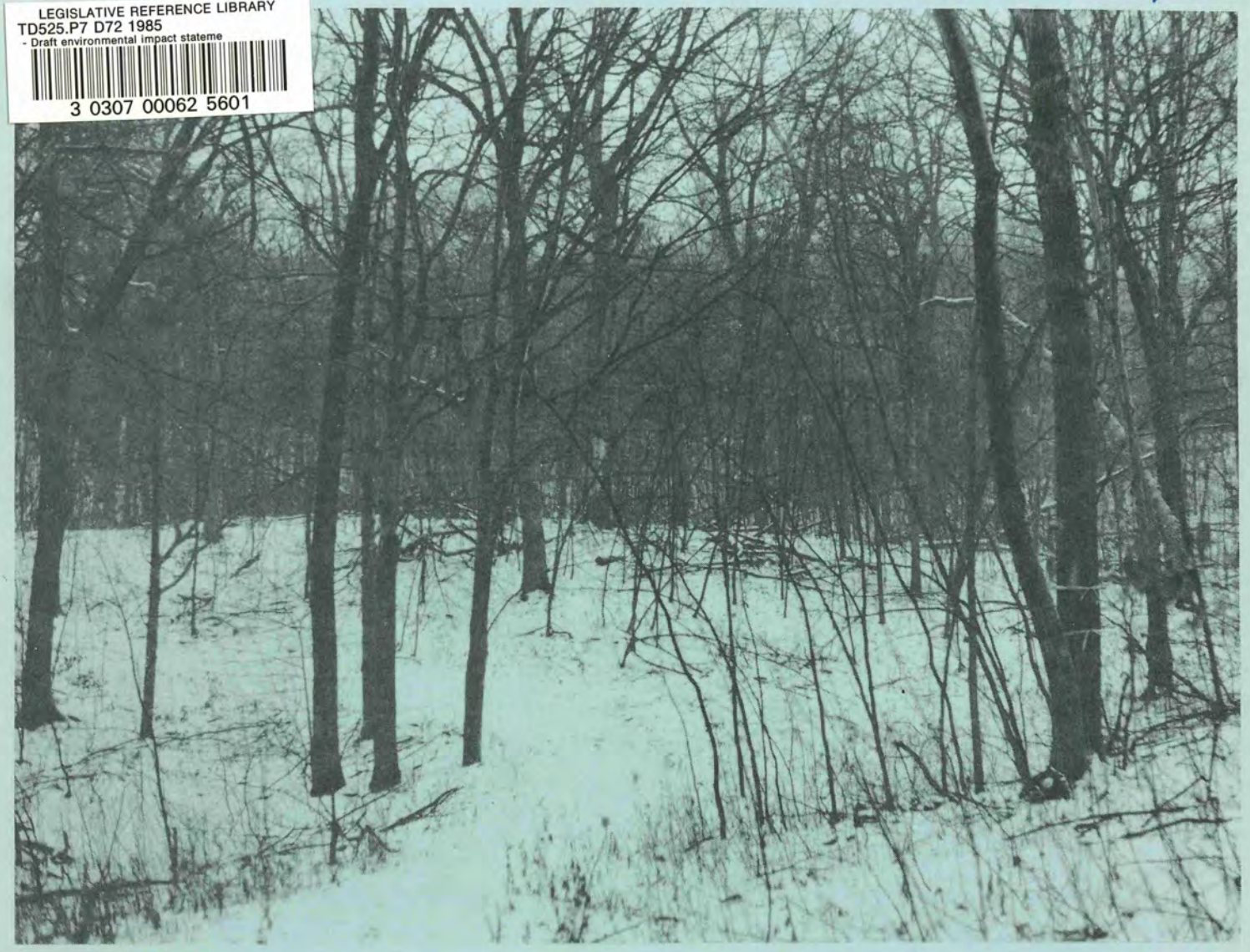
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Environmental Impact Statement
Prior Lake Northshore Trunk Sewer

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Minnesota Pollution Control Agency

Draft Environmental Impact Statement
Prior Lake North Shore Trunk Sewer

Prepared By:
Minnesota Pollution Control Agency

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Abstract:

This Draft EIS documents the analysis of potential impacts associated with the proposed construction of a trunk sewer, watermain, stormsewer and minor street improvements along or in the general vicinity of the North Shore of Lower Prior Lake. The proposed facilities are to provide sewer and water service to a 326 acre service area presently lacking those services. The environmental consequences of four build alternatives and a no-build alternative are evaluated so that the appropriate alternative may be selected.

Public Meeting: April 2, 1985
Prior Lake City Hall
4629 Dakota Street S.E.
Prior Lake, Minnesota 55372
Open House 5:00 - 7:00 P.M.
Public Comments 7:00 P.M.

Comment Deadline: April 16, 1985

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SUMMARY

This Draft Environmental Impact Statement (EIS) for the Prior Lake North Shore Trunk Sewer project has been prepared by the staff of the Minnesota Pollution Control Agency (MPCA), with the assistance of an environmental/engineering consulting firm, BRW, Incorporated. Environmental review of the project began in March, 1984, with the preparation and distribution of an Environmental Assessment Worksheet (EAW) on the project. Following its consideration of the EAW, the MPCA Board ordered, on May 22, 1984, that an EIS be prepared. This draft EIS complies with the Rules of the Minnesota Environmental Review Program.

1.0 DESCRIPTION OF THE PROPOSED PROJECT

The City of Prior Lake proposes to construct a wastewater trunk sewer and tributary lateral sewers along the North Shore of Lower Prior Lake. In a related action, a trunk watermain is proposed to be constructed parallel to the trunk sewer and some existing roads disturbed by construction would be paved and provided with curb and gutter and storm sewer. The design flow of the proposed trunk sewer would be approximately 0.9 MGD (million gallons per day). The trunk line would discharge to an existing Metropolitan Waste Control Commission (MWCC) interceptor sewer (MSB 7020) at County Highway 21. Wastewater would ultimately be treated at the MWCC Blue Lake Treatment Facility.

The trunk sewer project would enable the abandonment of an existing wastewater lift station, at the east end of Manitou Road by rerouting the existing flows by gravity to the proposed trunk sewer. This alteration would result in decreases in operation and maintenance costs, and increased system reliability. The project would further enable gravity wastewater collection capacity for future planned development, including the Sand Pointe 3rd and 4th Additions located on the east side of the project area. Capacity would also be available for future developments, presently unplanned, within the project area (Figure 2-3).

2.0 ENVIRONMENTAL AND ECONOMIC IMPACTS

The issues and concerns related to the project were raised by the general public and governmental agencies during development of the Scoping Decision Document. The issues that were incorporated into the adopted Scoping Decision Document are as follows:

- Economic Impacts
- Impacts on Vegetation and Wildlife Habitat
- Impacts on Water Quality
- Impacts on Archaeological and Historic Resources

These issues are explored in detail in the EIS and summarized below.

2.1 ECONOMIC IMPACTS

A hypothetical typical lot (0.3 acres) assessment for the proposed project was estimated at $4,100, with a typical large parcel (10 acres) assessment estimated at $79,290. Analogous assessments for the respective alternatives ranged between $2,700 and $3,550 for the small lot and $51,945 and $68,775 for the large lot. The capital costs (and consequently) the assessments associated with the

proposed project and alternative #3 were higher than capital costs and assessments associated with alternatives #1 and #2, which included the use of lift stations to minimize depths of excavation. The increased costs of lift station operation and maintenance are not reflected in capital costs or assessments. When the alternatives were compared on the basis of total equivalent uniform annual disbursement to reflect operations, maintenance, and financing costs, they were roughly comparable with the exception of alternative 1, the service area of which did not include the Beach Street and Meadowlawn portions of the project area. Economic impacts of the no-build alternative were not comparable to those of the build alternatives.

2.2 IMPACTS ON VEGETATION AND WILDLIFE

The "Big Woods" remnant located in the vicinity of Chatonka Beach was evaluated by the Minnesota Department of Natural Resources staff and by an independent investigator. It was determined that the remnant has been degraded by grazing, harvesting, and Dutch Elm disease, and is not a "Big Woods" remnant of statewide or regional significance.

Certain woodlands in the project area would be affected by any of the build alternatives. Construction would result in open corridors in wooded areas and losses of trees. Trees near residential homes would also be lost as a result of construction. It is possible to minimize tree loss to some extent by using special construction techniques to reduce the width of the construction trench and/or by jacking the pipe through high hills rather than creating an open trench. Also, tree loss may be mitigated by using nursury stock to replant areas where trees were removed.

Direct impacts on wildlife as a result of the build alternatives are limited to the construction period and are of relatively short duration. Some minor benefits would result from the corridor openings by introducing habitat diversity within the wooded areas. Some minor changes in wildlife species composition would occur as a result of implementing a build alternative. Long term indirect impacts on wildlife populations would result from development in the project area. Wildlife populations presently characterized by woodland and agricultural land species would be replaced by species more tolerant of urban habitats.

2.3 WATER QUALITY IMPACTS

It was not possible to quantify positive impacts of the proposed alternative on water quality, and those impacts appear to be relatively small from a qualitative stand point. The major impacts on water quality of Lower Prior Lake were associated with non-piont phosphorus inputs. Development associated with any of the alternatives has the potential to result in increased phosphorus loading to the lake from stormwater runoff. It appears likely that stormwater runoff is now and will continue to be the most significant source of phosphorus input to Lower Prior Lake.

2.4 IMPACTS ON HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Impacts on archaeological resources are unlikely. No sites were found in the project area during an archaeological survey of a suspected site.

3.0 ALTERNATIVE ACTIONS

The draft EIS contains an evaluation of four alternatives to the original proposal, including no-build. They are as follows:

- No-build: Subsequent development would occur at densities supportable by on-site sewage treatment and individual wells.

#1 Pike Lake Trail-Carriage Hill Road Alignment: Wastewater would be collected from Shore Trail, Pine Drive, and part of Sand Pointe. Sewer and water would be linked between Carriage Hill Road and Pike Lake Trail at CSAH 42.

#2 Pike Lake Trail-Carriage Hill Road-Chatonka Beach Alignment: Same as #1, except that Chatonka Beach and Meadowlawn would also be served.

#3 The same area as Alternative #2 would be served by gravity, and watermain would be linked to the west end of the project area by the originally proposed alignment.

1.0 PROJECT DESCRIPTION

1.1 BACKGROUND

1.1.1 Project History

In the mid-1970's, the City of Prior Lake and their consulting engineer, Orr-Schelen-Mayeron and Associates, Inc., began studying the need for replacing the on-site water and sewer along the North shore of lower Prior Lake with public sewer and water. Several alternatives were presented to the City staff and the City Council. The objective of these alternatives was to provide trunk sewer service for developed areas as well as those areas expected to develop in the future. The trunk sewer would connect with the Metropolitan Waste Control Commission interceptor sewer and sewage treatment would take place at the Blue Lake Sewage Treatment Plant. Concurrent with the development of the trunk sewer line, it was also proposed to install a looped water system in order to increase water pressure in the northeast portion of the city water supply system. At one time in the late 1970's, some contamination of the water supply occurred and a boil order was issued by the State Department of Health for the public water supply system. A study performed subsequently concluded that a looped water system would foster the maintenance of adequate water pressure, thereby reducing the chance of water system contamination.

The City and their consulting engineers continued to study and evaluate the trunk sewer alignment alternatives and eventually selected an alignment which paralleled the North Shore of Lower Prior Lake and would connect with the interceptor sewer near the junction of Manitou Road and County Road 21. This alternative included a 15" trunk sewer, related watermain construction to complete the watermain loop around Prior Lake, some road and street improvements, and a stormwater collection and management system. It was this alternative that the City proposed to construct and which became the subject of environmental review. An Environmental Assessment Worksheet (EAW) was prepared and distributed in March of 1984. Following its consideration of the EAW, the Minnesota Pollution Control Agency (MPCA) Board found that the project had the potential for significant environmental effects, and offered, on May 22, 1984, that an Environmental Impact Statement (EIS) be prepared.

1.1.2 Purpose of the Environmental Impact Statement

It has been recognized by the legislature of the State of Minnesota, as articulated in the Minnesota Environmental Policy Act (MEPA), that the maintenance of the quality of our environment is critical to human welfare, and that human activities have the potential for significant impact upon the environment. The purpose of environmental review in general and the environmental impact statement specifically is to enhance understanding of the impact a given project will have upon the environment. It is hoped that the project proposer, other governmental decision-makers, and the public will be provided with useful information on the impacts of the project and mitigative measures which address those impacts.

It is not the intent of the EIS to justify or recommend a specific alignment for the project, or to justify approval or disapproval of the project. Rather, the EIS is to be utilized by permitting agencies and the City of Prior Lake, the project proposer, in making their decisions. It is hoped that adverse environmental effects can thus be avoided or minimized.

1.1.3 Issues of the EIS

To insure that the significant issues associated with a particular project are evaluated in an EIS, Minnesota Rules Part 4410.2100 require that the scope of issues to be evaluated be defined. Defining the scope also reduces the bulk of an EIS by limiting analysis to only those issues that are relevant to the project at hand and by delineating the level of detail that is appropriate for each issue.

The scoping decision is intended to serve as a basis for the determination of adequacy of the EIS. Following a public scoping meeting on July 2, 1984, and a public comment period ending July 6, 1984, the MPCA Board approved the Scoping Decision Document on August 28, 1984.

The major elements ennumerated in the Scoping Decision Document included a description of the project originally proposed by the City of Prior Lake, including related utility construction, and construction methods, impacts, and associated mitigation. The Scoping Decision Document also indicated that a similar analysis of the following alternatives would be performed.

- The original "North Shore" route.
- Alternative 1, the "Pike Lake Trail" alignment, which would not include sewer service in the area of Chatonka Beach and Meadow Lawn.
- Alternative 2, the Pike Lake Trail-Meadow Lawn-Chatonka Beach alignment.
- The No-build alternative
- A third alternative, #3, was developed during the preparation of the EIS.

The impact areas identified in the Scoping Decision Document as requiring evaluation were economic impacts, impacts on vegetation and water quality, and impacts on suspected archeological resources. It was indicated that mitigative measures would be addressed as well.

Areas listed specifically as not within the scope of the EIS included:

- Air quality
- Energy
- Noise
- Transportation
- Solid waste
- Employment
- Sociological aspects
- Treatment plant and receiving interceptor capacity
- Impacts upon prime farmland

The alternative alignment which would follow the proposed extension of Carriage Hill Road to CSAH 21 was specifically excluded from the scope of the EIS.

1.2 GOVERNMENTAL APPROVALS REQUIRED

Five state, regional, county, or local permits or approvals were identified in the EAW as required for construction of the North Shore Trunk Sewer. No federal approvals are necessary. These approvals, their current status and relevant comments are presented in Table 1-1.

TABLE 1-1

Permit	Status	Comments
State		
Minnesota Pollution Control Agency Sewer Extension Permit	Pending	For construction of trunk sewer.
Minnesota Department of Health Watermain Extension Permit	Pending	Water supply system plan approval.
Minnesota Department of Natural Resources Public Waters Permit	Pending	For construction of storm-water outlets.
Regional		
Metropolitan Waste Control Commission Sewer Extension and Connection Permit	Pending	Coordination procedure with MWCC and connection approval.
County		
Scott Soil and Water Conservation District Erosion Control Plan	Pending	-
Local		
Prior Lake City Council Project Approval	Pending	-
Prior Lake/Spring Lake Watershed District	Pending	Plan review.

1.3 PROJECT AREA LOCATION AND DESCRIPTION

Figure 1-1 shows the location of the project in a regional context. The project area is in the City of Prior Lake and is located within Scott County in the southwestern quadrant of the seven county metropolitan area. The general details of the site are shown in Figure 1-2, the U.S.G.S. map. The site is located in a developing part of the City of Prior Lake located north of Lower Prior Lake and south of County State Aid Highway 42. (Figure 1-3.)

