (LRR R, MLRA 14	49B)		Coast Pra	airie Redox (A16) (LRR K, I	., R)
Black Histic (A3)		Polyvalu	e Below Surface (S8) (LRR	R, MLRA 14	9B)	5 cm Muc	ky Peat or Peat (S3) (LRR	K, L, R)
Hydrogen Sulfide	(A4)	Thin Dai	k Surface (S9) (LRR R, MLI	RA 149B)		Dark Surf	face (S7) (LRR K, L)	
Stratified Layers (	A <i>5</i> )	Loamy N	lucky Mineral (F1) (LRR K, I	L)		Polyvalue	Below Surface (S8) (LRR	K, L)
Depleted Below D	ark Surface (A11)	Loamy 🤆	ileyed Matrix (F2)			Thin Dark	(Surface (S9) (LRR K, L)	
Thick Dark Surface	e (A12)	Depleted	l Matrix (F3)			Iron-Mang	ganese Masses (F12) (LRF	R K, L, R)
Sandy Mucky Mine	eral (S1)	Redox D	ark Surface (F6)			Piedmont	Floodplain Soils (F19) (ML	.RA 149B)
Sandy Gleyed Ma	trix (S4)	Depleted	I Dark Surface (F7)			Mesic Sp	odic (TA6) (MLRA 144A, 14	45, 149B)
Sandy Redox (S5)	)	Redox D	epressions (F8)			Red Pare	nt Material (TF2)	Other (explain in soil
[3] Indicators of hydro	phytic vegetation and wetland l	hydrology must b	e present, unless disturbed	or problema	tic.	Very Sha	llow Dark Surface (TF12)	remarks)
Restrictive Layer (if	present): Type:		Depth (inche	s):		Hj	ydric soil present?	Yes
Remarks: Saturated to	0 8"				•			
HYDROLOGY								
Wetland Hydrology I	Indicators:							
Primary Indicators (r	minimum of one required; ch	eck all that app	<b>y</b> )		Secon	dary Indicato	ors (minimum of two requ	ired)
Surface Water (A1	1)	Wat	er-Stained Leaves (B9)		🗌 Su	rface Soil Cra	cks (B6)	FAC-Neutral Test (D5)
High Water Table	(A2)	Aqu	atic Fauna (B13)		Dra	ainage Patterr	ns (B10)	
Saturation (A3)		Mari	Deposits (B15)		Mo	oss Trim Lines	(B16)	
Water Marks (B1)		Hyd	rogen Sulfide Odor (C1)		Dr.	y-Season Wat	ter Table (C2)	
Sediment Deposit	s (B2)		ized Rhizospheres on Living ere not tilled) (C3)	g Roots		ayfish Burrows	s (C8)	
Drift Deposits (B3)	)				Sa	turation Visible	e on Aerial Imagery (C9)	
Algal Mat or Crust	· (B4)		ence of Reduced Iron (C4)		Stu	inted or Stres	sed Plants (D1)	
🔲 Iron Deposits (B5)	1	_	ent Iron Reduction in Tilled	Soils (C6)	Ge	omorphic Pos	iition (D2)	
Inundation Visible	on Aerial Imagery (B7)		Muck Surface (C7)		Sh	allow Aquitard	1 (D3)	
	ed Concave Surface (B8)	Othe	er (explain in remarks)		Mio	crotopographic	c Relief (D4)	
Field Observations:						W. 0.	d budgete and a second second	Ver
Surface water presei			e Water Depth (inches):				d hydrology present?	Yes
Water table present?			Table Depth (inches):			Descri	be Recorded Data:	
Saturation present?	(includes capillary fringe)	✓ Satura	ntion Depth (inches):	8				
Recorded Data:				ious Inspect	ions			

Project/Site:	Zim Sod				Applicant/	Owner:	Zim Sod	1	City/County: <u>St.</u>	Louis		State:	<u>MN</u>	Sam	pling Date:	<u>11/18/10</u>
Investigator(s):	MAJ				Section:	<u>11</u>			Township: <u>55</u>			Range:	<u>18</u>	Sam	npling Point:	#15 NE Corner of N08
Land Form:	Terrace				Local Relie	əf:			Slope %:			Soil Map	o Unit Nai	me:	Greenwood	<u>B14A</u>
Subregion (LRR):	<u>k</u>				Latitude:				Longitude:			Datum:				
NWI/Cowardin Cla	ssification.	: up	land		Circular 3	9 Class	sification:	upland								
Are climatic/hydrol	logic condi	tions o	n the site ty	pical for this	time of yea	ar?	Yes	(If no, expla	ain in remarks)		00	& Reed (µ		-	<u>Upland</u>	
Are vegetation	Yes	Soil	Yes	Hydrology	Yes	sianifia	cantly distu	urbed?	Are "normal	Yes	Eggers a	& Reed (s	secondary	y):		
						U	1		circumstances"		Eggers	& Reed (t	ertiary):			
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	natura	lly problen	natic?	present?		Eggers	& Reed (d	quaternar	у):		

#### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present?	<u>Yes</u> Yes	Remarks (explain any answers if needed):	Tile drained sod field. NE corner of Red Fox field.
Wetland hydrology present?	No		
Is the sampled area within a wetland?	No	lf yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:	,	<u>Absolute</u> <u>% Cover</u>	<u>Dominant</u> Species?	<u>Indicator</u> Status *	<u>Dominan</u>	ice Test W	orksheet:			
1.		(11010120.	/	0					nt Species W or FAC:	1	(A)	
2. 3.				0				mber of Do Across All		1	(B)	
4.			Total Cover:	0			Percent	of Domina	nt Species W or FAC:	100.00%	(A/B)	
			Total Cover:	<u>0</u>				022,7770				
	Sapling/Shrub Stratum	(Plot Size:	)				Prevalence	ce Index V	/orksheet:			
1. 2.				0			T	otal % Cov	ver of:	M	ultiply by:	
2. 3.				0			OBL Spe	cies	0	X 1	0	_
4.				0			FACW S		0	X 2	0	-
5.				0			FAC Spe	cies	95	Х З	285	_
			Total Cover:	<u>0</u>			FACU Sp	ecies	0	X 4	0	_
	Herb Stratum	(Plot Size:	)				UPL Spe	cies	0	X 5	0	_
1.	Poa pratensis			95	Yes	FAC	Column		95	(A)	285	(B)
2.				0			_	-	alence Index =		3.00	-
3.				0								
4.				0				tic Vegeta	tion Indicators:			
5. 6.				0			No	Rapid Te	est for Hydroph	ytic Vegetatio	n	
7.				0			Yes	Dominar	nce Test is >50%	%		
8.				0			Yes	Prevelar	ice Index $\leq 3.0$	[1]		
	Woody Vine Stratum	(Plot Size:	Total Cover:	<u>95</u>			No		ogical Adaptati ation remarks o			ng data
4	woody vine Stratum	(1 101 0120.	,				No	- Problem	atic Hydrophyt	ic Vegetation	[1] (Explain)	
1. 2.				0			[1] Indicato	-	soil & wetland hy	•		
			Total Cover:	<u>0</u>	* In USFWS I	Region 3	uistui bed u	, prosiciliat				
							Hydrophyt	ic vegetatic	n present?	<u>Yes</u>		
	narks: lude photo numbers here c	or on a separate she	et)									

C	Λ	11
J	υ	ᇿ

Sampling Point: #15 NE Corner of N08

Profile Description Depth	: (Describe to the depth need Matrix	ded to documen		abscence Features	e of indicato	ors).		
(inches)	Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1 0 - 36	10yr2/1						fibric peat mostly	some hemic below 30"
· · · · · · · · · · · · · · · · · · ·							iblic peat mostly	
4							·	
6 [1] Type: C=Conce	entration, D=Depletion, RM=R	educed Matrix,	CS=Covered or Coated Sand	l Grains	[2] Locatio	n: PL=Pore	Lining, M=Matrix.	
Hydric Soil Indicat	ors: (applicable to all LRRs,	unless otherwis	e noted)			Indicators fo	or Problematic Hydric Soi	ls [3]:
✓ Histosol (A1)		Strippe	l Matrix (S6)			2 cm Mu	ck (A10) (LRR K, L, MLRA	149B)
Histic Epipedon	(A2)	🗌 Dark Si	ırface (S7) (LRR R, MLRA 149	)B)		Coast Pr	airie Redox (A16) (LRR K,	L, R)
Black Histic (A3)	)	Polyval	ie Below Surface (S8) (LRR R	, MLRA 14	9B)	📃 5 cm Mu	cky Peat or Peat (S3) (LRR	K, L, R)
Hydrogen Sulfid	le (A4)	🗌 Thin Da	rk Surface (S9) (LRR R, MLRA	a 149B)		Dark Sur	face (S7) (LRR K, L)	
Stratified Layers	; (A5)	Loamy	Mucky Mineral (F1) (LRR K, L)			Polyvalue	e Below Surface (S8) (LRR	K, L)
Depleted Below	Dark Surface (A11)	Loamy	Gleyed Matrix (F2)			Thin Dan	k Surface (S9) (LRR K, L)	
Thick Dark Surfa		Deplete	d Matrix (F3)				ganese Masses (F12) (LRI	
Sandy Mucky M			Dark Surface (F6)				t Floodplain Soils (F19) (M	,
Sandy Gleyed N			d Dark Surface (F7)				oodic (TA6) (MLRA 144A, 1	45, 149B)
Sandy Redox (S	\$5)	Redox	Depressions (F8)				ent Material (TF2)	Other (explain in soil
[3] Indicators of hydi	rophytic vegetation and wetland	l hydrology must	be present, unless disturbed o	r problema	tic.	Very Sha	allow Dark Surface (TF12)	remarks)
Restrictive Layer (i	if present): Type:		Depth (inches)	):		Н	ydric soil present?	Yes
Remarks: Saturated	d at 34"							
HYDROLOG	Y							
Wetland Hydrology								
Primary Indicators	(minimum of one required; c						ors (minimum of two requ	_
Surface Water (A	A1)		ter-Stained Leaves (B9)			rface Soil Cra		FAC-Neutral Test (D5)
High Water Tab	le (A2)		uatic Fauna (B13)		_	ainage Patten		
Saturation (A3)			1 Deposits (B15)			oss Trim Lines		
Water Marks (B <sup>-</sup>	1)		Irogen Sulfide Odor (C1)	-			ter Table (C2)	
Sediment Depos	sits (B2)		dized Rhizospheres on Living I ere not tilled) (C3)	Roots		ayfish Burrow		
Drift Deposits (B		Pre	sence of Reduced Iron (C4)				le on Aerial Imagery (C9) sed Plants (D1)	
Algal Mat or Cru			cent Iron Reduction in Tilled Sc	oils (C6)		omorphic Po		
Iron Deposits (B	35)		n Muck Surface (C7)			allow Aquitar		
	le on Aerial Imagery (B7)	Oth	er (explain in remarks)		_	crotopographi	. ,	
Sparsely Vegeta	ated Concave Surface (B8)		· · ·					
Field Observations		_ • •				Watla	nd hydrology present?	No
Surface water pres			ce Water Depth (inches):		-			
Water table presen			r Table Depth (inches):		-	Descri	ibe Recorded Data:	
-	? (includes capillary fringe)		ration Depth (inches):		-			
Recorded Data:		oring Well	Stream Gauge Previou	us Inspec	tions			
Hydrology Remark	IS:							

Project/Site:	Zim Sod				Applicant/	Owner:	Zim Soo	<u>d</u>	City/County: <u>St</u>	. Louis		State:	<u>MN</u>	Sai	mpling Date:	<u>11/18/10</u>
Investigator(s):	MAJ				Section:	<u>11</u>			Township: <u>55</u>			Range:	<u>18</u>	Sai	mpling Point:	#16 NW Corner of N12
Land Form:	Terrace				Local Relie	ef:			Slope %:			Soil Ma	o Unit Na	me:	Greenwood	Soils B14A
Subregion (LRR):	<u>k</u>				Latitude:				Longitude:			Datum:				
NWI/Cowardin Cla	assification	<u>up</u>	land		Circular 3	9 Clas	sification:	<u>upland</u>								
Are climatic/hydro	logic condi	tions o	n the site ty	pical for this	s time of yea	r?	Yes	(If no, expla	ain in remarks)		00	& Reed (µ			Upland	
Are vegetation	Yes	Soil	Yes	Hydrology	Yes	signific	cantly dist	turbed?	Are "normal	Yes			secondary	y):		
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	natura	ally proble	matic?	circumstances" present?		00	& Reed (t & Reed (d	ertiary): quaternar	у):		

#### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present? Wetland hydrology present?	<u>Yes</u> <u>Yes</u> <u>No</u>	Remarks (explain any answers if needed):	Tile drained sod field
Is the sampled area within a wetland?	No	If yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:	,	<u>Absolute</u> <u>% Cover</u>	<u>Dominant</u> Species?	<u>Indicator</u> Status <u>*</u>	Dominance Test Worksheet:	
1.	<u>nee onatum</u>	1. 101 0120.	,	0			Number of Dominant Species           That Are OBL, FACW or FAC:         1 (A)	
2.				0			Total Number of Dominant Species Across All Strata: 1 (B)	
3.				0				
4.			Total Cover:	<u>0</u>			Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)	
	Sapling/Shrub Stratum	(Plot Size:	)				Prevalence Index Worksheet:	
1.				0			Total % Cover of: Multiply by:	
2. 3.				0			OBL Species 0 X 1	0
4.				0			FACW Species         0         X 2	0
5.				0			<b>FAC Species</b> 95 X 3 28	,5
			Total Cover:	<u>0</u>			FACU Species 0 X 4	0
	Herb Stratum	(Plot Size:	)				UPL Species 0 X 5	0
1.	Poa pratensis			95	Yes	FAC	Column Totals: 95 (A) 28	85 (B)
2.				0			Prevalence Index = B/A = 3.0	0
3. 4.				0				
4. 5.				0			Hydrophytic Vegetation Indicators:	
6.				0			No Rapid Test for Hydrophytic Vegetation	
7.				0			Yes Dominance Test is >50%	
8.				0			Yes Prevelance Index ≤ 3.0 [1]	
	Woody Vine Stratum	(Plot Size:	Total Cover:	<u>95</u>			No Morphological Adaptations [1] (provide suppor in vegetation remarks or on a separate sheet)	ting data
4	woody vine Stratum	(11010120.	/	0			No Problematic Hydrophytic Vegetation [1] (Explain	1)
1. 2.				0			[1] Indicators of hydric soil & wetland hydrology must be present, un disturbed or problematic.	
			Total Cover:	<u>0</u>	* In USFWS I	Region 3		
							Hydrophytic vegetation present? Yes	
	narks: lude photo numbers here o	or on a separate she	eet)					