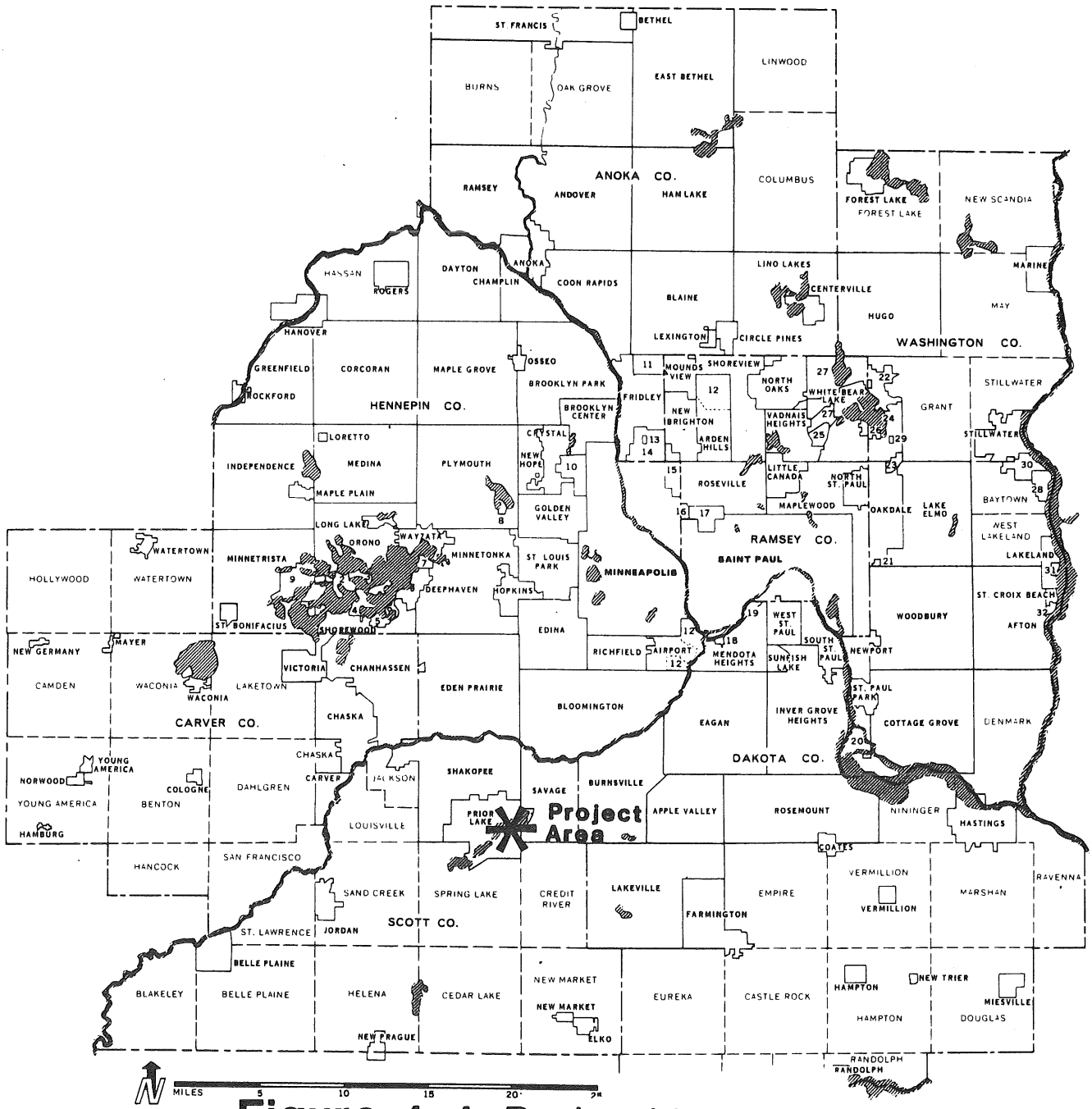
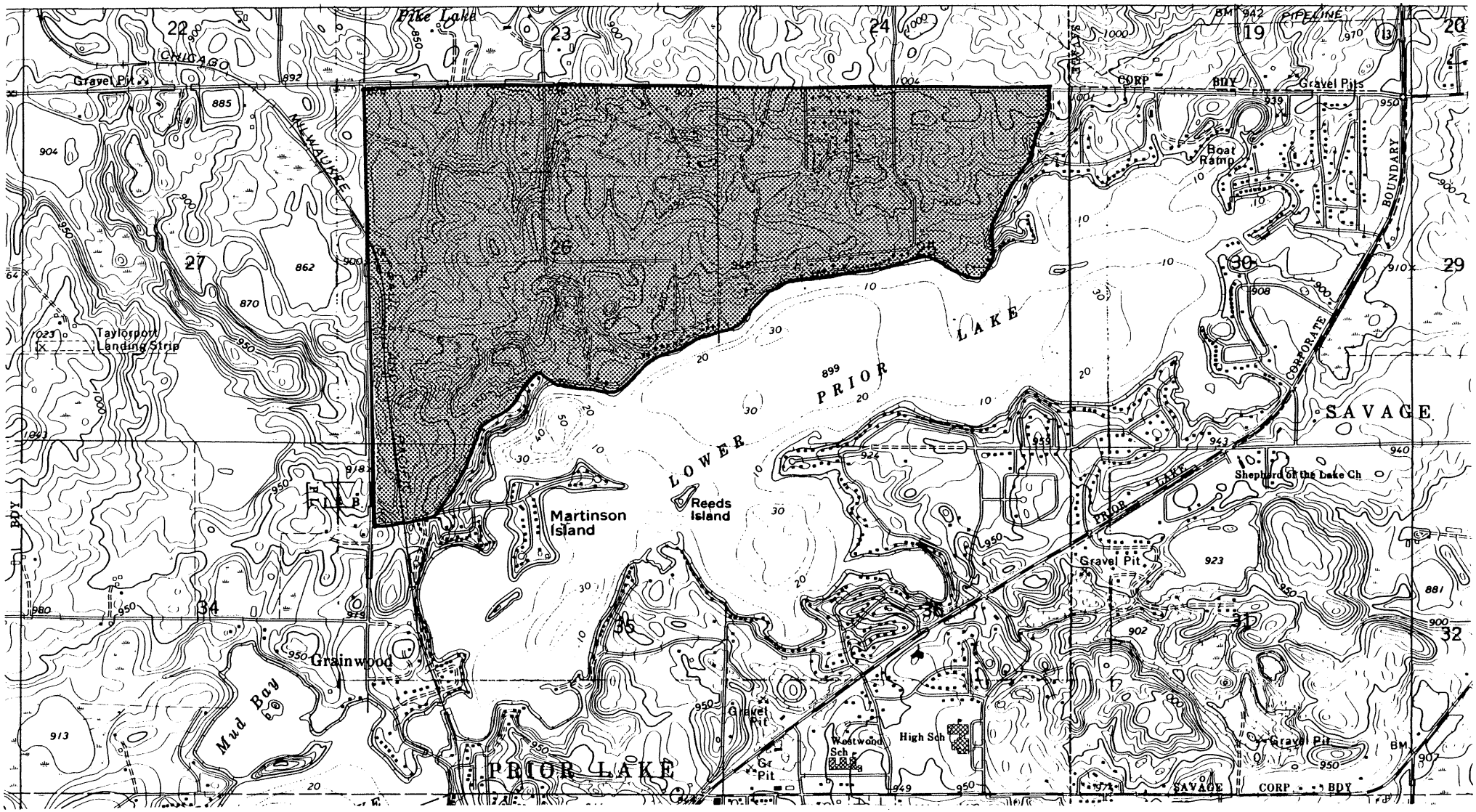


Figure 1-1: Regional Location

Prior Lake Northshore Trunk Sewer EIS

MPCA

——— County Boundary
——— Municipal Boundary
- - - - - - Township Boundary



MPCA

Figure 1-2: USGS Map

Prior Lake Northshore Trunk Sewer EIS

0 1000 2000

NORTH

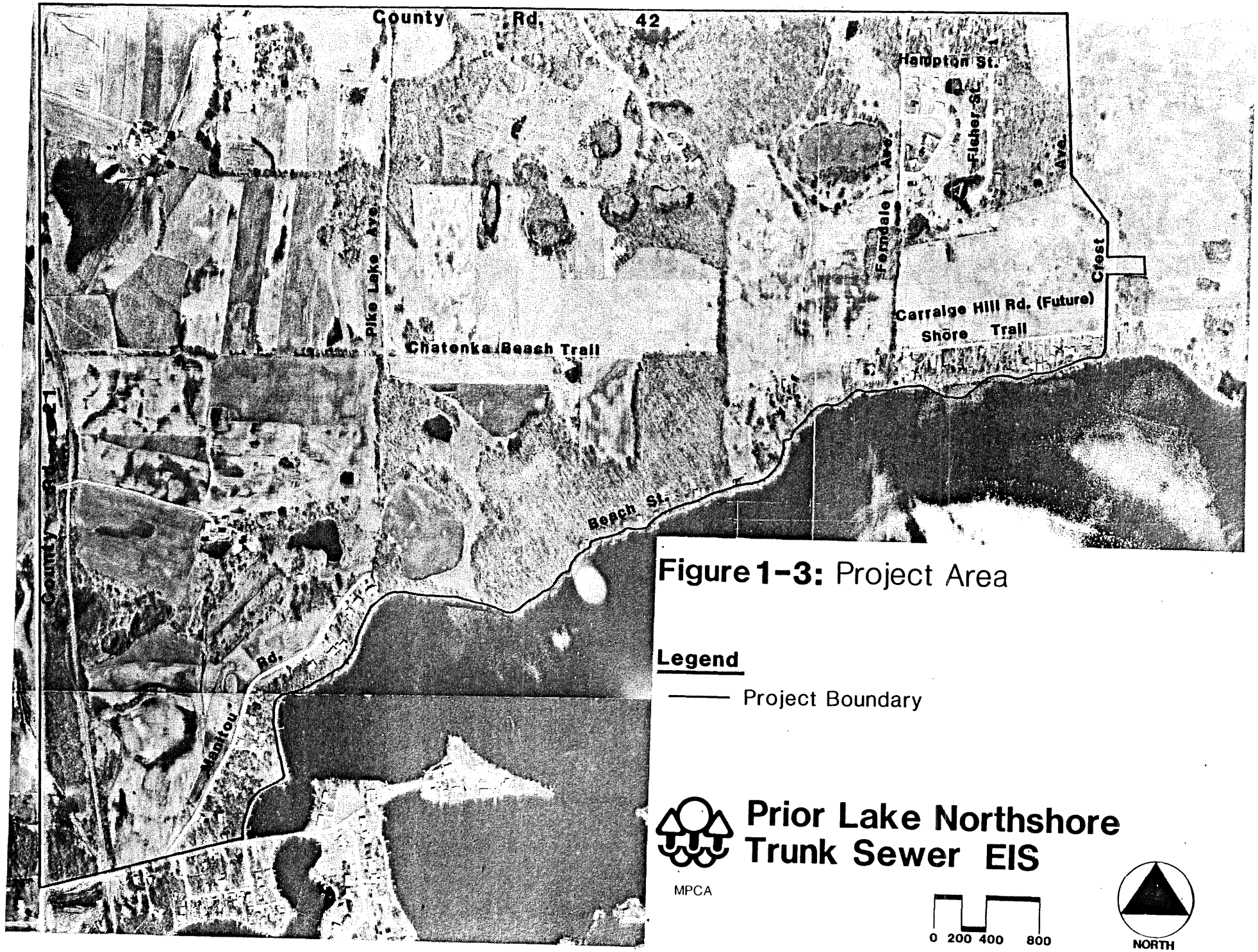


Figure 1-3: Project Area

1.4 PROJECT TIMING

Preparation of the EIS is expected to be completed in late April of 1985. The EIS will be presented to the MPCA on May 28, 1985 for determination of adequacy. If that determination is favorable, and if the City of Prior Lake so authorizes, construction of the project could commence in the late summer of 1985 and extend until 1986.

2.0 PROJECT AREA DESCRIPTION

2.1 EXISTING LAND USE AND ZONING

2.1.1 Land Use

The study area contains two principle existing land uses: agriculture and single family housing. The farmland is productive and has few constraints to agricultural use. The northwestern sector of the study area contains a high percentage of prime farmland and farmland of statewide significance. This sector is, however, a small portion of the quality farmland which extends both to the west and north of the project area. Farmland is an important economic base for the region and is encouraged to remain in agricultural use by City of Prior Lake policy.

Single Family Residential land use along the lakeshore in the study area is largely the result of platting prior to 1950. Small lots in single rows along Prior Lake's north shore form the bulk of single family land use. Several single family developments have been platted and developed more recently along County Road 42, primarily at the eastern boundary of the North Shore neighborhood. The North Shore neighborhood is only about 6 percent developed according to Prior Lake's Comprehensive Plan.

Land ownership in the project area for the larger parcels is shown in Figure 2-1.

2.1.2 Zoning

Zoning within the study area is divided into four categories which are shown in Figure 2-2. R-1, Urban Residential, comprises the largest land area and establishes land for single family dwellings. The western protion of the project area is zoned I-1, Special Industrial. This Land is defined in the Comprehensive Plan as an industrial land reserve for long-term growth opportunities. Permitted uses are research and testing laboratories and offices developed within a planned landscape setting.

Cutting through both the industrial and residential zones are C-1 Conservation zones. Although single family dwellings are permitted, this land is intended to remain in a natural, undeveloped condition. At the study area's eastern boundary, a platted PUD district contains land for additional single family development.

Although allowable residential densities for PUD zones are somewhat higher than non-PUD zones, the low density prescribed in R-1 zones is predominant and allows up to 4 dwelling units per acre.

In addition to the city's standard zoning requirements, Figure 2-3 shows the tracts of farmland within the study area which are designated "Green Acres."