C	Λ	11
J	υ	ᇿ

Sampling Point: #16 NW Corner of N12

Profile Description: (Describe Depth	to the depth needed to do Matrix	ocument the indicator or confirm the Redox	e abscence x Features	of indicators	5).		
· · ·	lor (moist) %		%	Type [1]	Loc [2]	Texture	Remarks
1. <u>0 - 36</u> <u>10yr2/1</u>	· ·					fibric & hemic peat	woody frags 30-36"
_				·			
6	Depletion, RM=Reduced	Matrix, CS=Covered or Coated Sand	d Grains	[2] Location	: PL=Pore	Lining, M=Matrix.	
Hydric Soil Indicators: (application)	able to all LRRs, unless o	therwise noted)		li	ndicators fo	or Problematic Hydric So	ils [3]:
✓ Histosol (A1)		Stripped Matrix (S6)			2 cm Mu	ck (A10) (LRR K, L, MLRA	149B)
Histic Epipedon (A2)		Dark Surface (S7) (LRR R, MLRA 149	9B)		Coast Pr	airie Redox (A16) (LRR K,	L, R)
Black Histic (A3)		Polyvalue Below Surface (S8) (LRR R	R, MLRA 149	9B)	5 cm Mu	cky Peat or Peat (S3) (LRF	? K, L, R)
Hydrogen Sulfide (A4)		Thin Dark Surface (S9) (LRR R, MLR.	A 149B)		Dark Sur	face (S7) (LRR K, L)	
Stratified Layers (A5)		Loamy Mucky Mineral (F1) (LRR K, L)	)		Polyvalue	e Below Surface (S8) (LRR	? K, L)
Depleted Below Dark Surface	e (A11)	Loamy Gleyed Matrix (F2)			Thin Dan	k Surface (S9) (LRR K, L)	
Thick Dark Surface (A12)		Depleted Matrix (F3)			Iron-Man	ganese Masses (F12) (LR	R K, L, R)
Sandy Mucky Mineral (S1)		Redox Dark Surface (F6)			Piedmon	t Floodplain Soils (F19) (M	LRA 149B)
Sandy Gleyed Matrix (S4)		Depleted Dark Surface (F7)			Mesic Sp	oodic (TA6) (MLRA 144A, 1	45, 149B)
Sandy Redox (S5)		Redox Depressions (F8)			Red Pare	ent Material (TF2)	Other (explain in soil
[3] Indicators of hydrophytic vege	tation and wetland hydrolog	gy must be present, unless disturbed o	or problemat	tic.	Very Sha	allow Dark Surface (TF12)	remarks)
Restrictive Layer (if present):	Type:	Depth (inches)	):		Н	ydric soil present?	Yes
Remarks: Nearly saturated @ 36"	but not above			•			
HYDROLOGY							
Wetland Hydrology Indicators:							
Primary Indicators (minimum o	of one required; check all	that apply)		Second	ary Indicate	ors (minimum of two requ	uired)
Surface Water (A1)		Water-Stained Leaves (B9)		Surfa	ace Soil Cra	acks (B6)	FAC-Neutral Test (D5)
High Water Table (A2)		Aquatic Fauna (B13)		🗌 Draii	nage Patter	ns (B10)	
Saturation (A3)		Marl Deposits (B15)		Mos	s Trim Lines	s (B16)	
Water Marks (B1)		Hydrogen Sulfide Odor (C1)		Dry-	Season Wa	ter Table (C2)	
Sediment Deposits (B2)		Oxidized Rhizospheres on Living (where not tilled) (C3)	Roots	Cray	fish Burrow	s (C8)	
Drift Deposits (B3)		Presence of Reduced Iron (C4)				le on Aerial Imagery (C9)	
Algal Mat or Crust (B4)		_	oile (C6)			sed Plants (D1)	
Iron Deposits (B5)		Recent Iron Reduction in Tilled So     Thin Muck Surface (C7)			morphic Po		
Inundation Visible on Aerial I	magery (B7)	Other (explain in remarks)			low Aquitar	. ,	
Sparsely Vegetated Concave	e Surface (B8)			Micro	otopographi	ic Relief (D4)	
Field Observations:					M/otios	ad hydrology propert?	No
Surface water present?		Surface Water Depth (inches):				nd hydrology present?	No
Surface water present? Water table present?		Water Table Depth (inches):				nd hydrology present? ibe Recorded Data:	No
Surface water present? Water table present? Saturation present? (includes		Water Table Depth (inches): Saturation Depth (inches):					<u>No</u>
Surface water present? Water table present?		Water Table Depth (inches): Saturation Depth (inches):	us Inspecti	ions			<u>No</u>

Project/Site:	Zim Sod				Applicant/	Owner:	Zim Soc	<u>d</u>	City/County: <u>St.</u>	Louis		State:	<u>MN</u>	Samp	oling Date:	<u>11/18/10</u>	
Investigator(s):	<u>MAJ</u>				Section:	<u>11</u>			Township: <u>55</u>			Range:	<u>18</u>	Samp	oling Point:	<u>#17 S of SW c</u> N14	orner of
Land Form:	Terrace				Local Reli	əf:			Slope %:			Soil Ma	o Unit Nar	me:	Greenwood	B14A	
Subregion (LRR):	<u>k</u>				Latitude:				Longitude:			Datum:					
NWI/Cowardin Cla	assification:				Circular 3	9 Class	sification:	<u>7</u>									
Are climatic/hydrol	logic condi	tions o	n the site ty	pical for this	time of yea	ar?	Yes	(If no, expla	ain in remarks)		00	& Reed (j		_	Coniferous S	<u>Swamp</u>	
Are vegetation	No	Soil	No	Hydrology	No	sianific	cantly dist	urbed?	Are "normal	Yes			secondary	/):			
-						U	-		circumstances"		Eggers	& Reed (i	tertiary):				
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	No	natura	lly probler	mauc?	present?		Eggers	& Reed (	quaternary	y):			

#### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present?	<u>Yes</u> Yes	Remarks (explain any answers if needed):	South of Porcupine field
Wetland hydrology present?	Yes		
Is the sampled area within a wetland?	Yes	If yes, optional Wetland	Site ID:

			<u>Absolute</u> % Cover	<u>Dominant</u> Species?	<u>Indicator</u> Status *	Dominance Test Worksheet:		
	<u>Tree Stratum</u>	(Plot Size:	<u>/// 00/01</u>	<u>opecies:</u>	otatus	Number of Dominant Species	2	(4)
1.	Larix laricina		60	Yes	FACW	That Are OBL, FACW or FAC:	2	(A)
2.	Picea mariana		20	Yes	FACW	Total Number of Dominant	0	<b>(D</b> )
3.			0			Species Across All Strata:	3	(B)
4.			0			Percent of Dominant Species	66.67%	(A/B)
		Total Cover:	<u>80</u>			That Are OBL, FACW or FAC:		(10-)
	Sapling/Shrub Stratum	(Plot Size:				Prevalence Index Worksheet:		
1.			0			Total % Cover of:	Μ.,	Hinly by
2.			0					Itiply by:
3.			0			OBL Species 20	X 1	20
4.			0			FACW Species 80	X 2	160
5.			0			FAC Species 0	Х З	0
		Total Cover:	<u>0</u>			FACU Species 0	X 4	0
	Herb Stratum	(Plot Size:				UPL Species 0	X 5	0
1.	Calamagrostis canadensis		10	No	OBL	Column Totals: 100	(A)	180 (B)
2.	Sphagnum sp.		60	Yes		Prevalence Index =		1.00
3.	Carex lasiocarpa		10	No	OBL	Prevalence index -	B/A -	1.80
4.			0			Hydrophytic Vegetation Indicators:		
5.			0			Yes Rapid Test for Hydroph		
6.			0					,
7.			0					
8.			0			Yes <b>Prevelance Index</b> $\leq$ 3.0		
		Total Cover:	<u>80</u>			No Morphological Adaptati in vegetation remarks o		
	Woody Vine Stratum	(Plot Size:				No Problematic Hydrophyt		
1.			0					
2.		Total Cover:	0 0			[1] Indicators of hydric soil & wetland hydric soil & wetland hydric disturbed or problematic.	drology must be	present, unless
			<u>-</u>	* In USFWS I	Region 3	Hydrophytic vegetation present?	<u>Yes</u>	
	narks: lude photo numbers here of	r on a separate sheet)						

SOIL

Sampling Point: #17 S of SW corner of N14

Profile Description: (Describe to the depth neede Depth Matrix		the abscence dox Features	of indicator	s).								
(inches) Color (moist)	% Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks						
0 - 8 10yr2/1					hemic peat							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					fibric peat							
3.												
4												
5												
0.	duced Matrix, CS=Covered or Coated Sa	and Grains	[2] Location	: PL=Pore	Lining, M=Matrix.							
Hydric Soil Indicators: (applicable to all LRRs, un	nless otherwise noted)		I	ndicators fo	r Problematic Hydric So	ils [3]:						
✓ Histosol (A1)	Stripped Matrix (S6)			2 cm Muc	ck (A10) (LRR K, L, MLRA	149B)						
Histic Epipedon (A2)	Dark Surface (S7) (LRR R, MLRA	149B)		Coast Pra	airie Redox (A16) (LRR K,	L, R)						
Black Histic (A3)	Polyvalue Below Surface (S8) (LRI	R R, MLRA 149	9 <b>B</b> )	5 cm Muc	ky Peat or Peat (S3) (LRF	? K, L, R)						
Hydrogen Sulfide (A4)	🗌 Thin Dark Surface (S9) (LRR R, M	LRA 149B)		Dark Surf	face (S7) (LRR K, L)							
Stratified Layers (A5)	🗌 Loamy Mucky Mineral (F1) (LRR K	(, L)		Polyvalue	e Below Surface (S8) (LRR	K, L)						
Depleted Below Dark Surface (A11)	Loamy Gleyed Matrix (F2)			Thin Dark	Surface (S9) (LRR K, L)							
Thick Dark Surface (A12)	Depleted Matrix (F3)			Iron-Man	ganese Masses (F12) (LR	R K, L, R)						
Sandy Mucky Mineral (S1)	Redox Dark Surface (F6)			Piedmont	Floodplain Soils (F19) (M	LRA 149B)						
Sandy Gleyed Matrix (S4)	Depleted Dark Surface (F7)			Mesic Sp	odic (TA6) (MLRA 144A, 1	45, 149B)						
Sandy Redox (S5)	Redox Depressions (F8)			Red Pare	nt Material (TF2)	Other (explain in soil						
[3] Indicators of hydrophytic vegetation and wetland h	nydrology must be present, unless disturbe	ed or problemat	ic.	Very Sha	llow Dark Surface (TF12)	remarks)						
Restrictive Layer (if present): Type:	Depth (inch	nes):		H	ydric soil present?	Yes						
<b>Remarks:</b> saturated to surface, waterlogged at surface.												
HYDROLOGY												
Wetland Hydrology Indicators:												
Primary Indicators (minimum of one required; ch					ors (minimum of two requ							
Surface Water (A1)	Water-Stained Leaves (B9)			face Soil Cra		FAC-Neutral Test (D5)						
High Water Table (A2)	Aquatic Fauna (B13)			inage Patterr								
Saturation (A3)	Marl Deposits (B15)			s Trim Lines								
Water Marks (B1)	Hydrogen Sulfide Odor (C1)				ter Table (C2)							
Sediment Deposits (B2)	Oxidized Rhizospheres on Livia (where not tilled) (C3)	ng Roots		yfish Burrows								
Drift Deposits (B3)	Presence of Reduced Iron (C4	()			e on Aerial Imagery (C9)							
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled				sed Plants (D1)							
Iron Deposits (B5)	Thin Muck Surface (C7)		_	morphic Pos								
☐ Inundation Visible on Aerial Imagery (B7)	Other (explain in remarks)		_	llow Aquitarc rotopographi								
Sparsely Vegetated Concave Surface (B8)				olopographi	c Reliel (D4)							
Field Observations:				Wetlan	d hydrology present?	Yes						
Water table present? Saturation present? (includes capillary fringe)	<ul> <li>Water Table Depth (inches):</li> <li>Saturation Depth (inches):</li> </ul>	0		Descri	ue Recorded Data:							
Recorded Data: 🕅 Aerial Photo 🦳 Monitor	ing Well 🔲 Stream Gauge 🦳 Pre	vious Inspect	ions									

Project/Site:	Zim Sod				Applicant/0	Owner: <u>Zin</u>	<u>n Sod</u>	City/County: <u>St</u>	. Louis		State:	<u>MN</u>	Sam	pling Date:	<u>11/18/10</u>	
Investigator(s):	MAJ				Section:	<u>11</u>		Township: <u>55</u>			Range:	<u>18</u>	Sam	pling Point:	<u>#18 W of</u> Rd	N14/Elsner
Land Form:	Terrace				Local Relie	əf:		Slope %:			Soil Ma	o Unit Nar	me:	Greenwood	<u>I B14A</u>	
Subregion (LRR):	<u>k</u>				Latitude:			Longitude:			Datum:					
NWI/Cowardin Cla	assification	:			Circular 3	9 Classifica	tion: <u>6</u>									
Are climatic/hydro	logic condi	tions o	n the site ty	pical for this	time of yea	r? <u>Ye</u>	<u>s</u> (If no, expl	ain in remarks)		00	& Reed (µ		-	Shrub-Carr		
Are vegetation	<u>No</u>	Soil	No	Hydrology	No	significantl <sup>,</sup>	v disturbed?	Are "normal	Yes	00		secondary	/):			
								circumstances"		Eggers	& Reed (t	ertiary):				
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	naturally pr	roblematic?	present?		Eggers	& Reed (d	quaternary	y):			

#### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present?	<u>Yes</u> Yes	Remarks (explain any answers if needed):	West of Porcupine field
Wetland hydrology present?	Yes		
Is the sampled area within a wetland?	Yes	If yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:	Absolute	<u>Dominant</u> Species?	<u>Indicator</u> Status *	Dominance Test Worksheet:	
1.	Larix laricina	(, , , , , , , , , , , , , , , , , , ,	10	Yes	FACW	Number of Dominant Species           That Are OBL, FACW or FAC:         2	
2. 3.			0			Total Number of Dominant Species Across All Strata: 4 (B)	
4.		Total Cover:	0			Percent of Dominant Species That Are OBL, FACW or FAC: 50.00% (A/B)	
	Sapling/Shrub Stratum	(Plot Size:	)			Prevalence Index Worksheet:	
1.	Salix sp.		0		FAC	Total % Cover of: Multiply by	r:
2. 3.			0			OBL Species         20         X 1	20
4.			0			FACW Species10 X 2	20
5.		Total Cover:	0 0			FAC Species         0         X 3           FACUS Species         0         X 4	0
	<u>Herb Stratum</u>	(Plot Size:	)			FACU Species         0         X 4           UPL Species         0         X 5	0
1.	Calamagrostis canadensis		20	Yes	OBL	Column Totals: 30 (A)	40 (B)
2. 3.	Spirea alba Sphagnum sp.		15 30	Yes Yes	NI		1.33
4.			0			Hydrophytic Vegetation Indicators:	
5. 6.			0			No Rapid Test for Hydrophytic Vegetation	
7.			0			No Dominance Test is >50%	
8.			0			Yes Prevelance Index ≤ 3.0 [1]	
	Woody Vine Stratum	Total Cover: (Plot Size:	<u>65</u> )			No Morphological Adaptations [1] (provide supplication remarks or on a separate sheet)	
1.			0			No Problematic Hydrophytic Vegetation [1] (Expl	ain)
2.		Total Cover:	0 0			[1] Indicators of hydric soil & wetland hydrology must be present, disturbed or problematic.	unless
			<u>•</u>	* In USFWS I	Region 3	Hydrophytic vegetation present? <u>Yes</u>	
	narks: lude photo numbers here o	r on a separate sheet)				*	