This classification has been requested by the land owners and defers payment of assessments for utilities until the land is sold or changes from agricultural use. (Telephone Conversation with Scott County Assessor's Office 1-10-85)

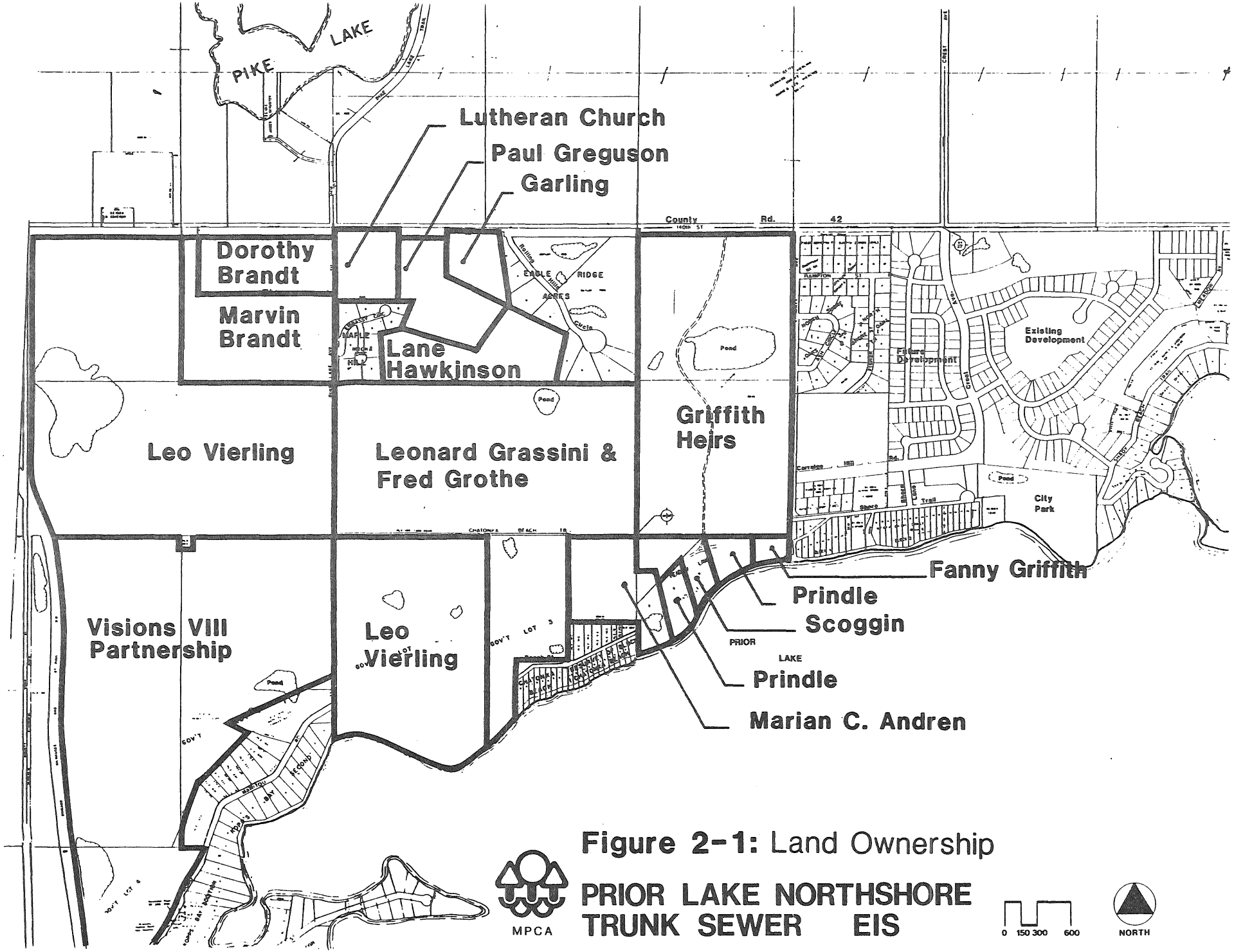


Figure 2-1: Land Ownership

PRIOR LAKE NORTHSHORE TRUNK SEWER EIS

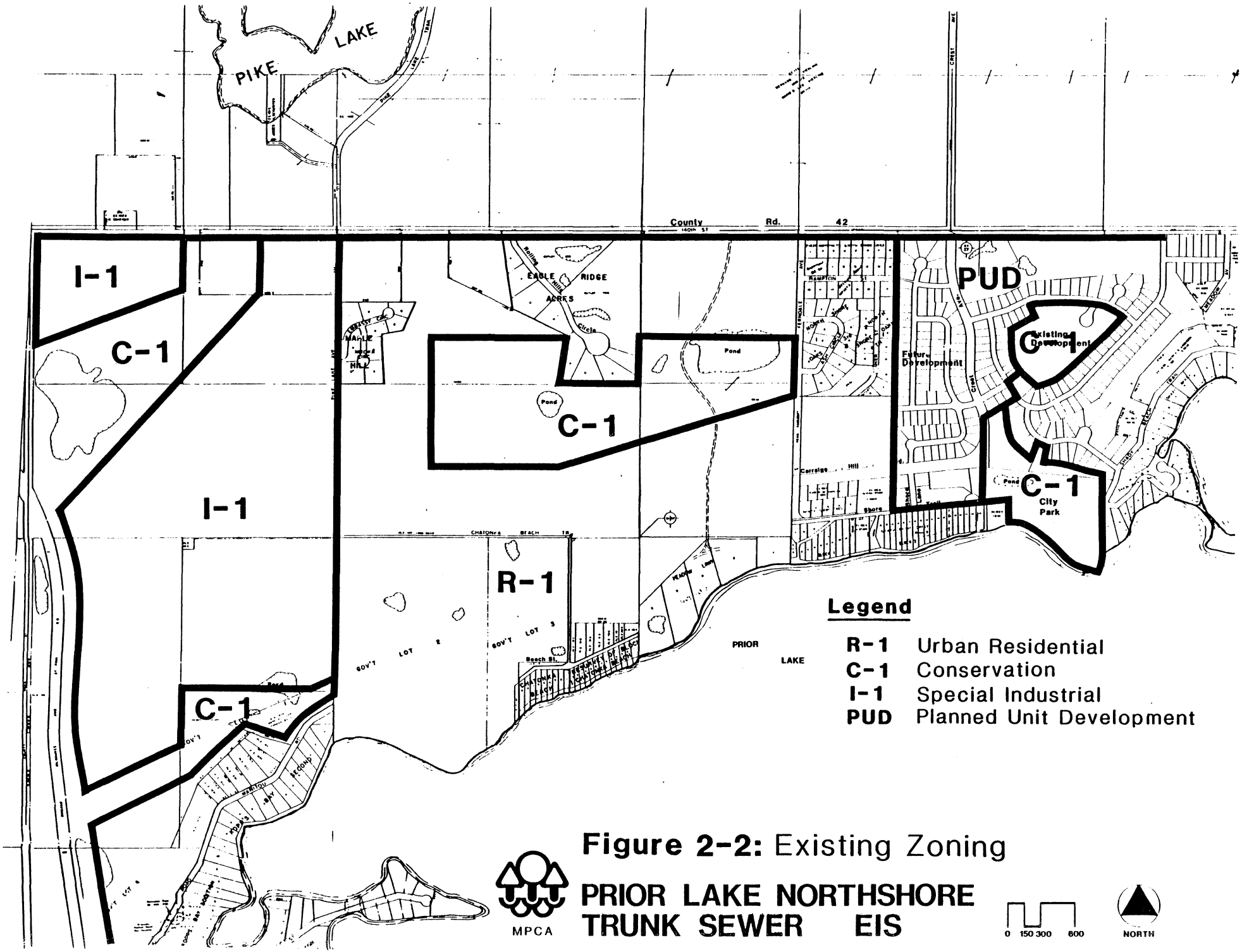


Figure 2-2: Existing Zoning

PRIOR LAKE NORTHSHORE TRUNK SEWER EIS

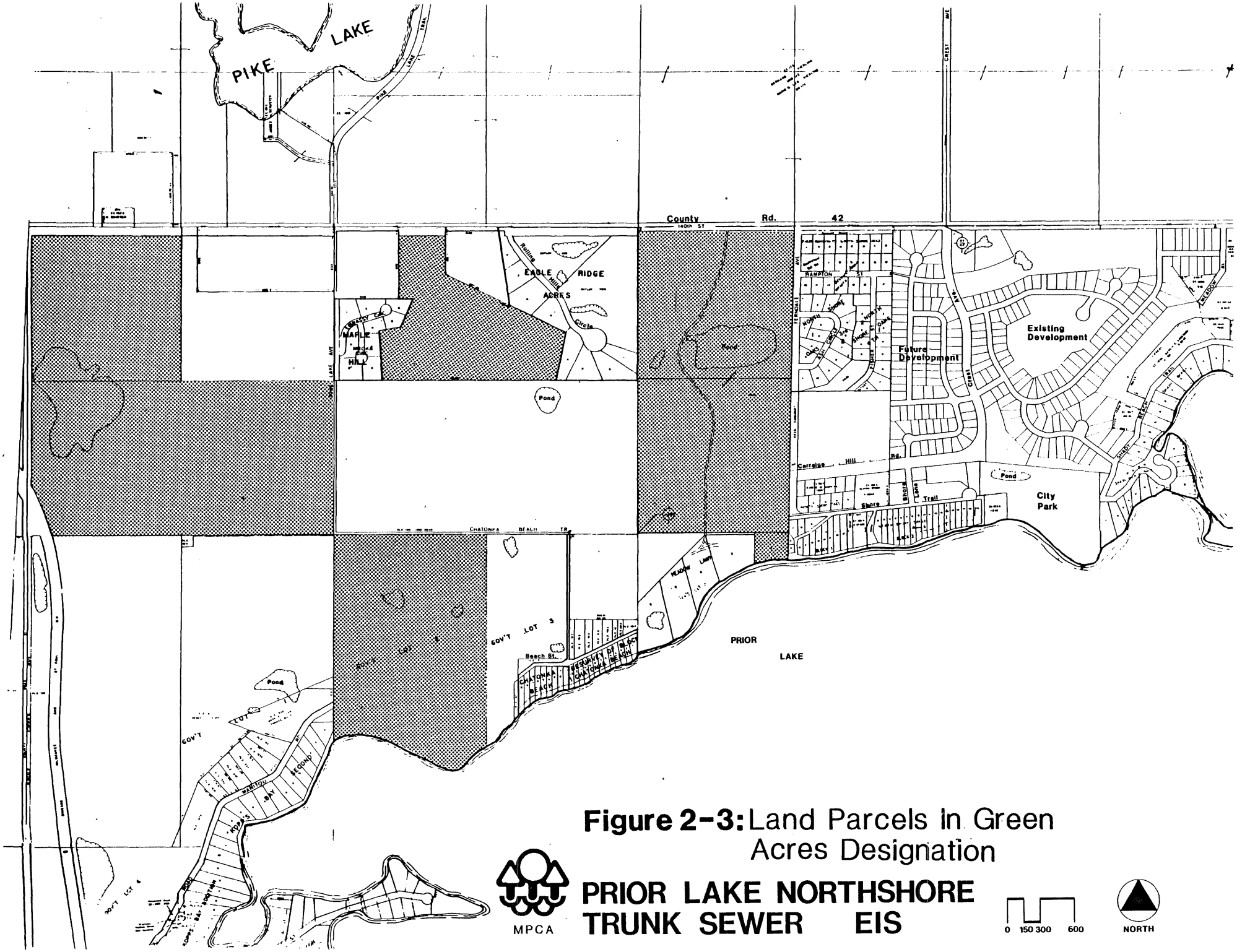


Figure 2-3: Land Parcels in Green Acres Designation

PRIOR LAKE NORTHSHORE TRUNK SEWER EIS

In order for land to be designated for Green Acres classification, it must meet several requirements. The land parcel must exceed 10 acres in size and be in agricultural use, producing an agricultural income. The land must be homesteaded or farmed in relationship to a homestead. Land remote from a farmstead can be designated Green Acres as long as it is within 12 miles from the farmstead. To qualify, land must have been owned by the farm operator for 7 years prior to request for Green Acres designation.

Special assessments, such as those for sewer and water improvements, are deferred from Green Acres land for as long as the land qualifies. Interest charges are applied to deferred special assessment costs through the entire life of the Green Acres designation and up to 90 days following the removal of the Green Acres designation. If deferred special assessments and accrued interest charges are not paid within 90 days of official notice to develop the land, the special assessments plus a 10 percent penalty are placed on the tax list for the current year by the county auditor. The Green Acres designation is automatically removed from the land if the current owner changes the land use or if the land is sold to a new owner.

2.1.3 Planned Land Use

Proposed land use within the study area is defined in the City's Comprehensive Plan. The proposed land uses are directly affected by previous development, existing zoning regulations and the demand for new development generated by additional population. Population and household projections have been made by both the city and by the Metropolitan Council. Table 2-1 shows that Metropolitan Council planners predict lower population growth than that projected by the City of Prior Lake.

TABLE 2 - 1

COMPARISON OF PRIOR LAKE AND METROPOLITAN COUNCIL POPULATION PROJECTIONS

	POPULATION		HOUSEHOLDS	
YEAR	Prior Lake	Met. Council	Prior Lake	Met. Council
1980	7284 (actual)	7284	2257 (actual)	2260
1985	9000		3000	
1990	11,250	10,500	3750	3500
1995	13,500		4500	
2000	15,750	11,600	5250	4000

Prior Lake's Comprehensive Plan is based upon an estimated average increase of 150 dwelling units per year through the year 2000 in order to satisfy residential demand. Using a projected Metropolitan Council household size of 2.9

people, approximately 90 dwelling units/year would be required to satisfy the Metropolitan Council Population growth projection. The difference in these growth rates has an impact on the pace at which undeveloped land within the study area is converted to residential use.

Figure 2-4 depicts planned land use within the project area. The Land Use Plan matches patterns established by the zoning maps, except for the Vierling property which is shown as public open space but is zoned R-1. Following city residential development policy, an area of medium-density housing is planned with direct access onto County Road 42. The remainder of undeveloped land is planned for low density residential development with density limits of 3.5 dwelling units per acre. Also shown in relationship to the low and medium density housing, is a proposed public park of over 50 acres, with frontage on Prior Lake.

Completing the plan, the entire northwest portion of the study area is planned for special industrial use. As stated in the Comprehensive Plan, this area is viewed as a long term land reserve and would remain in agricultural use until a definite development commitment has been made. In addition, over half of this industrial land is currently in Green Acres zoning which would tend to keep it in agriculture.

The Comprehensive Plan has been developed under the assumption that all development will be served by appropriate water and sewer utilities. Thus, any "no build" sewer decision would either require a major revision in the Comprehensive Plan or significant reductions, under current zoning regulations, in the planned residential densities. Industrial development in the northwest sector could be served by laterals extending from County Road 21 or County Road 42, under either a build or no-build decision.

2.2 WATER QUALITY

The water quality of Lower Prior Lake is exceptionally high for a lake in the Twin City Metropolitan area. The water quality of Lower Prior Lake contrasts markedly with that of Upper Prior Lake. During the summer algal "bloom", Upper Prior Lake has approximately 6 times the algal density as Lower Prior Lake. The major reason for the high water quality of Lower Prior Lake is the relatively low inflow of nutrients to the lake.

Numerous researchers have studies lake ecosystems, and have shown that in most lakes, the nutrient limiting algal growth is phosphorus. Jones and Bachmann (1976), showed that the relationship between Chlorphyl$\underline{a}$ and Total Phosphorous for a number of lakes can be approximated by a straight line. This relationship is shown in Figure 2-5. Associated with this line are actual data values collected at Prior Lake by the Metropolitan Council and the Minnesota Pollution Control Agency. If phosphorus is the limiting nutrient in Lower Prior Lake, then any increases or decreases in phosphorus loadings to the lake will affect the water quality.

Lower Prior Lake is unusual in that it has a watershed that is relatively small compared with its surface area. If inflows from Upper Prior Lake are neglected, the ratio of watershed area to water surface area for Lower Prior Lake is 3.44 (2945 acres of watershed divided by 855 acres of lake surface). This contrasts with Upper Prior Lake's ratio of 9.58 (not counting drainage from Fish Lake).

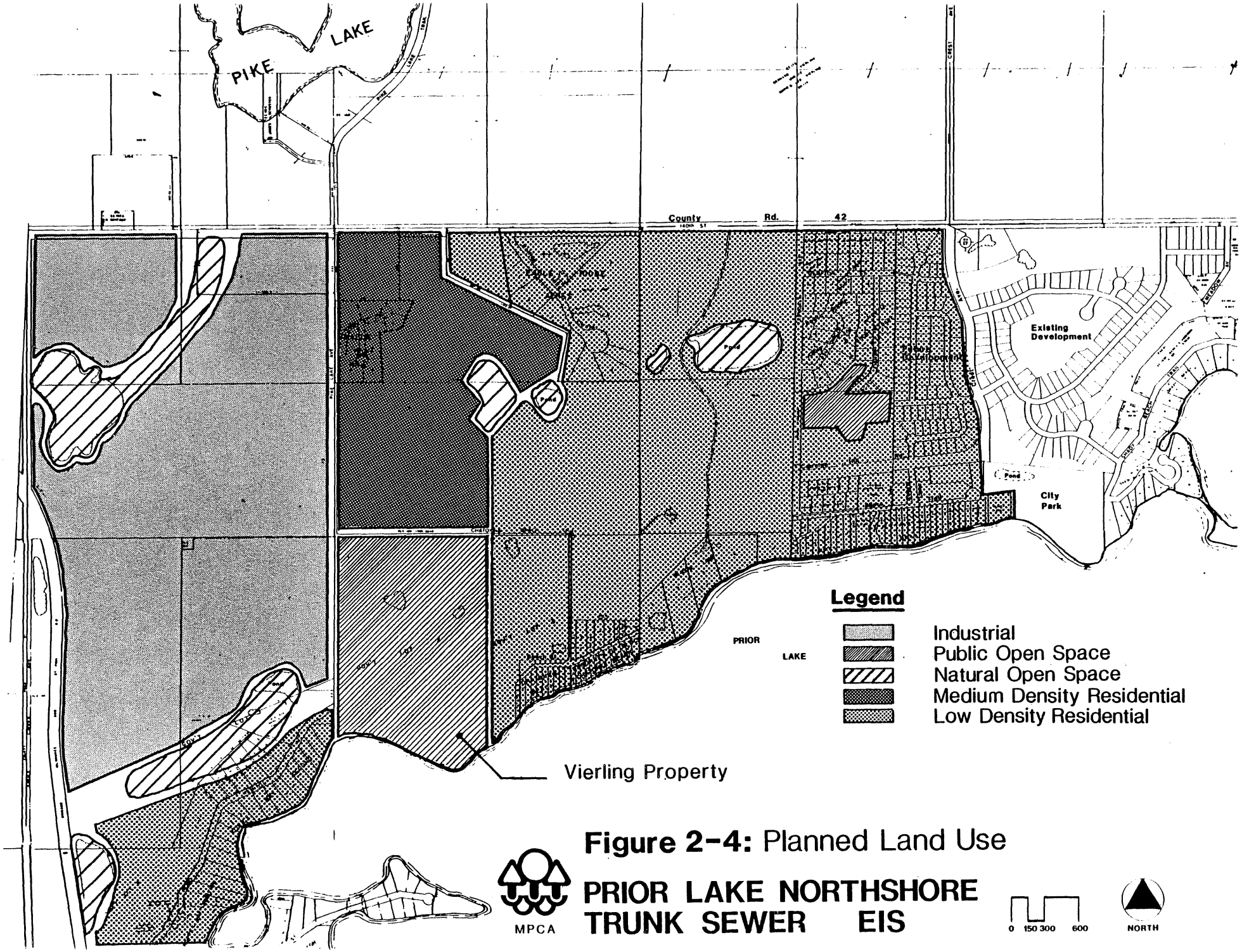
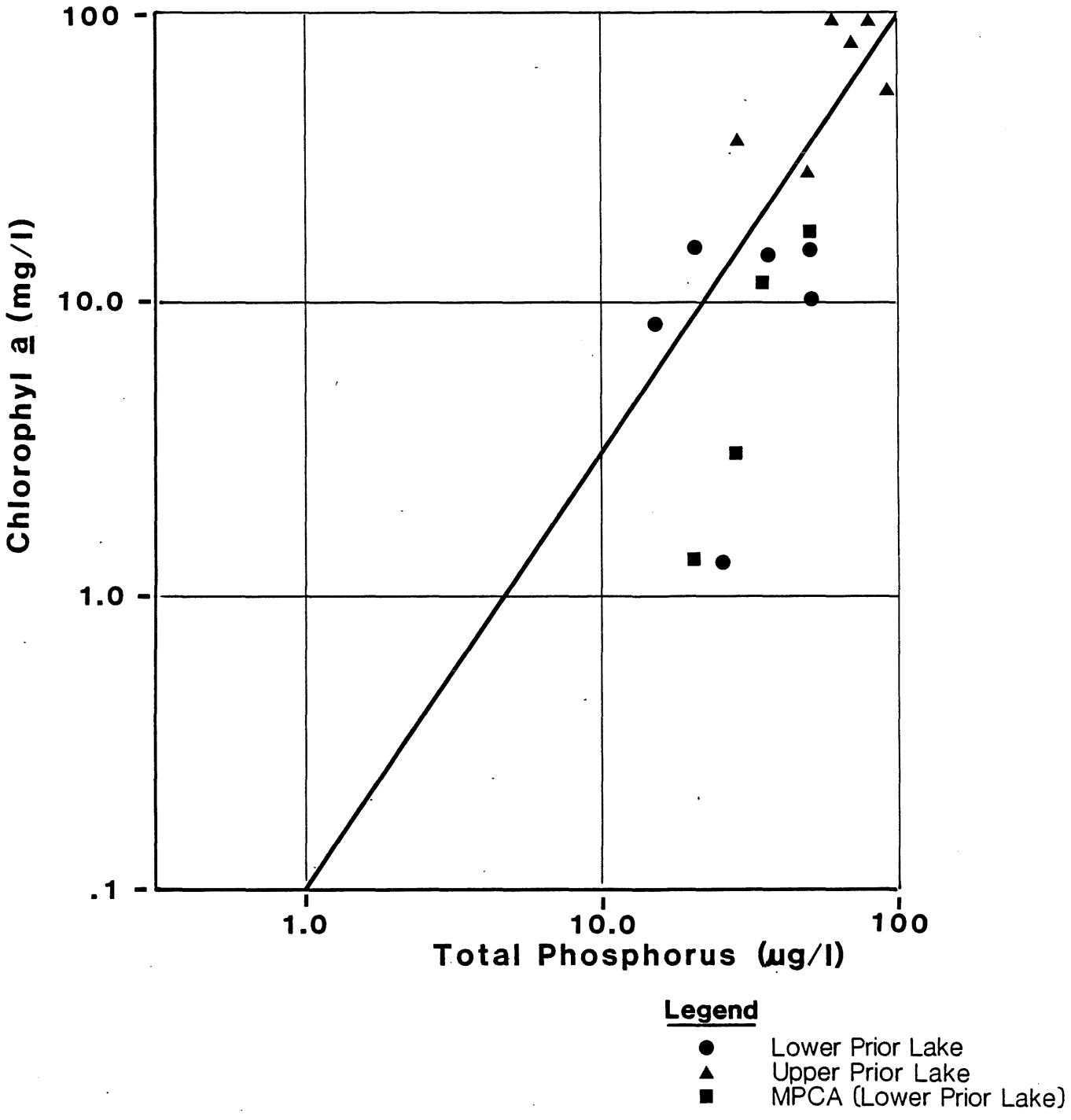


Figure 2-4: Planned Land Use

PRIOR LAKE NORTHSHORE TRUNK SEWER EIS



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Figure 2-5: Total Phosphorus vs Chlorophyl a

Prior Lake Northshore Trunk Sewer EIS

Nutrient inflow is directly proportional to the watershed area to water surface area ratio, provided nutrient export coefficients (or rates) within watersheds are the same.

In Lower Prior Lake, this low ratio has resulted in a relatively high water quality. Because the lake is phosphorus-limited with a relatively low inflow of phosphorus, it is highly susceptable to changes in phosphorus loadings. For this reason, future changes in lake water quality will be directly related to any increases in phosphorus entering the lake from its surrounding watershed. Experience with other metropolitan area lakes shows that lakes in urban areas tend to experience long term decline in water quality, primarily as a result of stormwater and snowmelt inflows.

At the present time, the Lower Prior Lake Watershed is only partially developed. As development continues, however, nutrient loadings to the lake will inevitably increase. Any efforts made to control these ultimate nutrient loadings in Lower Prior Lake will tend to maintain existing water quality by controlling algal concentrations.

In order to estimate the impact of phosphorus loading and changes in loading on the lake, it is necessary to estimate nutrient loading from the various land uses in the watershed. Based on an extensive review of watershed nutrient export coefficients developed by others (located mainly in Northeastern and Upper Midwestern United States), Rast and Lee (1983) developed a set of recommended nutrient transport coefficients based on general land use. According to the authors, estimates of nutrient loadings made with these coefficients will be within plus or minus 2x the actual loadings for most lakes. The suggested phosphorus export coefficients of Rast and Lee are shown below:

Watershed Land Use	% of Total Land Use in Prior Lake Watershed	Export Coefficient (g/m^2/year)
Urban	89	0.1
Rural/agricultural	11	0.05

The atmospheric phosphorus co-efficient is applied to the lake surface only and is estimated at 0.025 g/m^2/year.

By applying these coefficients to the Lower Prior Lake watershed, it is estimated that the non-point source phosphorus entering the lake from the various land use types and from precipitation is as follows:

Urban	1,664 lbs/year
Rural/agricultural	100 lbs/year
Atmosphere	191 lbs/year
Total	1,955 lbs/year

The outflow from Upper Prior Lake into the west bay of Lower Prior Lake contributes some additional phosphorus to the lake. However, the inlet from Upper Prior Lake and the recently constructed Lower Prior Lake outlet are located in a small western bay in close proximity to one another. Hence, it is probable that

a large proportion of the Upper Prior Lake outflow is short-circuted, that is, it flows into and out of Lower Prior Lake without mixing with the main body of the lake. The phosphorus contribution from Upper Prior to Lower Prior cannot be accurately determined but it is believed to be small.

2.3 VEGETATION

2.3.1 Methods

The major concentration of the EIS was directed at determination of the community quality of the woodlands directly impacted by the build alternatives. Emphasis was also given to determining the possible presence of rare, threatened or endangered plant species in the least disturbed parts of the project area. If rare, threatened or endangered species were absent there, it appeared to be reasonably safe to conclude that these species would not be likely to occur elsewhere given their sensitivity to disturbance. For general descriptions of the Big Woods community, literature references and general field observation methods were used. Areas altered as a result of agriculture or urbanization were not surveyed.

Black and white aerial photographs at a scale of 1 inch = 800 feet were used to prepare a cover type map for the project area. The project area boundaries were defined as County Road 21 to the west, County Road 42 to the north, Crest Avenue to the east, and the north shoreline of Lower Prior Lake to the south (Figure 1-3). A draft cover type map was prepared using stereoscopic aerial photo coverage and then field verified. Changes in land use since the aerial photos were flown in 1976 are reflected on the cover type map. The purpose of field verification was to be certain that the various cover types were correctly identified and that any changes in land use since the aerial photography was flown could be recorded. Project area and cover type acreages were measured from the 1 inch = 800 ft. cover type map using a polar planimeter. The acreage figures measured and reported have an accuracy of plus or minus 5 percent as a result of possible inaccuracies in the scale of the aerial photographs used as the base map and in the measuring accuracy of the polar planimeter.

Alexis Duxbury, a consulting plant ecologist, evaluated the Chatonka Beach woodland and two other woodlands in the project area for the potential presence of rare, threatened and endangered plant species and also evaluated the Chatonka Beach woodland for its status as a possible remnant big woods community. Her report is included as Appendix B.

In completing the analysis of the vegetation impacts resulting from construction of the alternatives some assumptions needed to be made regarding the width of the disturbed corridor since detailed design drawings with easements delineated were not available. For Alternatives 1 and 2 an average disturbance width of 100 feet was assumed and used in the calculations. This seemed reasonable since these two alternatives incorporate lift stations, and trench excavations would not be as deep as for a total gravity system. For Alternative 3, a gravity system, an average disturbance width of 120 feet was assumed. The average disturbance width for the 11,606 feet of the original route is about 115 feet.

To determine the potential impacts of the alternatives on trees, tree counts, species identification and diameter measurements were taken in four woodland area. The purpose of these counts was to determine the number, size, and species of trees potentially impacted by the alternatives.

In the Chatonka Beach area, the proposed sewer alignment was surveyed according to the detail design drawings. The survey limits included the temporary and permanent easements, i.e., the area likely to be disturbed during construction. In Woodland 1, trees were counted in a strip 100 feet wide within the alignment.

The alignment strip sampled by Duxbury in Woodland 2 was later determined to not be the best alignment for sewer construction because of topographic elevation. Therefore, a second sample count was made in Woodland 2 following the revised sewer alignment.

The results for the second sample count were generally similar except the second area had more ironwood and fewer oaks than the first area sampled. This is probably the result of differences in soil type, slope of the land and aspect (direction of the slope where the trees are located).

2.3.2 Definition of Cover Types

Fourteen cover types or land uses were identified in the project area. These cover type/land use categories are described in this section.

2.3.2.1 Grassland

Old Field (FLD) - Old field communities include abandoned farm fields and meadows which have reverted to a variety of grasses and weeds. Typical grasses include brome grass and bluegrass. A fairly broad variety of herbaceous species are present and may include thistles, goldenrods, wild strawberries, and various introduced plant species.

2.3.2.2 Brushland

Open Brush (BRU) - The brushland community includes brushy species which do not generally exceed a height of six to twelve feet. Typical brushland species may include hazelbrush, dogwoods, and other brushy species.

Young Deciduous Upland (YDU) - This cover type includes those areas being invaded by early successional tree species. Height of the trees is generally twelve feet or less and includes such species as cottonwood, boxelder, elm, ash, and aspen.

2.3.2.3 Woodland

Mature Deciduous Upland (MDU) - Mature deciduous upland includes trees which are over forty feet in height and generally in excess of fifty years of age. The mature deciduous upland is a closed canopy forest and includes a variety of species including boxelder, elm, ash, oak, hickory, sugar maple, basswood, and butternut.

2.3.2.4 Wetlands

Wet Meadow (WMD) - Wet meadows include Type 1 and Type 2 wetlands as described in circular 39 of the U.S. Fish and Wildlife Service and are characterized by species such as reed canary grass. Standing surface water is generally not present throughout the growing season.

Marsh (MSH) - Marshes are classified include Type 3 and 4 wetlands as described in circular 39. Typical species present include cattails and other emergent aquatic plant species. Standing water is present throughout the growing season and patches of open water may be present in areas where water depths exceed eighteen inches.

Open Water (OW) - Open water areas are generally ponds which lack any type of emergent aquatic vegetation within the water area. These ponds may be fairly deep or may be shallow but lack adequate fertility levels to support emergent aquatic plants.

2.3.2.5 Seasonally Altered

Open Pasture (OPT) - Open pasture areas include areas which are fenced in and seasonally grazed by livestock.

Orchards, Plantations (ORP) - Orchards and plantations include those areas such as arboretums, apple orchards, and conifer plantations where a variety of trees and shrubs are planted and regularly cultivated for purposes of transplanting, for harvesting fruit or transplanting trees for landscaping purposes.

Agricultural Field (AGF) - Agricultural fields include areas which are seasonally tilled, and planted and from which agricultural crops are harvested on an annual basis. Crops may include either row crops such as corn and soybeans or cereal grains such as wheat and oats.

Agricultural Meadow (AGM) - Agricultural meadows are areas where grasses or legumes are planted for purposes of harvest as a food resource for livestock. Typical species include brome grass and alfalfa.

2.3.2.6 Special Habitats

Rural Residential (RUR) - Rural residential land use type consists of farm homesteads which include various outbuildings such as barns, machine sheds, livestock buildings, and other outbuildings related to the operation of a farm.

Single Family Residential (SFM) - Single family residential areas include suburban subdivisions as well as single family homes having only one or two outbuildings such as garages or a storage shed. Lakeshore residences are included in this category. In classifying the single family residential land use type, cover type boundaries included the residence and any property associated with the residence showing evidence of human use and activity such as mowed lawns, gardens, play areas, and storage areas.

Disturbed Areas (DIS) - Disturbed areas are those which have been recently graded for construction purposes or subjected to other activities which have altered the natural soil profile.

2.3.3 Existing Vegetation

In pre-settlement days, the Prior Lake Project Area was a part of the Big Woods, mainly a maple-basswood forest. Remnant woodlots of this cover type are still present in this area, though they are relatively small and have had disturbances. The dominant trees of this type of forest are sugar maple, basswood, slippery elm, american elm and hop hornbeam. Table 2-2 is a listing of the more common plants present in the Big Woods. . A detailed study of southern mesic forests (maple-basswood) was completed in Wisconsin by Curtis 1959. These forests are similar in structure and species composition to maple-basswood forests in southeastern Minnesota and the Twin Cities area.