SOIL

Sampling Point: #18 W of N14/Elsner Rd

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).         Depth       Matrix         Redox Features									
(inches)	Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks	
0 10 10							homia noot		
1.         0 - 10         10yr2/1           2.         10 - 36         10yr2/1							hemic peat mostly fibric peat		
3									
4									
5									
	n Dependetion DM-De		C= Covered or Constant Source		[2]	DI - Dava			
			S=Covered or Coated Sand	Grains	[2] Locall		Lining, M=Matrix.		
Hydric Soil Indicators: (ap	pplicable to all LRRs, ui	_				_	r Problematic Hydric Soil		
✓ Histosol (A1)		_	Matrix (S6)				ck (A10) (LRR K, L, MLRA (		
Histic Epipedon (A2)			rface (S7) (LRR R, MLRA 149				airie Redox (A16) (LRR K, L		
Black Histic (A3)			e Below Surface (S8) (LRR R		9B)		ky Peat or Peat (S3) (LRR	K, L, R)	
Hydrogen Sulfide (A4)			rk Surface (S9) (LRR R, MLR)			_	face (S7) (LRR K, L)		
Stratified Layers (A5)			Nucky Mineral (F1) (LRR K, L)				Below Surface (S8) (LRR	K, L)	
Depleted Below Dark Su			Gleyed Matrix (F2)				Surface (S9) (LRR K, L)		
Thick Dark Surface (A12			l Matrix (F3)				ganese Masses (F12) (LRF		
Sandy Mucky Mineral (S	,		Park Surface (F6)				Floodplain Soils (F19) (ML		
Sandy Gleyed Matrix (S	:4)		I Dark Surface (F7)				odic (TA6) (MLRA 144A, 14	45, 149B)	
Sandy Redox (S5)		Redox L	epressions (F8)			_	nt Material (TF2)	Other (explain in soil remarks)	
[3] Indicators of hydrophytic	vegetation and wetland l	hydrology must l	e present, unless disturbed o	r problema	tic.	Very Sha	llow Dark Surface (TF12)	Temarksj	
Restrictive Layer (if prese	nt): Type:		Depth (inches)	):		H	ydric soil present?	Yes	
Remarks: saturated at 6"									
HYDROLOGY									
Wetland Hydrology Indica	itors:								
Primary Indicators (minim	um of one required; ch	eck all that app	ly)		Seco	ndary Indicato	ors (minimum of two requ	ired)	
Surface Water (A1)		Wat	er-Stained Leaves (B9)		S	urface Soil Cra	cks (B6)	FAC-Neutral Test (D5)	
High Water Table (A2)		🗌 Aqu	atic Fauna (B13)			rainage Patterr	ns (B10)		
Saturation (A3)		Mar	Deposits (B15)		<u> </u>	oss Trim Lines	(B16)		
Water Marks (B1)		🗌 Hyd	rogen Sulfide Odor (C1)		D	ry-Season Wat	ter Table (C2)		
Sediment Deposits (B2)	)		lized Rhizospheres on Living I	Roots		rayfish Burrows	s (C8)		
Drift Deposits (B3)			ere not tilled) (C3)		S	aturation Visibl	e on Aerial Imagery (C9)		
Algal Mat or Crust (B4)			sence of Reduced Iron (C4)		Si	tunted or Stres	sed Plants (D1)		
Iron Deposits (B5)			ent Iron Reduction in Tilled So	oils (C6)	G	eomorphic Pos	sition (D2)		
Inundation Visible on Ae	erial Imagery (B7)	_	Muck Surface (C7)		S	hallow Aquitaro	1 (D3)		
Sparsely Vegetated Cor		Oth	er (explain in remarks)		M	icrotopographi	c Relief (D4)		
Field Observations:									
Surface water present?		Surfa	ce Water Depth (inches):			Wetlan	d hydrology present?	Yes	
Water table present?		Water	Table Depth (inches):			Descri	be Recorded Data:		
Saturation present? (inclu	Ides capillary fringe)	✓ Satur	ation Depth (inches):	6	-				
Recorded Data: Aeri	ial Photo 🔄 Monitor	ing Well	Stream Gauge 📃 Previo	us Inspect	tions				
Hydrology Remarks: sa	turated at 6 inches								

Project/Site:	Zim Sod				Applicant/	Owner: <u>Zin</u>	n Sod	City/County: <u>St</u>	. Louis		State:	MN	Samp	oling Date:	<u>11/18/10</u>
Investigator(s):	<u>MAJ</u>				Section:	<u>11</u>		Township: <u>55</u>			Range:	_		U U	#19 Wetland East of N09
Land Form:	Terrace				Local Relie	ef:		Slope %:			Soil Map	o Unit Nar	me: <u>(</u>	Greenwood	<u>I B14A</u>
Subregion (LRR):	<u>k</u>				Latitude:			Longitude:			Datum:				
NWI/Cowardin Cla	assification	:			Circular 3	9 Classifica	tion: <u>8</u>								
Are climatic/hydro	logic condi	tions o	n the site ty	pical for this	time of yea	r? <u>Ye</u>	<u>s</u> (If no, expl	ain in remarks)		00	& Reed (p			oniferous E	Bog
Are vegetation	No	Soil	No	Hydrology	No	significantly	v disturbed?	Are "normal	Yes	Eggers	& Reed (s	secondary	y):		
								circumstances"	100	Eggers	& Reed (t	ertiary):			
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u>	naturally pr	oblematic?	present?		Eggers	& Reed (a	quaternary	y):		

#### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Hydric soil present? Wetland hydrology present?	<u>Yes</u> <u>Yes</u> Yes	Remarks (explain any answers if needed):	East of Bear Paw field
Is the sampled area within a wetland?		If yes, optional Wetland	Site ID:

	Tree Stratum	(Plot Size:	<u>30 ft radius</u> )	<u>Absolute</u> <u>% Cover</u>	<u>Dominant</u> Species?	<u>Indicator</u> Status *	Dominance Test Worksheet:			
1.	Larix laricina			75	Yes	FACW	Number of Dominant Species That Are OBL, FACW or FAC:	3	(A)	
2.	Picea mariana			15	No	FACW	Total Number of Dominant	_		
3.				0			Species Across All Strata:	4	(B)	
4.				0			Percent of Dominant Species	75.00%	(A/B)	
			Total Cover:	<u>90</u>			That Are OBL, FACW or FAC:	75.00%		
	Sapling/Shrub Stratum	(Plot Size:	<u>15 ft radius</u> )				Prevalence Index Worksheet:			
1.	Cornus sericea ssp. sericea			5	No	FACW	Total % Cover of:		a ha ha a	
2.	Rubus idaeus			10	Yes	FACU	· · · · · · · · · · · · · · · · · · ·		iply by:	
3.	Ledum groenlandicum			30	Yes	OBL	OBL Species	X 1	45	
4.				0			FACW Species 95	X 2	190	
5.				0			FAC Species 0	Х З	0	
			Total Cover:	<u>45</u>			FACU Species 10	X 4	40	
	<u>Herb Stratum</u>	(Plot Size:	<u>5 ft radius</u>				UPL Species 0	X 5	0	
1.	Calamagrostis canadensis			15	Yes	OBL		(A)	275	(B)
2.	Sphagnum sp.			0						
3.				0			Prevalence Index = B	/A =	1.83	
4.				0			Hydrophytic Vegetation Indicators:			
5.				0			Yes Rapid Test for Hydrophy	tic Vocatation		
6.				0			· · · · · · ·	•		
7.				0			Yes Dominance Test is >50%			
8.				0			Yes Prevelance Index ≤ 3.0 [1	-		
	Woody Vine Stratum	(Plot Size:	Total Cover: )	<u>15</u>			No Morphological Adaptation in vegetation remarks or			g data
1.				0			No Problematic Hydrophytic	Vegetation [1]	(Explain)	
2.				0			[1] Indicators of hydric soil & wetland hydr	rology must be pr	resent, unless	
			Total Cover:	<u>0</u>	* In USFWS I	Degion 2	disturbed or problematic.		,	
				-	111 USFW3 1	Region 5	Hydrophytic vegetation present?	Yes		
	narks: lude photo numbers here or	on a separa	te sheet)							

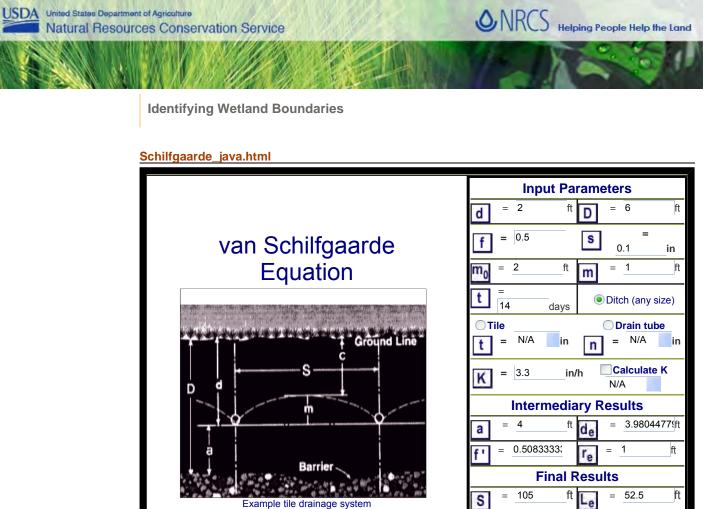
SOIL

Sampling Point: #19 Wetland East of N09

Profile Description: (Describe to the depth need Depth Matrix	led to document the inc		abscence Features	of indicate	ors).		
(inches) Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.         0 - 10         10yr2/1           2.         10 - 32         10yr2/1           3.         32 - 36         10yr2/1						hemic peat fibric peat hemic peat	
4 5 6 [1] Type: C=Concentration, D=Depletion, RM=R Hydric Soil Indicators: (applicable to all LRRs, t			Grains	[2] Locatio		Lining, M=Matrix. pr Problematic Hydric Sc	
✓ Histosol (A1)	Stripped Matrix				_	ck (A10) (LRR K, L, MLRA	
<ul> <li>✓ Histosol (A1)</li> <li>☐ Histic Epipedon (A2)</li> <li>☐ Black Histic (A3)</li> <li>☐ Hydrogen Sulfide (A4)</li> <li>☐ Stratified Layers (A5)</li> <li>☐ Depleted Below Dark Surface (A11)</li> <li>☐ Thick Dark Surface (A12)</li> <li>☐ Sandy Mucky Mineral (S1)</li> <li>☐ Sandy Gleyed Matrix (S4)</li> <li>☐ Sandy Redox (S5)</li> <li>[3] Indicators of hydrophytic vegetation and wetland</li> <li>Restrictive Layer (if present): Type:</li> <li></li> <li>Remarks: saturated to surface</li> <li>HYDROLOGY</li> </ul>	<ul> <li>Dark Surface (S</li> <li>Polyvalue Belov</li> <li>Thin Dark Surface</li> <li>Loamy Mucky N</li> <li>Loamy Gleyed I</li> <li>Depleted Matrix</li> <li>Redox Dark Sur</li> <li>Depleted Dark Sur</li> <li>Redox Depress</li> </ul>	57) (LRR R, MLRA 149 v Surface (S8) (LRR R, ce (S9) (LRR R, MLR4 lineral (F1) (LRR K, L) Matrix (F2) (F3) face (F6) Surface (F7) ions (F8)	, MLRA 148 A 149B) r problemat		Coast Pri 5 cm Mui Dark Sur Polyvalue Thin Darl Iron-Man Piedmon Mesic Sp Red Pare	ck (A10) (LRR K, L, MLRA airie Redox (A16) (LRR K, cky Peat or Peat (S3) (LRI face (S7) (LRR K, L) e Below Surface (S8) (LRI k Surface (S9) (LRR K, L) ganese Masses (F12) (LR t Floodplain Soils (F19) (N rodic (TA6) (MLRA 144A, ent Material (TF2) illow Dark Surface (TF12) <b>ydric soil present?</b>	L, R) R K, L, R) R K, L) PR K, L, R) MLRA 149B)
Wetland Hydrology Indicators:							
Primary Indicators (minimum of one required; cl	heck all that apply)			Secor	dary Indicate	ors (minimum of two req	uired)
<ul> <li>Surface Water (A1)</li> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> <li>Drift Deposits (B3)</li> <li>Algal Mat or Crust (B4)</li> <li>Iron Deposits (B5)</li> <li>Inundation Visible on Aerial Imagery (B7)</li> <li>Sparsely Vegetated Concave Surface (B8)</li> </ul>	Aquatic Fat Marl Depos Hydrogen S Oxidized Ri (where not Presence o Recent Iror	its (B15) Sulfide Odor (C1) nizospheres on Living F		DI Ma DI CI Sa St St		ns (B10) s (B16) ter Table (C2) s (C8) le on Aerial Imagery (C9) sed Plants (D1) sition (D2) d (D3)	FAC-Neutral Test (D5)
Field Observations:					14/- 4/-	- d harden la ma anno	N
Surface water present? Water table present? Saturation present? (includes capillary fringe) Recorded Data: Aerial Photo Monito Hydrology Remarks: Saturated to surface	Water Table	er Depth (inches): Depth (inches): epth (inches): Gauge	0 us Inspecti	ions		nd hydrology present? ibe Recorded Data:	Yes
Tyurology Remarks. Oddraida to sundae							