In the undisturbed Wisconsin maple-basswood forests, there are 205 ground layer species of herbs and shrubs. Shrubs and woody vines make up to 16.1 percent of the understory. There are 115 species of flowers that predominantely bloom in the spring. Of these flowers, 60 percent bloom before June 15th, another 30 percent bloom in the summer between June 15th and August 15th, and the remaining 5 percent bloom after August 15th.

With the coming of the settlers, parts of the Big Woods were cleared to make room for agricultural fields and to provide lumber for buildings and fuelwood for heating and cooking. Although there are woodlots of maple-basswood still present in the project area, they have in the past been moderately to heavily disturbed by logging and/or grazing.

By 1940, 65 percent of the area was used for agricultural purposes. The area of forest accounted for 27 percent. Very little of the area was developed for single family dwellings (see Table 2-3).

An area of beach existed on the 1940 photos because the lake was very low after the extended drought of the 1930's. Since then, the water levels have been increasing in Prior Lake, so the beach area no longer is evident on the 1984 cover type map.

The wetland areas have basically remained the same from 1940 to 1984. The wet meadows were included in the agricultural category because they could not be distinguished on the 1940 photography. For the same reason, marshes and ponds were aggregated for the 1940 cover type classification.

The acreage of forested area has remained fairly constant from 1940 to 1984. The agricultural area has been reduced by approximately 100 acres.

The Prior Lake Project Area now has several tracts of single family homes. The Sand Pointe Addition, currently being developed, is occurring in the area classified as disturbed on the cover type map.

The Prior Lake Comprehensive Plan identifies this part of the project area as a growth area for single family homes. As this happens, more of the agricultural and forested land will be converted to single family housing.

Existing vegetation types (Figure 2-6) and their respective acreages are listed in Table 2-3. The most common land use cover type in the project area is Agricultural Field which accounts for 27.48 percent of the project area.

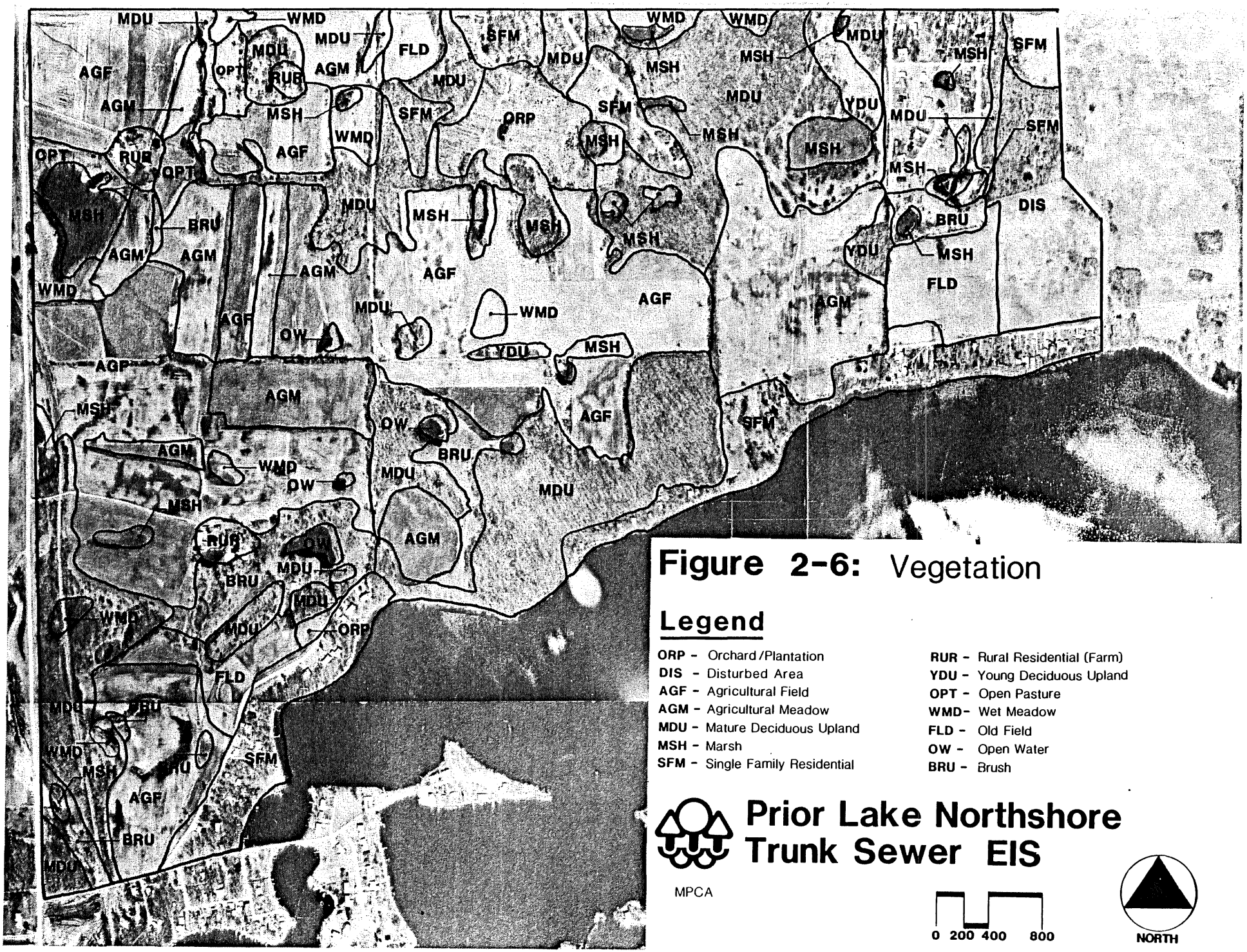


Figure 2-6: Vegetation

Legend

ORP - Orchard/Plantation
DIS - Disturbed Area
AGF - Agricultural Field
AGM - Agricultural Meadow
MDU - Mature Deciduous Upland
MSH - Marsh
SFM - Single Family Residential
RUR - Rural Residential (Farm)
YDU - Young Deciduous Upland
OPT - Open Pasture
WMD - Wet Meadow
FLD - Old Field
OW - Open Water
BRU - Brush

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NORTH

Another 22.60 percent of the project area is in mature deciduous upland, 10.64 percent is in Agricultural Meadow, and 12.30 percent is classified as Single Family Residential. Approximately 57.80 percent of the project area is subject to some type of human use activity or disturbance. This human use activity would apply to the areas being managed for agricultural purposes, rural residences, and single family residential areas. The remaining 41.20 percent includes woodland areas, marshes, wet meadows, and open water. About half of the undisturbed area, 20.54 percent, is in mature deciduous upland. The report prepared by Alexis Duxbury, describes the characteristics and species components of various woodlands in the project area (Appendix B). The pasture portion of the mature deciduous uplands is shown in Figure 2-7.

2.3.4 American Tree Farm

Approximately 10 acres of the woodland known as the Chatonka Beach Woodland (Figure 2-7), is registered in the American Tree Farm Program. In a Forest Management Plan Revision Report by Tom Romaine, DNR District Forester, prepared in 1980, Mr. Romaine indicated that the woodlot has never been grazed and was selectively harvested during the middle 1950's. Selective harvesting was again completed in the early 1980's following severe windstorm damage to this woodlot. Woodland areas enrolled in the American Tree Farm Program are generally managed for timber production purposes and woodland conservation. In the Forest Management Plan Revision, Mr. Romaine indicated that forest management needs for this woodlot are: protection, timber stand improvement, and wildlife habitat enhancement. The Forest Management Plan Report is included as part of the Vegetation Technical Report (Appendix B).

2.3.5 Rare, Threatened, and Endangered Plant Species and Communities

The Chatonka Beach Woodland and other woodlands in the project area were examined by Alexis Duxbury for the potential presence and habitat suitability for rare, threatened, and endangered plant species which might be present in mature deciduous uplands. Ms. Duxbury did not find any rare, threatened, or endangered plant species which might occur in this area. The survey was conducted at a period of time when all three species would have been recognizable. The species potentially present included ginseng, Carex formosa, and Carex plataginea. No reports of these species occurring in the general area are on record either (see Appendix B for details).

2.3.6 Big Woods Remnant

The Chatonka Beach Woodland area was also evaluated to determine its quality as a possible remnant of the former Big Woods community present in this part of Minnesota. The woodland was examined by Keith Wendt of the Minnesota Department of Natural Resources Natural Heritage Program and also by Alexis Duxbury. The part of the woodland least disturbed was the area enrolled in the Tree Farm program and it was this part of the woodland that was evaluated by Mr. Wendt and Ms. Duxbury. Their conclusions were similar regarding the quality of the

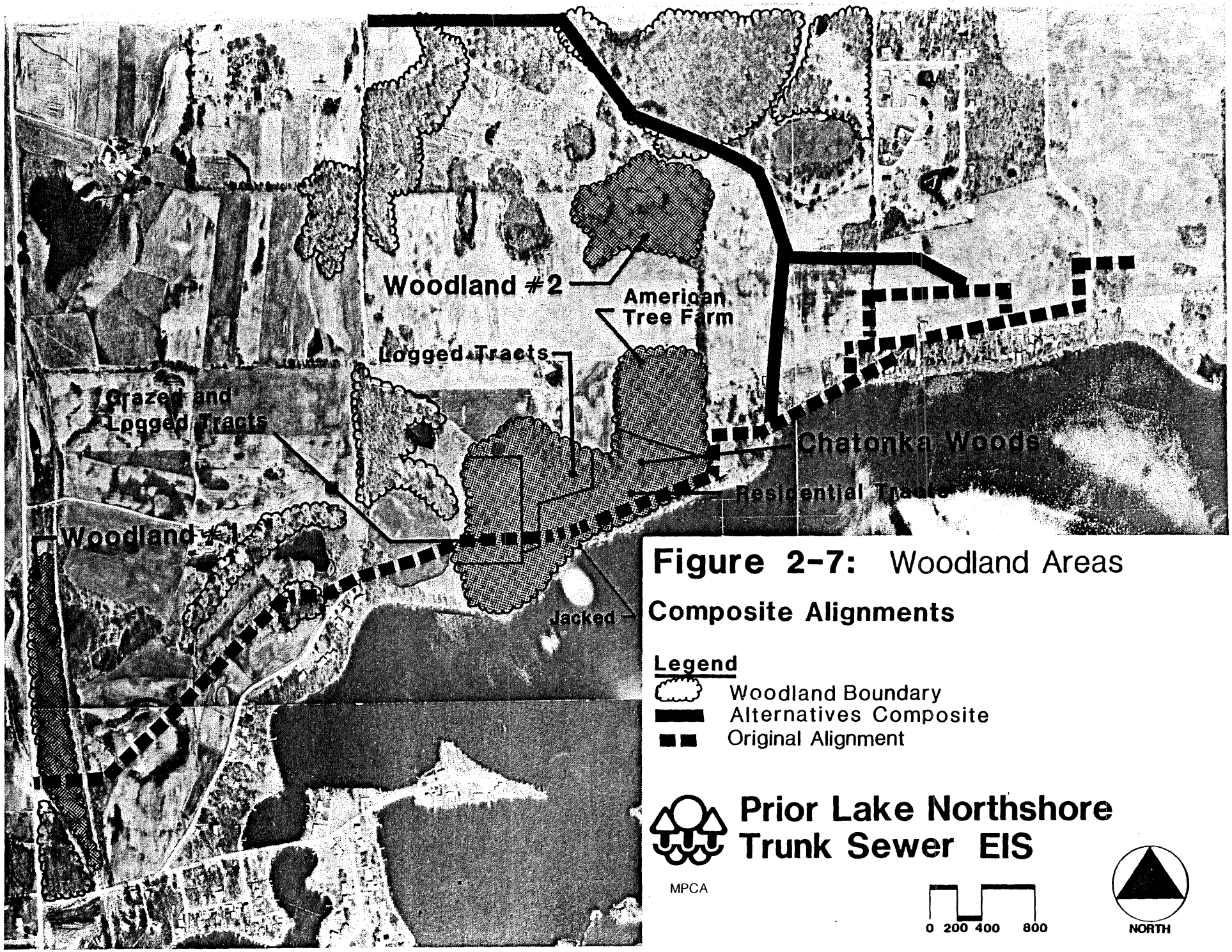


Figure 2-7: Woodland Areas

Composite Alignments

Legend

- Woodland Boundary
- Alternatives Composite
- Original Alignment

Prior Lake Northshore Trunk Sewer EIS

MPCA

0 200 400 800

NORTH

Table 2-2. Trees of the Big Woods Region

Common Name	Scientific Name
Bur Oak	Quercus macrocarpa
White Oak	Quercus Alba
Red Oak	Quercus borealis
Black Oak	Quercus velutina
American Elm	Ulmus americana
Slippery Elm	Ulmus rubra
Basswood	Tilia americana
Ash	Fraxinus americana
	Fraxinus pennsylvanica
Sugar Maple	Acer saccharum
Hop hornbeam	Ostrya virginiana
Bigtooth Aspen	Populus grandidentata
White Birch	Betula papyrifera
Wild Cherry	Prunus serotina
Bitternut Hickory	Carya cordiformes
Butternut	Juglans cinerea
Black Walnut	Juglans nigra
White Pine	Pinus Strobus
Beech	Fagus grandifolia

Dominant Shrubs and Herbs	
Virginia creeper	Parthenocissus vitaceae
Climbing bittersweet	Celastrus scandens
Red berried elder	Sambucus pubens
Sweet Cicely	Osmorhiza Claytoni
Large Flowered Bellwort	Uvularia grandiflora

Source: Curtis, John T., 1959. Vegetation of Wisconsin

Table 2-3. Cover Type Comparisons: 1940 to 1984

Cover Type	1940			1984	
	Acres	Percent of Total		Acres	Percent of Total
Agricultural Field	572.45	65.46	455.55	240.38	27.48
Agricultural Meadow	included in agri. field			93.01	10.64
Mature Deciduous Upland	196.15*	22.43		197.68	22.60
Marsh	23.37	2.67		43.03	4.92
Young Deciduous Upland	44.97	5.14		9.52	1.09
Rural Residential	5.44	.62		8.52	.97
Single Family Residential	-			107.55	12.30
Open Pasture	included in agri. field			9.11	1.04
Old Field	included in agri. field			30.13	3.45
Wooded Pasture	8.52	.97		8.80	1.00
Open Water	included in march			11.02	1.26
Wet Meadow	included in agri. field			19.12	2.19
Disturbed	-			28.21	3.23
Brush	included in young decid. upland			49.82	5.70
Orchard	-			18.66	2.13
Sand Beach and Dunes	23.66	2.71			
Total	874.56	100%		874.56	100%

*Includes dense woodlands which have been or are presently being pastured.

woodland. The area has been subject to logging which has affected the character of the woodland. Previous logging had removed the large diameter trees which characterize old growth Big Woods forests and also almost entirely remove the red oaks. Also, recently because of Dutch Elm disease, many of the elms are dying and others have been harvested to salvage the wood before it becomes unmerchantable. The selective harvesting process has resulted in changing the species composition of this woodland so that it is not a high quality representation of the Big Woods community. As a result, the ranking given to this community was Grade C, a mid-successional forest recovering from logging. The details of both evaluations are in the Vegetation Technical Report (Appendix B).

2.4 WILDLIFE AND HABITAT

2.4.1 Study Methods

The decision was made to utilize published data from a variety of sources to identify potential wildlife species present in the project area, to describe the potential impacts resulting from the proposed project on wildlife, and to identify measures which would be appropriate to mitigate project-related impacts. A number of sources were contacted to obtain data regarding breeding bird composition and population densities in the the project area. A study completed in 1979 for the Minnesota Valley National Wildlife Refuge by Dwain Warner (Warner, 1979) was considered. Examination of the data in that report revealed that the woodland community studied generally represented hillside bluff forests or bottomland woodlands and were not similar enough in plant species composition to be appropriate for use in this study. A number of local state parks, regional parks and nature centers were also contacted. The best information these facilities could provide were listings of bird species present but no information was available on population densities of these birds.

Scientific journals and publications were also reviewed to collect information about breeding bird studies completed in similar habitat types on a regional basis. Data were available about population densities and species compositions for forests in Wisconsin and Ohio. In selecting these areas of similar habitat type, study areas were chosen which were within a similar ecoregion as described by Bailey (1978). The Prior Lake Project Area is located in the northern hardwoods forest ecoregion which extends southeastward roughly from west central Minnesota through southern Wisconsin. A similar ecoregion region, the northern hardwoods fir forest, occurs in lower Michigan and most of Indiana and Ohio.

A search was made of American Birds, a National Audubon publication which annually publishes breeding bird censuses completed in North America. The search focused on attempting to find one or more breeding bird surveys which were completed for one or more years in areas within the northern hardwoods ecoregion. The literature search resulted in information about a study completed for several forests in south central Wisconsin and for an area in Preble County, Ohio (Tables 2-4, 2-5, and 2-6).

American Birds also provided a source of relatively long-term information regarding wintering birds in the general project area. A Christmas bird count has been conducted annually by volunteers in the Chanhassen area since 1973. This Chanhassen study area is approximately 10 miles northwest of the Prior Lake

Project area, and includes a mix of wetlands, farmland, woodland, and residential development very similar to that present in the Prior Lake area (Table 2-7).

In addition to providing information about the possible species composition of breeding birds in the project area, the literature search procedure was also utilized to obtain information about the possible impacts of the construction of a sewer line on wildlife species. Because the impacts of a sewer line corridor are essentially identical to those of a pipeline corridor or transmission line corridor, searches were made to obtain information about the potential impacts of such clearing activities on wildlife species. Sources of information included various published scientific articles and other environmental impact reports.

A computerized data base called SPECLIST was used to generate a listing of species which might potentially occur in the project area. The basis of this listing is the normal distribution range of wildlife species within Minnesota and the potential habitat types within which they might occur. The listing created as a result of the SPECLIST search was then cross-checked with the wildlife inventory completed for the Minnesota Valley National Wildlife Refuge and with the publication "Birds of the Minneapolis-St. Paul Region" by Dodge, Fullerton, Breckenridge and Warner as published in Warner (1979).

A meeting was also held with the Department of Natural Resources Area Wildlife Manager, Jon Parker, to identify any potential concerns that the Department of Natural Resources might have regarding the project. The Minnesota Department of Natural Resources Natural Heritage Program also searched their data base to determine the possible presence of any rare, threatened, or endangered wildlife species which might occur in the project area.

In general, bird data was used to address the potential impacts of the project because the issue of greatest concern was the impact of the project upon a woodland area. Relatively good data is available which documents the presence and population densities of certain bird species in woodland areas and the effects certain types of habitat alteration have on these species and population densities.

It was not possible to utilize primary data for the wildlife analysis due to various constraints. These constraints included the timing of the preparation of the EIS, which occurred during the fall and winter months, and budget limitations. In order to obtain truly comprehensive wildlife population data, it is necessary to conduct studies which span a period of several years in order to document normal cyclic fluctuations in populations. Furthermore, these studies could involve a variety of techniques including breeding bird surveys to document the populations and species occurrence of breeding birds, small mammal censuses and surveys to determine the presence and the population densities of small mammals and various studies to determine the presence of reptiles and amphibians. Therefore, when analyzing the impacts of a particular project on wildlife, secondary sources of information are frequently utilized whereby studies completed in other areas serve as a basis for determining impacts and drawing conclusions in the project area under study.

2.4.2 Existing Wildlife Species

The tables in Appendix C are listings of wildlife species which may potentially occur in the project area on the basis of their occurrence in the Twin Cities Metropolitan Area and on the basis of the habitat types present in the Prior Lake North Shore Trunk Sewer Project area. This listing only includes those species which are either seasonal residents and breed in the area or are permanent residents. The microcomputer data base system used to generate this listing was described in detail in the Laukka-Beck Minnesota Jockey Club Site Development Proposal Draft EIS (1983) (Appendix E).

To summarize the listing, there are 109 species of birds, 34 species of mammals, and 15 species of reptiles and amphibians potentially occurring in the project area. Table 2-4 and 2-5 list species generally common in maple-basswood forests. These species include the great crested flycatcher, grey catbird, red-eyed vireo, scarlet tanager, downy woodpecker and eastern wood peewee (Ambuel and Temple 1982: 155; American Birds 1975: 1096-1097; American Birds 1979: 64; American Birds 1982: 62; American Birds 1977: 46).

The most common breeding birds in the Preble County, Ohio virgin beech maple forest included, in addition to the red-eyed vireo, the acadian flycatcher, the blue-gray gnatcatcher, cardinal, cerulean warbler, tufted titmouse, brown-headed cowbird, Carolina wren, redheaded woodpecker, and the eastern wood peewee (Table 2-6, American Birds 1977: 46; American Birds 1975: 1096-1097). Other studies (e.g. Eldridge and Coffin, 1980; Anderson, 1979; MacClintock, Whitcomb and Whitcomb, 1977) include the red-eyed vireo, scarlet tanager, acadian flycatcher, eastern wood peewee, great crested flycatcher, downy woodpecker, and tufted titmouse as commonly occurring species in decidous upland forests.

Table 2-7 is listing of commonly occurring over-wintering birds recorded during the annual Christmas bird count in the Chanhassen area 10 miles northwest of the Prior Lake area (American Birds, 1976 through 1983). The data obtained through these Christmas bird counts, although limited to only birds, can be useful in measuring habitat quality in general because winters pose the greatest hardship to wildlife. As habitat is lost, numbers of over-wintering birds and other wildlife as well will decline as will species richness. The data for these Christmas bird counts must be used advisedly. These counts are the products of an annual census which is subject to weather conditions and the enthusiasm of the census takers.

A linear regression analysis was completed for 18 bird species which are either permanent residents or which consistently were counted over the eight year period. The analysis indicated that two species, the rock dove and the starling, had populations that were increasing over the eight year census period. One species, the house sparrow showed a relatively consistent decline over the same eight year period. The remaining species for which an analysis was completed included the ring-necked pheasant, the great horned owl, pileated woodpecker, red-bellied woodpecker, hairy woodpecker, downy woodpecker, blue jay, common crow, black-capped chickadee, white-breasted nuthatch, brown creeper, cardinal, purple finch, dark-eyed junco, and tree sparrow. All showed virtually little or no change, either positive or negative, in population numbers over the eight year period. The increase in rock dove and starling counts suggests a generally urbanizing habitat but not to the extent that the urbanization is affecting the populations of the other species.

TABLE 2-4 BREEDING BIRDS - WAUKESHA COUNTY, WISCONSIN
UPLAND MAPLE - LAKE FOREST*

Species	Birds/100 Acres 1978	1977
Great Crested Flycatcher	15	15
Gray Catbird	15	15
Red-eyed Vireo	15	30
Scarlet Tanager	15	15
Downy Woodpecker	15	15
Eastern Wood Peewee	11	--
Hairy Woodpecker	8	8
House Wren	8	8
Ovenbird	8	8
Song Sparrow	8	8
Common Flicker	8	8
Blue Jay	8	8
Brown Thrasher	8	15
American Robin	8	15
Wood Thrush	8	15
Blue-winged Warbler	8	--
Rose-breasted Grasbeak	8	8
Rufous-sided Towhee	8	8
Black-capped Chickadee	--	8
Indigo Bunting	4	--
Common Crow	--	--
Northern Oriole	--	--
White-breasted Nuthatch	--	8
Total	186	215

* Study area location - Fallswoods Nature Conservancy area. Lat. 42° 56' N, Long. 88° 14' W, Muskego Quadrangle.

TABLE 2-5 RELATIVE ABUNDANCE OF SONGBIRDS IN SOUTH-CENTRAL WISCONSIN FORESTS

Forest and Species	Relative Abundance (% of all Birds Detected)
Forest A: Sugar Maple, Basswood, and White Ash	
Red-eyed Vireo	13
Eastern Wood Peewee	10
Great Crested Flycatcher	20
White-breasted Nuthatch	10
Blue Jay	13
House Wren	13
American Robin	10
Starling	7
Gray Catbird	3
Forest B: Red Oak, Basswood, and White Oak	
Red-eyed Vireo	5
Eastern Wood Peewee	8
Great Crested Flycatcher	3
Ovenbird	3
Scarlet Tanager	11
Blue Jay	8
Wood Thrush	3
White-breasted Nuthatch	3
Blue-gray Gnatcatcher	3
Northern Oriole	8
Rose-breasted Grosbeak	5
House Wren	5
Brown-headed Cowbird	5
Indigo Bunting	18
American Robin	13

From Ambuel and Temple, 1982 (155).

TABLE 2-6 BREEDING BIRDS - PREBLE COUNTY, OHIO VIRGIN BEECH MAPLE FOREST*

Species	Birds/100 Acres 1977	1974
Red-eyed Vireo	70	60
Acadian Flycatcher	60	77
Blue-gray Gnatcatcher	60	63
Cerulean Warbler	50	47
Cardinal	30	60
Carolina Wren	--	27
Common Flicker	--	20
Red-headed Woodpecker	17	27
Tufted Titmouse	17	40
Yellow-breasted Nuthatch	17	--
Woodthrush	17	13
Ovenbird	17	33
Brown-headed Cowbird	17	40
Red-bellied Woodpecker	13	20
Great Crested Flycatcher	13	17
Eastern Wood Peewee	13	27
Yellow-billed Cuckoo	10	--
Downy Woodpecker	10	13
Scarlet Tanager	10	--
Ruby-throated Hummingbird	7	13
Carolina Chickadee	7	20
Gray Catbird	7	23
Starling	7	--
Yellow-throated Vireo	7	--

TABLE 2-6 (CONT.)

Species	Birds/100 Acres 1977	1974
Kentucky Warbler	7	23
House Sparrow	7	--
Indigo Bunting	7	--
Mourning Dove	--	7
Louisiana Waterthrush	--	7
Rufous-sided Towhee	--	7
Pileated Woodpecker	--	3
White-breasted Nuthatch	--	3
House Wren	--	3
Great Horned Owl	3	3
Barred Owl	3	3
Blue Jay	3	--
Common Crow	1	--
Hairy Woodpecker	--	17
Total	509	716

* Study area location - Hueston Woods State Park, T6N, R1E, Sec. 34. Collect Corner Quadrangle.

TABLE 2-7 LIST OF SELECTED OVER-WINTERING BIRD SPECIES IN THE VICINITY OF THE PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT AREA*

Species	1975	1976	1977	1978	1979	1980	1981	1982
Canada Goose	.05	1.42	1.24	1.12	8.91	4.08	.01	2.78
Mallard	17.29	14.19	17.70	14.48	45.24	4.47	40.44	12.04
Black Duck	.04	-	.03	.11	.48	.06	.10	.08
Gadwall	.03	-	-	.25	.18	.01	.03	.06
Wood Duck	.04	-	.03	.02	.03	-	.01	.01
Common Goldeneye	-	-	-	1.35	.55	.47	2.63	1.89
Sharp-shinned Hawk	.01	-	-	.01	.02	.01	-	.02
Cooper's Hawk	-	.01	-	.01	-	-	-	-
Red-tailed Hawk	.05	.07	.08	.08	.08	.16	.14	-
Red-shouldered Hawk	-	-	-	-	-	-	.01	-
Rough-legged Hawk	.01	.01	-	.01	-	.08	.10	-
Bald Eagle	-	-	-	-	-	-	.03	.01
American Kestrel	.04	.07	.03	.07	.02	.02	.01	.03
Ring-necked Pheasant	1.12	1.23	1.77	2.87	1.33	.29	2.08	.27
American Coot	.04	-	-	.02	.05	.06	.06	-
Rock Dove	2.25	3.06	2.08	7.82	7.88	3.88	17.34	2.45
Mourning Dove	.36	.04	.06	.20	-	.40	.21	.07
Screech Owl	.01	.01	-	.01	-	-	-	-
Great Horned Owl	.01	.02	.03	.05	.08	.02	.15	.03

TABLE 2-7 (CONT.)

Species	1975	1976	1977	1978	1979	1980	1981	1982
Common Flicker	-	-	-	-	.03	.01	.07	-
Pileated Woodpecker	.13	.07	.03	.09	.12	.05	.15	.05
Red-bellied Woodpecker	.16	.11	.08	.11	.21	.16	.22	.11
Red-headed Woodpecker	-	-	-	-	.03	.02	-	-
Hairy Woodpecker	.71	.50	.50	.46	7.46	.68	.84	.41
Downy Woodpecker	1.23	.48	.76	.80	1.15	1.12	1.25	.71
Horned Lark	.03	-	-	-	-	-	-	-
Blue Jay	1.52	2.43	2.21	.70	3.73	1.85	2.10	1.41
Common Crow	4.33	1.74	3.38	4.13	8.81	2.66	3.71	3.56
Black-capped Chickadee	4.05	3.82	2.73	2.52	4.51	4.18	4.59	3.60
White-breasted Nuthatch	1.21	1.22	.99	.94	1.66	1.34	1.38	1.15
Red-breasted Nuthatch	-	.03	.08	-	-	.04	.06	.02
Browncreeper	.03	.07	.08	.01	.28	.05	.04	.05
American Robin	.03	.07	.12	.02	.11	-	.01	.01
Golden-crowned Kinglet	-	-	.01	-	.03	.02	.01	.02
Cedar Waxwing	.28	.27	-	.04	2.30	1.41	.27	.52
Northen Shrike	.03	.04	-	.04	.02	.04	.01	.01
Starling	7.44	3.13	5.75	11.2	27.05	3.37	6.19	7.82
House Sparrow	18.91	6.63	13.01	13.58	11.18	11.65	12.68	5.18

TABLE 2-7 (CONT.)

Species	1975	1976	1977	1978	1979	1980	1981	1982
Red-winged Blackbird	.08	7.42	-	.20	.02	-	-	-
Common Grackle	.05	.14	.01	.04	.33	.01	-	-
Cardinal	1.63	.63	.75	.67	.96	.94	2.23	.12
Purple Finch	.67	.14	.33	.21	.25	1.16	.38	.37
Pine Grosbeak	-	-	.46	.03	-	-	-	-
Evening Grosbeak	.03	.01	.08	-	-	-	.01	-
Common Redpoll	5.01	.07	.14	-	-	.09	.06	-
Pine Siskin	.29	.29	1.27	.04	-	1.84	.41	-
American Goldfinch	1.72	1.84	1.35	1.01	1.19	1.73	1.60	.17
Dark-eyed Junco	2.91	3.00	2.14	2.65	3.48	5.87	2.07	2.90
Oregon Junco	.01	-	-	-	.02	-	-	-
Tree Sparrow	1.41	2.92	.88	1.27	2.27	5.68	.34	.91
White-throated Sparrow	.03	.01	.01	.01	-	.01	-	.03
Song Sparrow	.03	.04	-	-	-	-	.01	-
Snow Bunting	1.75	2.55	-	-	-	-	-	-

* Data are from annual Audubon Christmas Bird counts conducted in the Chanhassen area approximately 10 miles northwest of the Prior Lake Project Area. Habitat conditions in the Chanhassen study area are similar to those in the Prior Lake Project Area.

The pileated woodpecker, is a species for which there is local concern. The Fish and Wildlife Service, in its habitat evaluation procedures (HEP), has identified the pileated woodpecker as one of the key indicator species for the retention of a complete community of hole nesting birds. The HEP report for the pileated woodpecker suggests that if the habitat needs of the pileated woodpecker are met, other woodpeckers also would benefit.