# Appendix D

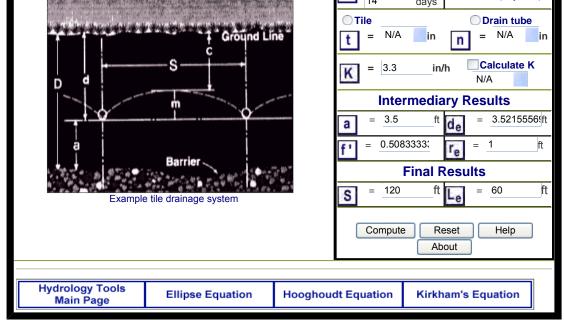
**Ditch Lateral Effect Calculations** 



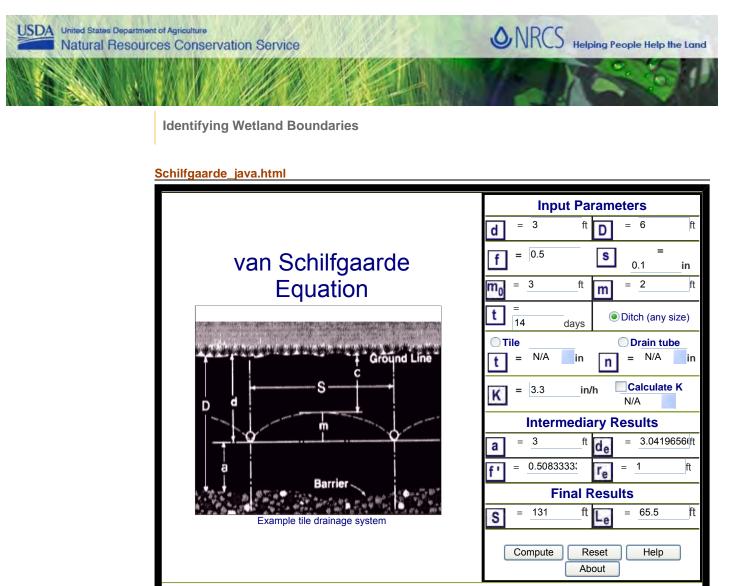
		Comput	e Reset Help
Hydrology Tools Main Page	Ellipse Equation	Hooghoudt Equation	Kirkham's Equation
		•	•

User Name : null	Notes
Reset Name	Greenwood soils, 2 ft deep ditch
Session # : 2	
Time: 13:08	
Date:	
11//index.html16//index.html2011	



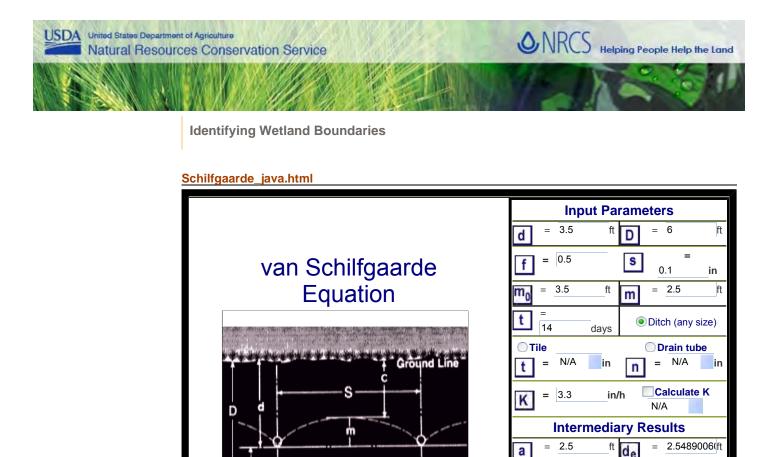


User Name : null	Notes
Session # : 2	Greenwood soils, 2.5 ft deep ditch
Time: 13:08	
Date:	
11//index.html16//index.html2011	



Hydrology Tools<br/>Main PageEllipse EquationHooghoudt EquationKirkham's Equation

User Name : null	Notes
Reset Name	Greenwood soils, 3 ft deep ditch
Session # : 2	
Time: 13:08	
Date:	
11//index.html16//index.html2011	



Barrier

**Ellipse Equation** 

Example tile drainage system

Hydrology Tools Main Page

User Name : null	Notes
Reset Name	Greenwood soils, 3.5 ft deep ditch
Session # : 2	Greenwood sorrs, 3.5 it deep ditten
Time: 13:08	
Date:	
11//index.html16//index.html2011	

0.50833333

=

S

**Hooghoudt Equation** 

= 140

Compute

Last Modified: 10/28/2011

ft

ft

= 1

= 70

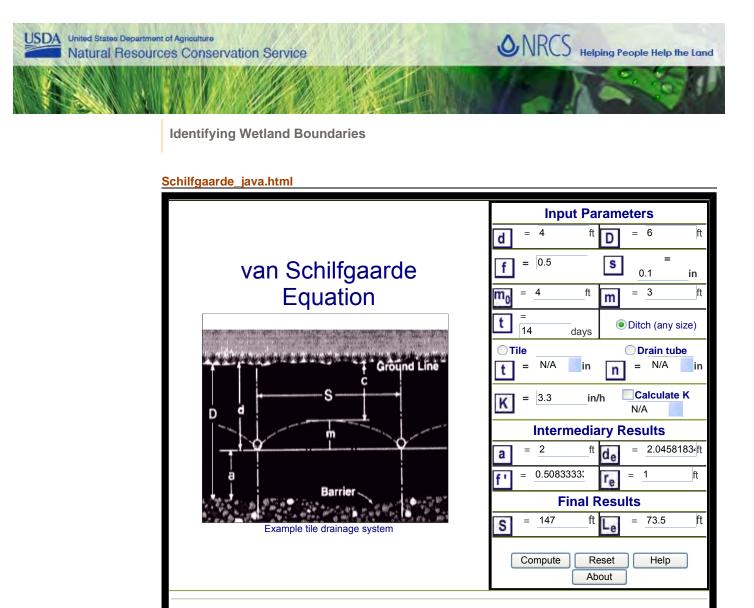
Help

Final Results

Reset

About

Kirkham's Equation

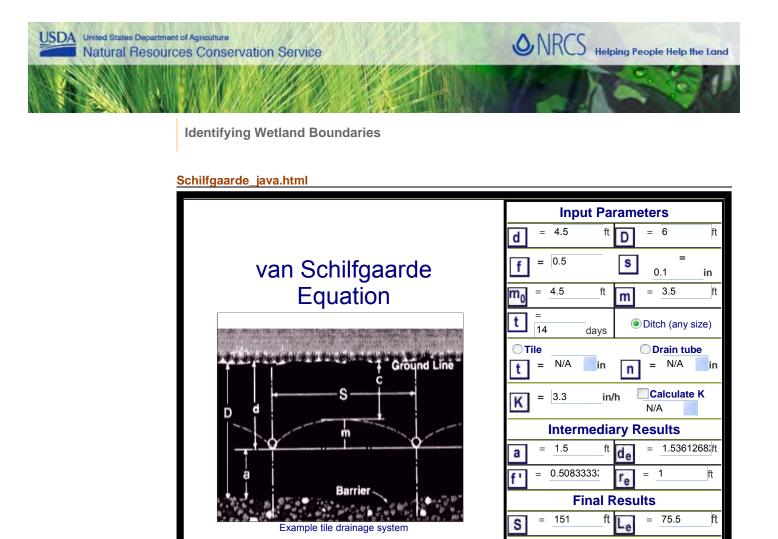


 Hydrology Tools Main Page
 Ellipse Equation
 Hooghoudt Equation
 Kirkham's Equation

 User Name : null
 Notes

Reset Name	
Session # : 2	Greenwood soils, 4 ft deep ditch
Time: 13:08	
Date:	
11//index.html16//index.html2011	



Hydrology Tools Main Page	Ellipse Equation	Hoogho	oudt Equation	Kirkham's Equation	
					,
User Name : null Reset Name		<b>Notes</b> Greenwood soils, 4.5 ft deep ditch			
Session # : 2					
Time: 13:08					
Date:					
11//index.html16//index.html2011					

Compute

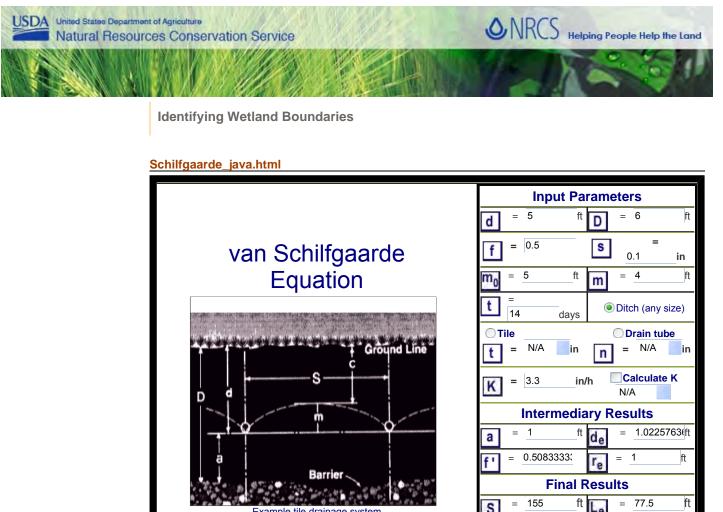
Reset

About

Last Modified: 10/28/2011

Help

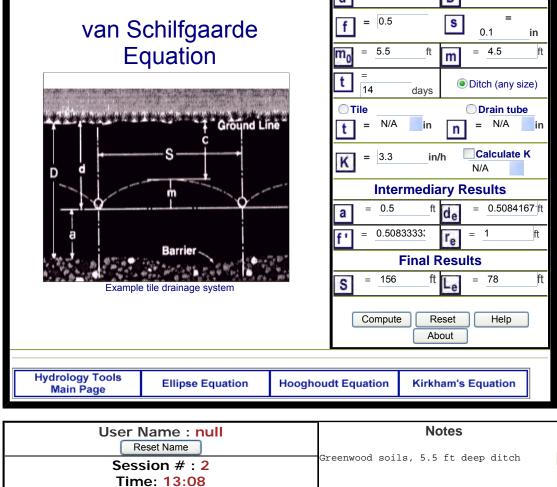
Hydrology Tools



		Compute	About Help	
Hydrology Tools Main Page Ellipse Equation	Hooghoudt Eq	uation	Kirkham's Equation	١

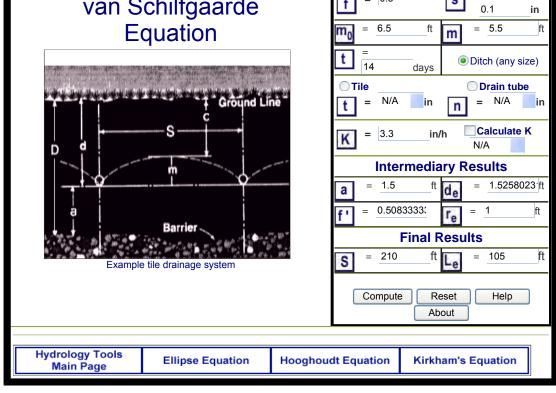
User Name : null	Notes
Reset Name	Gueenwood apila E ft door ditab
Session # : 2	Greenwood soils, 5 ft deep ditch
Time: 13:08	
Date:	
11//index.html16//index.html2011	



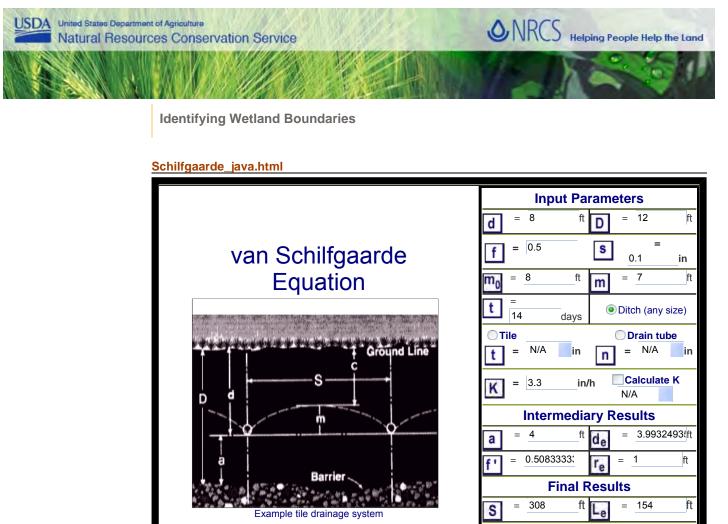


Date: 11../../index.html16../../index.html2011



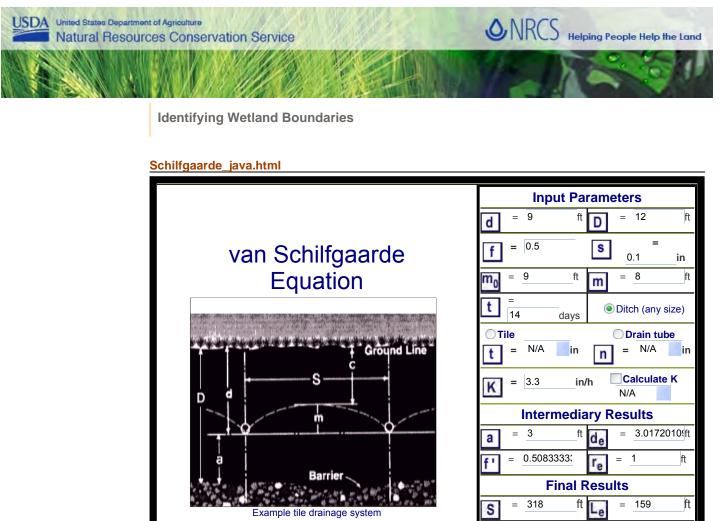


User Name : null	Notes
Reset Name	Greenwood soils, 6.5 ft deep ditch
Session # : 2	
Time: 13:08	
Date:	
11//index.html16//index.html2011	



			Compute	e Reset Help About	
Hydrology Tools Main Page	Ellipse Equation	Hooghoud	t Equation	Kirkham's Equation	

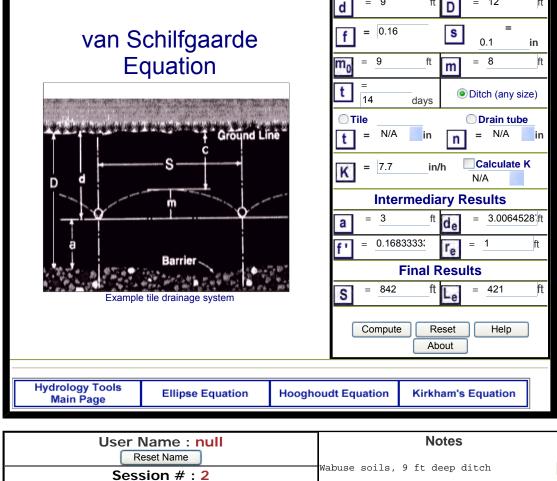
User Name : null	Notes		
Reset Name	Greenwood soils, 8 ft deep ditch		
Session # : 2			
Time: 13:08			
Date:			
11//index.html16//index.html2011			



			Compute	e Reset Help About	
Hydrology Tools Main Page	Ellipse Equation	Hooghoud	dt Equation	Kirkham's Equation	

User Name : null	Notes		
Reset Name	Greenwood acila 0 ft door ditch		
Session # : 2	Greenwood soils, 9 ft deep ditch		
Time: 13:08			
Date:			
11//index.html16//index.html2011			





Date: 11../../index.html16../../index.html2011

Time: 13:08