Critical habitat components for the pileated woodpecker include large snags (dead standing trees), large trees, diseased trees, dense forest stands, and high snag densities. The primary food item for pileated woodpeckers includes carpenter ants and other wood-boring insects. Vegetable food makes up the remaining portion of the diet. Pileated woodpeckers, as well as the other woodpecker species have certainly benefitted as a result of the dutch elm disease epidemic which has left numerous dead and dying elms scattered throughout the woodlands of the Twin Cities area. The stands of large mature elm which are dying from dutch elm disease create one of the required habitat components of large diameter snags. These dead and dying trees provide nesting cavities as well as a food supply for these birds. In order to meet its life requirements, a pileated woodpecker pair generally requires approximately 320 acres of contiguous suitable habitat to exist.

Although the specific habitat requirements for pileated woodpeckers in Minnesota have not been determined, an Illinois study (Graber, et. al. 1977) reported that woodpecker densities were the highest when there were about 20 large trees per acre and the approximate average diameter breast height (dbh) was 11.5 inches. This study found that optimum habitat suitability exists when the habitat contains 30 or more trees greater than 20 inches dbh per acre. At a minimum, suitable habitat must include a tree canopy closure which is greater than 25 percent, one or more tree stumps greater than one foot in height and 7 inches in diameter per acre and/or one or more fallen logs greater than 7 inches in diameter per acre.

In addition, minimum suitable habitat should also include at least one snag which is greater than 15 inches in diameter per 20 acres and the average dbh of all snags should exceed at least 15 inches DBH. Field observations of the pileated woodpecker were made in the Prior Lake Project area. The combination of scattered elm and other snags located in a maturing deciduous upland forest generally provides suitable habitat for the pileated woodpecker and the other woodpecker species present.

It was indicated in the EAW that no threatened, endangered or protected wildlife species were present in the project area. While sitings of bald eagles have been reported, they are only occaisional visitors.

2.5 ARCHEOLOGICAL AND HISTORIC RESOURCES

Systematic surveys of archeological sites in central Minnesota by the Minnesota Historical Society suggest that prehistoric archeological sites tend to concentrate in an area within 1000 feet of large bodies of water. Because the original proposal and portions of some of the alternative routes came within 1000 feet of the shoreline of Prior Lake, the possibility of the presence of archeological artifacts was quite high. Additionally, residents within the project area identified one area within the original proposed corridor which

appeared to be pre-Columbian burial sites. As a result of these two factors, the City of Prior Lake contracted with Cougar Consulting of St. Paul, Minnesota to complete a Phase I and Phase II archeological survey of the original North Shore Trunk Sewer route (Lothson, 1984). The survey by Lothson included shovel testing along the entire corridor route as well as the excavation of three one by two meter test pits in the area of the suspected burial site. The Lothson study concluded:

> "The results of these formal test excavations were completely negative. Not one flake or one ceramic sherd or bone fragment was found in any of the units. It would appear that the area tested is not of NRHP (National Register of Historic Places) significance and that the possible mounds may not be mounds at all but glacial features: kames (?). (NOTE: This tested location exists in a area dominated by "knob and kettle" topography and other glacial surface features associated with moranic land forms. It is the feeling of the writer that the initial identification of (the) area as a mound site may be an incorrect interpretation and that the location is more likely to be a natural feature produced by glacial activities" (Lothson 1984:16).

The Lothson study did not find any archeological artifacts in any of the shovel test holes that were dug along the original North Shore alignment proposal. Although he was somewhat surprised by these findings, he concluded that historically the water levels in Prior Lake were considerably lower and that the present high water elevation of the lake may have obscured evidence of prehistoric activity. This has been the case in at least one other area in Minnesota, particularly, Knife Lake located near Pine City, Minnesota.

To avoid impacting this potential site, the City of Prior Lake shifted the alignment of the North Shore Trunk Sewer slightly northward to avoid any possible impact upon the suspected burial mound area. On the basis of the negative results of the shovel testing and data collected by on-site walking surveys, Lothson concluded that the proposed project would not impact any known cultural resources. He further stated:

> "Future studies at the location, ... would be inappropriate and of little value. Prehistoric and historic cultural features and sites of NRHP (significance) do not exist in any frequency at the location" (Lothson 1984:18).

3.0 PROPOSED PROJECT AND ALTERNATIVES

This section consists of a description of the alternatives to be evaluated, the additional facilities that would be constructed in conjunction with the alternatives, the construction methods that would be employed, and the existing and projected land uses along, and adjacent to, the alternative alignments.

Four alternatives for sanitary sewer services are described, These alternatives are the North Shore Trunk Sewer Alignment (Original Route), and three Pike Lake Trail alternative alignments. In addition, the proposed North Shore watermain looping project and other facilities that would be constructed in conjunction with the proposed sewer project (storm sewer, curb and gutter, and paving) are described. Finally, the No-Build Alternative is described.

The North Shore Alignment (Original Route) of the trunk sanitary sewer is the alignment proposed for construction by the City of Prior Lake. This alignment would serve the west portion of the Sand Pointe Development, and run west along the north shore of Lower Prior Lake to the MWCC MSB 7020 interceptor sewer line at County Road 21, serving Shore Trail and Beach Street along the way.

The three alternatives to the route proposed by the City involve a more direct route between Crest Avenue and the MWCC MSB 7020 interceptor (located at Pike Lake Trail and County Road 42). Alternative 1 (Pike Lake Trail - Carriage Hill Road) would serve the west portion of the Sand Pointe Development and Shore Trail. Alternative 2 (Pike Lake Trail - Carriage Hill Road - Chatonka Beach) would serve everything served by Alternative 1, and in addition would serve Beach Street. Alternative 3 would serve the same area as Alternative 2. Alternatives 1 and 2 would have permanent lift stations, whereas the Original Route and Alternative 3 would be gravity systems.

The North Shore watermain looping project was proposed to be constructed concurrently with the North Shore Trunk Sewer Project. The alignment would utilize the same utility easements as the originally proposed trunk sewer project alignment, and would serve the same population areas.

In conjunction with installing a trunk sanitary sewer and watermain, paving of Beach Street, Shore Trail, Shore Lane, Carriage Hill Road, and Pine Road is proposed along with the construction of curb and gutter and storm sewer.

Finally, the "No-Build" alternative is addressed. This alternative assumes that all future development in the proposed project area would be served by on-site water and sewer systems.

3.1 NORTH SHORE ALIGNMENT (ORIGINAL ROUTE) TRUNK SANITARY SEWER

The North Shore Alignment is the trunk sanitary sewer alignment proposed for construction by the City of Prior Lake. This alignment was recommended in the Comprehensive Sewer Plan prepared by the City pursuant to Section 6, Subdivision 3 of the Metropolitan Waste Control Commission (MWCC) Act, Chapter 473 C, 1974, and approved by the MWCC in 1981.

The proposed trunk line, as shown in Figure 3-1, would be a gravity 15" reinforced concrete pipe (RCP) sewer. It would serve the north shore area of Lower

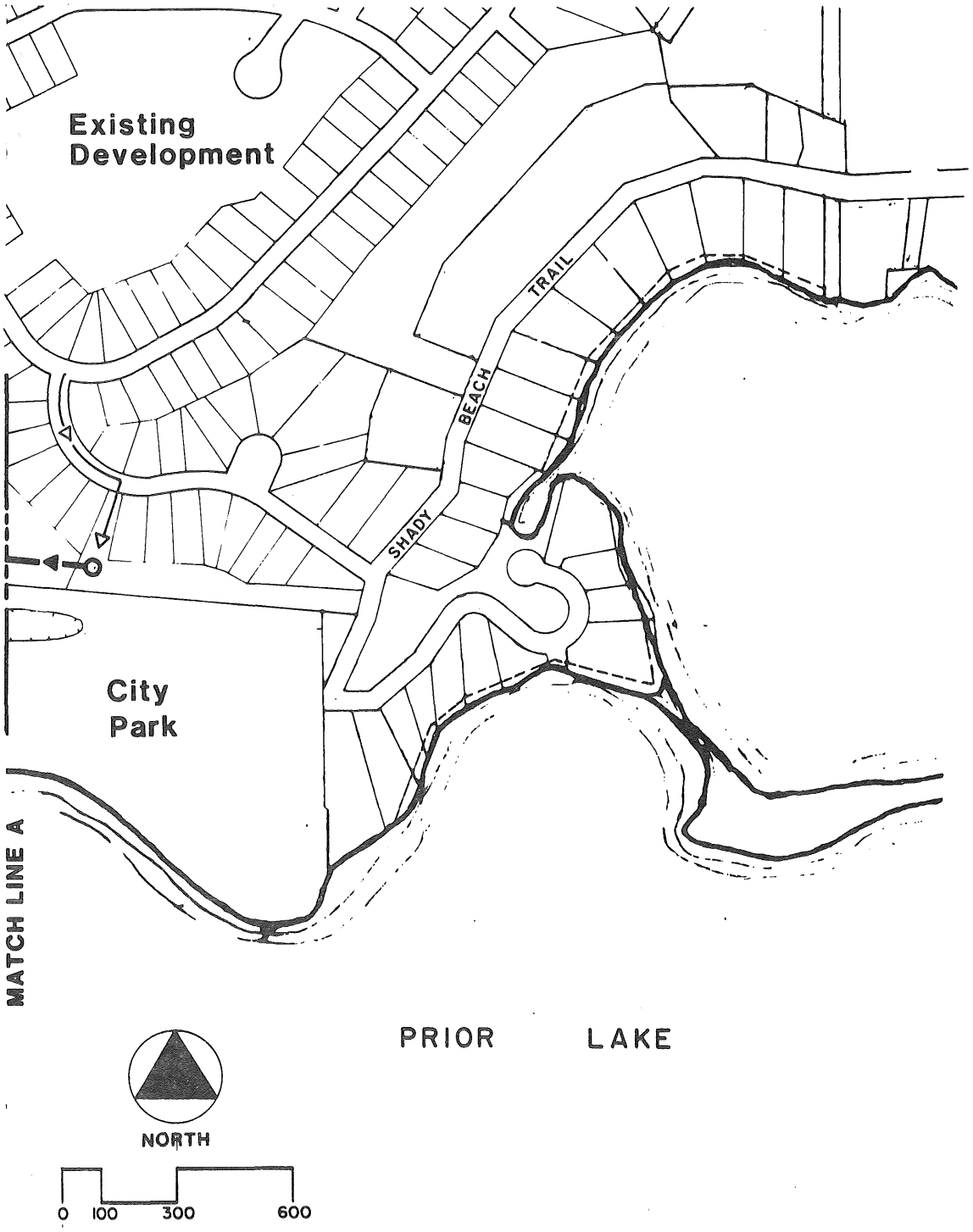


Figure 3-1a: Original Route

Prior Lake Northshore Trunk Sewer EIS

Legend

—◄— Proposed Sanitary Sewer

MPCA

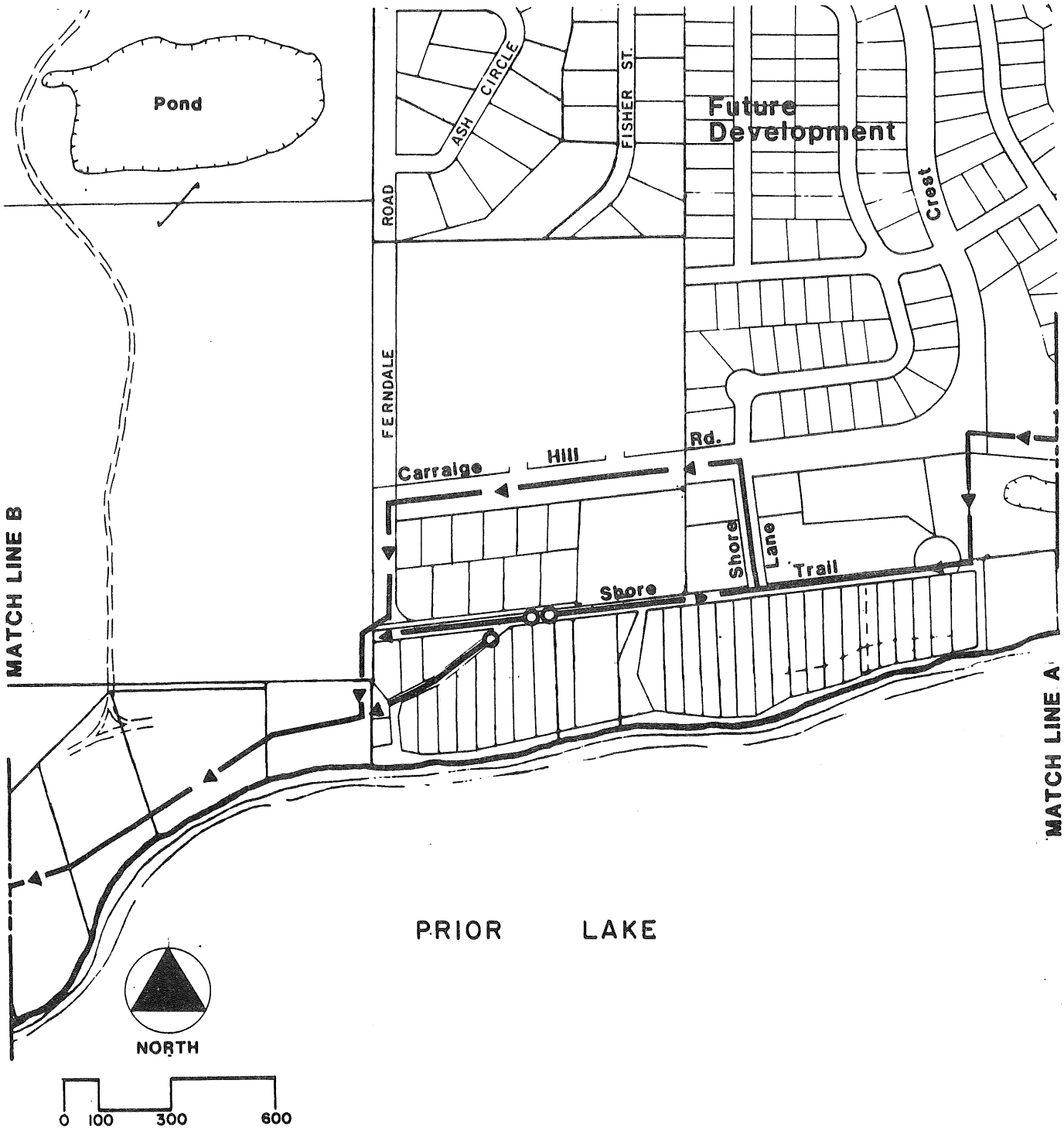


Figure 3-1b: Original Route
Prior Lake Northshore Trunk Sewer EIS

Legend

—◄—Proposed Sanitary Sewer

MPCA

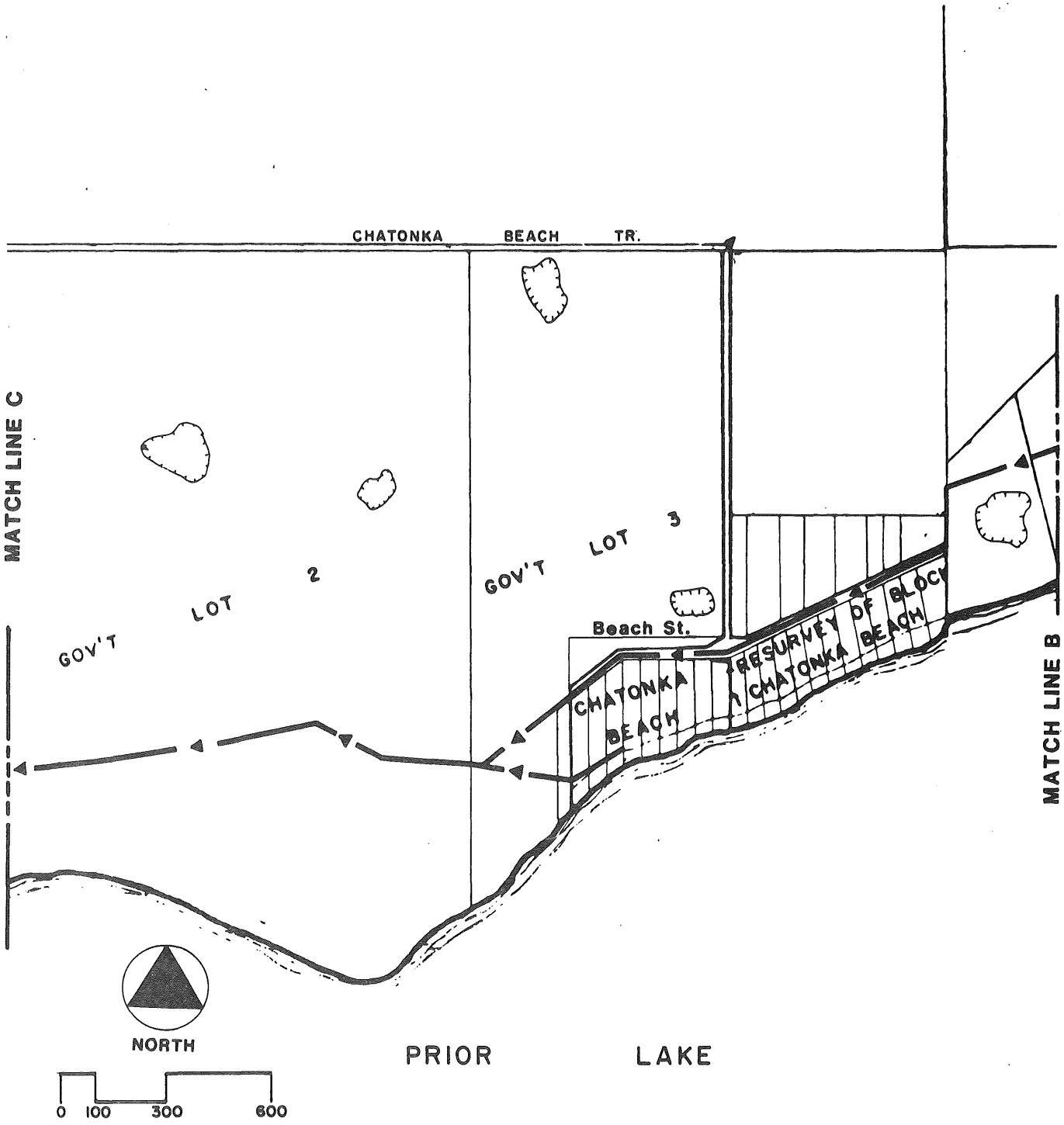


Figure 3-1c: Original Route

Prior Lake Northshore Trunk Sewer EIS

Legend

—◄—Proposed Sanitary Sewer

MPCA

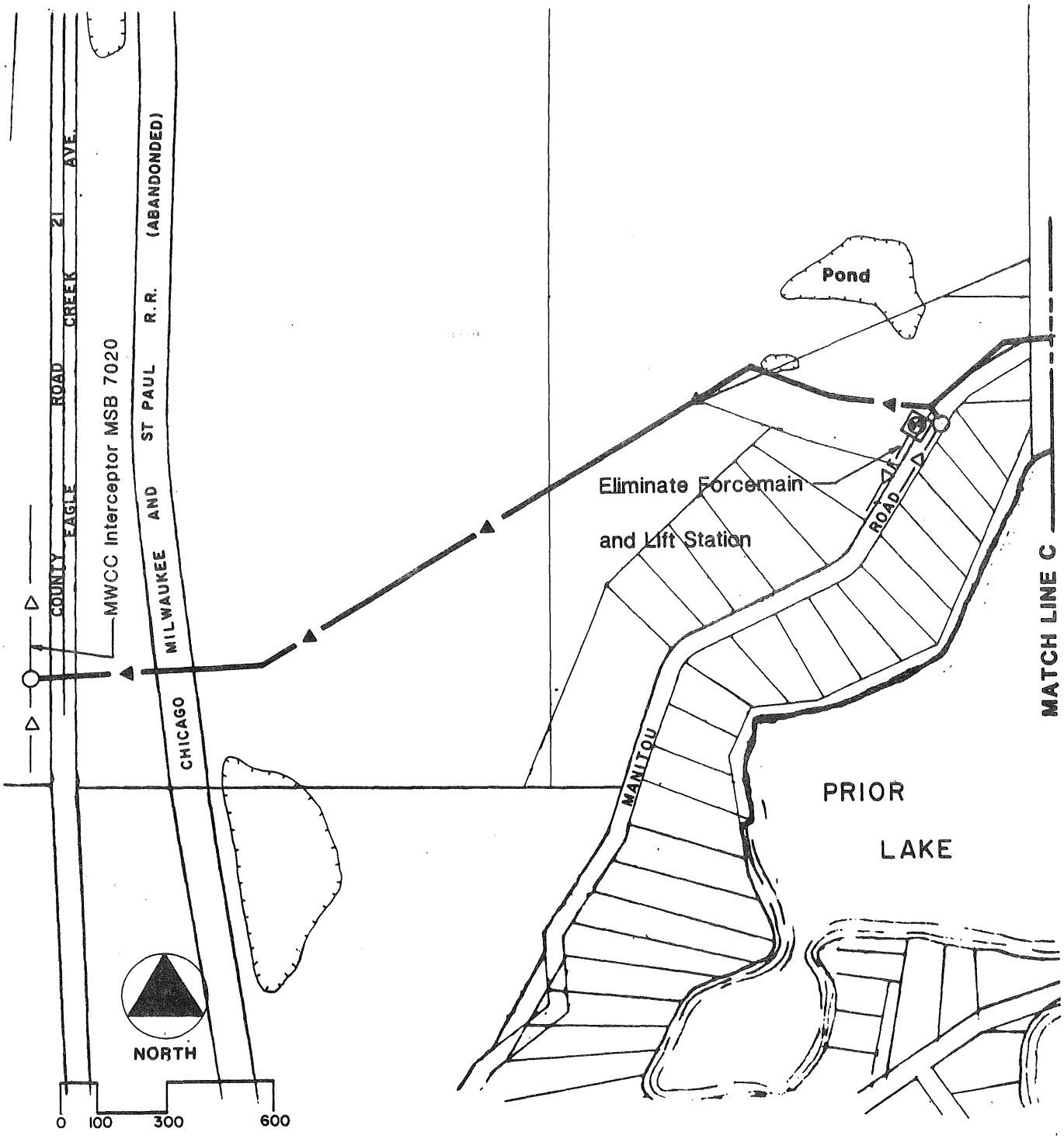


Figure 3-1d: Original Route

Prior Lake Northshore Trunk Sewer EIS

Legend

— ◄ — Proposed Sanitary Sewer

MPCA

Prior Lake and also the west portion of the Sand Pointe Development which is presently served through a temporary connection to the east. From this connection, discharges presently flow east, then south, and then west around the south side of Lower Prior Lake, through a series of three lift stations to the interceptor sewer at County Road 21. Rerouting discharges to the proposed trunk sewer would reduce the volume of waste reaching three existing pump stations in the existing system to the east, thereby decreasing the operational cost of the overall system. This rerouting would not enable elimination of a lift station serving the Sand Pointe Development (as stated in the EAW) since there are 46 parcels downstream of the proposed trunk sewer connection point but upstream of the first lift station. The Original Route trunk sewer with laterals would have a total length of approximately 11,606 feet.

From the connection point at the Sand Pointe Development, the line would run west and then south to the east end of Shore Trail then continue west in the Shore Trail right-of-way to the Shore Lane intersection. At the Shore Lane intersection, the trunk sewer would turn north while a lateral would enter from the west, serving a portion of Shore Trail. From the intersection with Shore Lane, the trunk sewer would run north to Carriage Hill Road and then west in the Carriage Hill Road right of way. At the west end of Carriage Hill Road, the sewer would turn south, to the west end of Shore Trail. At that point a lateral serving the west end of Shore Trail would enter. From the west end of Shore Trail, the trunk sewer would continue south going between some houses and then west along the shore of Prior Lake. At the point where the sewer turns west, a lateral would enter from the east, serving houses along Pine Drive.

From Pine Drive, the sewer would proceed west along the shore of Lower Prior Lake to the east end of Beach Street. The temporary easement for sewer line construction would be approximately 50 feet from the shoreline at the closest point. The sewer would follow the Beach Street right-of-way to the west end of Beach Street. Then, proceeding west through some woodland and agricultural pasture land, the trunk line would pass just north of the east end of Manitou Road. At that point, the lift station which serves the east portion of Manitou Road would be eliminated. Discharges would be rerouted by gravity into the proposed trunk sewer. From there, the trunk sewer would continue west to the 36" MWCC interceptor sewer line (MSB 7020) at County Road 21.

Construction of a gravity trunk sewer system along the Original Route alignment would involve depths varying between approximately 4 feet and 60 feet. At depths between 4-25 feet, the width of the surface disturbance would vary from approximately 20-55 feet. At depths of 25-60 feet, the width of surface disturbance would be approximately 60-130 feet. These estimates assume 1:1 sideslopes, with approximately 10 feet for access of equipment and supplies, and for width of the bottom of the trench.

To reduce the potential impacts of a deep trench through a densely wooded area at the west end of Beach Street, approximately 400 feet of pipe would be jacked through the hill. Also, some individual services may have to be jacked to get past existing garages and houses. Jacking is a construction technique used to install underground pipes beneath road embankments or small hills without

disturbing the surface. Figure 3-2 shows the extent of easement acquisitions that would be required for construction along the Original Route and for related laterals.

Present land use along and adjacent to the North Shore alignment is residential housing from the Sand Pointe development to Beach Street. Between Beach Street and Manitou Road, land use is agricultural, with the land used mainly for pasturing livestock. According to the City Comprehensive Plan, this area would some day be city park. City Planning staff indicated that it is unlikely that this entire area would be park because of its high value. City Planning staff also indicated that this land would probably remain agricutural for 20 years or more before it is developed.

From the east end of Manitou Road to the interceptor at County Road 21, a portion of the corridor along the proposed sewer presents severe limitations to development due to steep sideslopes and wetlands. This corridor is zoned Conservation (C-1), with land to the north zoned Special Industrial (I-1), and land to the south zoned Residential (R-1). All of the land east of Manitou Road along and adjacent to the proposed trunk sewer is zoned Residential (R-1) with the exception of the Sand Pointe development which is zoned Planned Unit Development (PUD), and the Sand Pointe Park which is zoned Conservation (C-1). Existing zoning is shown on Figure 2-2.

3.2 ALTERNATIVE 1 TRUNK SANITARY SEWER ALIGNMENT (PIKE LAKE TRAIL - CARRIAGE HILL ROAD)

As shown in Figure 3-3, Alternative 1 would provide service to the west portion of the Sand Pointe Development. The Sand Pointe Development is presently served through a temporary connection to the east. Discharge flows from the Sand Pointe development are as described for the Original Route. Construction of Alternative 1 would reduce the volume of waste reaching an existing lift station but would not result in the elimination of the lift station. The Alternative 1 trunk sewer, with forcemain and laterals, would have a total length of appoximately 10,853 feet.

From the connection point at the Sand Pointe Development, the trunk line would run west and then south to the east end of Shore Trail, then continue west in the Shore Trail right-of-way. At the Shore Lane intersection, a lateral would enter from the west, serving Shore Trail and Pine Drive. The Pine Drive lateral would require a small lift station at its west end to discharge into the main line at Shore Trail. Also, at the Shore Lane/Shore Trail intersection another lateral would enter Lift Station 1 from the east. This lateral would provide gravity service to the homes along Shore Trail east of Shore Lane. At the intersection of Shore Trail and Shore Lane, a lift station would lift discharges to the gravity line in Shore Lane from where it would run north to Carriage Hill Road.

From the intersection of Shore Lane and Carriage Hill Road, the trunk line would run west a short distance along Carriage Hill Road and then run west and northwest up to Rolling Oaks Circle. A lateral would enter from the west on Carriage Hill Road. The trunk line would follow Rolling Oaks Circle to County Road 42, then turn west on County Road 42 to the interceptor at Pike Lake Road. A lateral would serve the east end of Rolling Oaks Circle, connecting with the

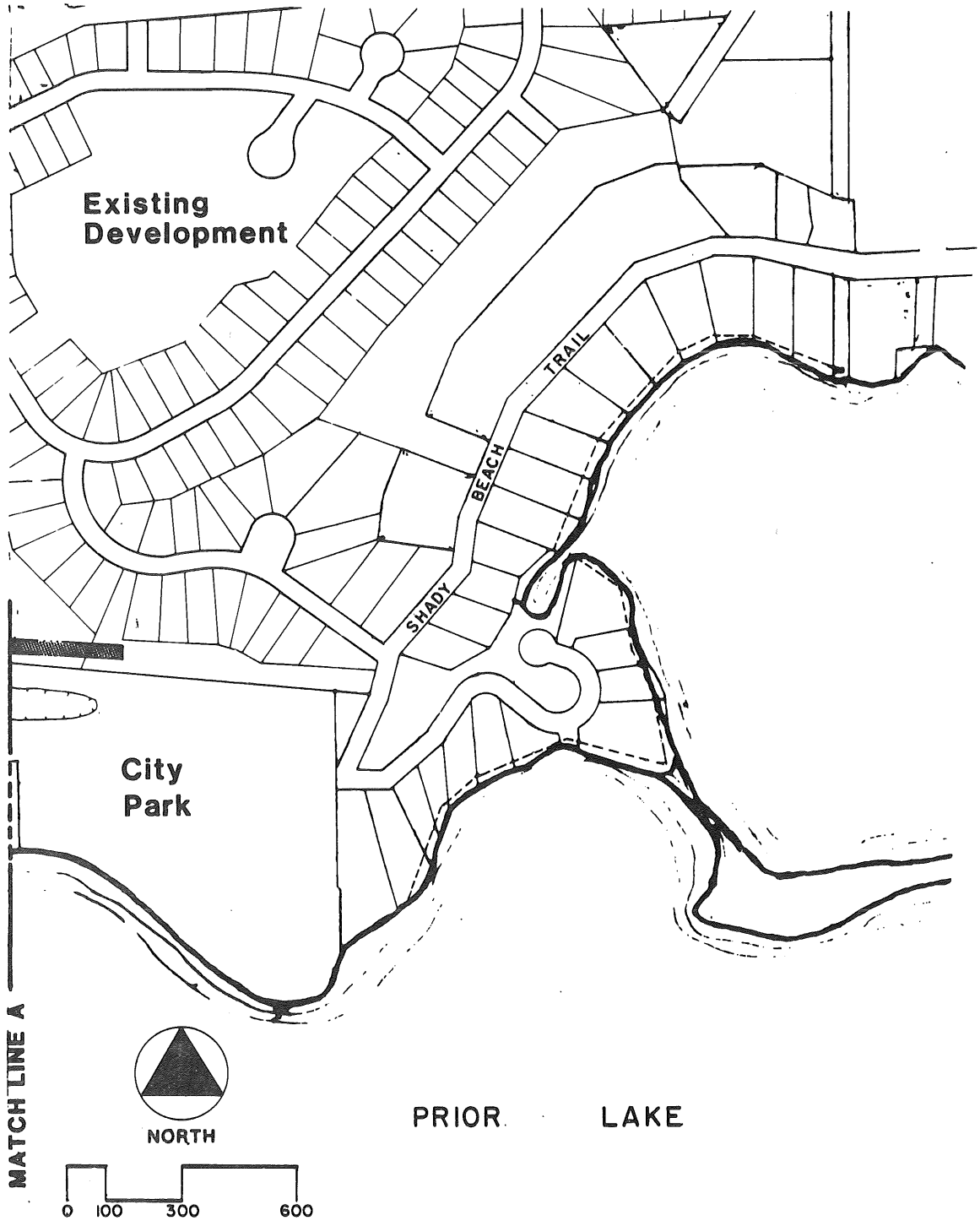


Figure 3-2a: Original Route

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

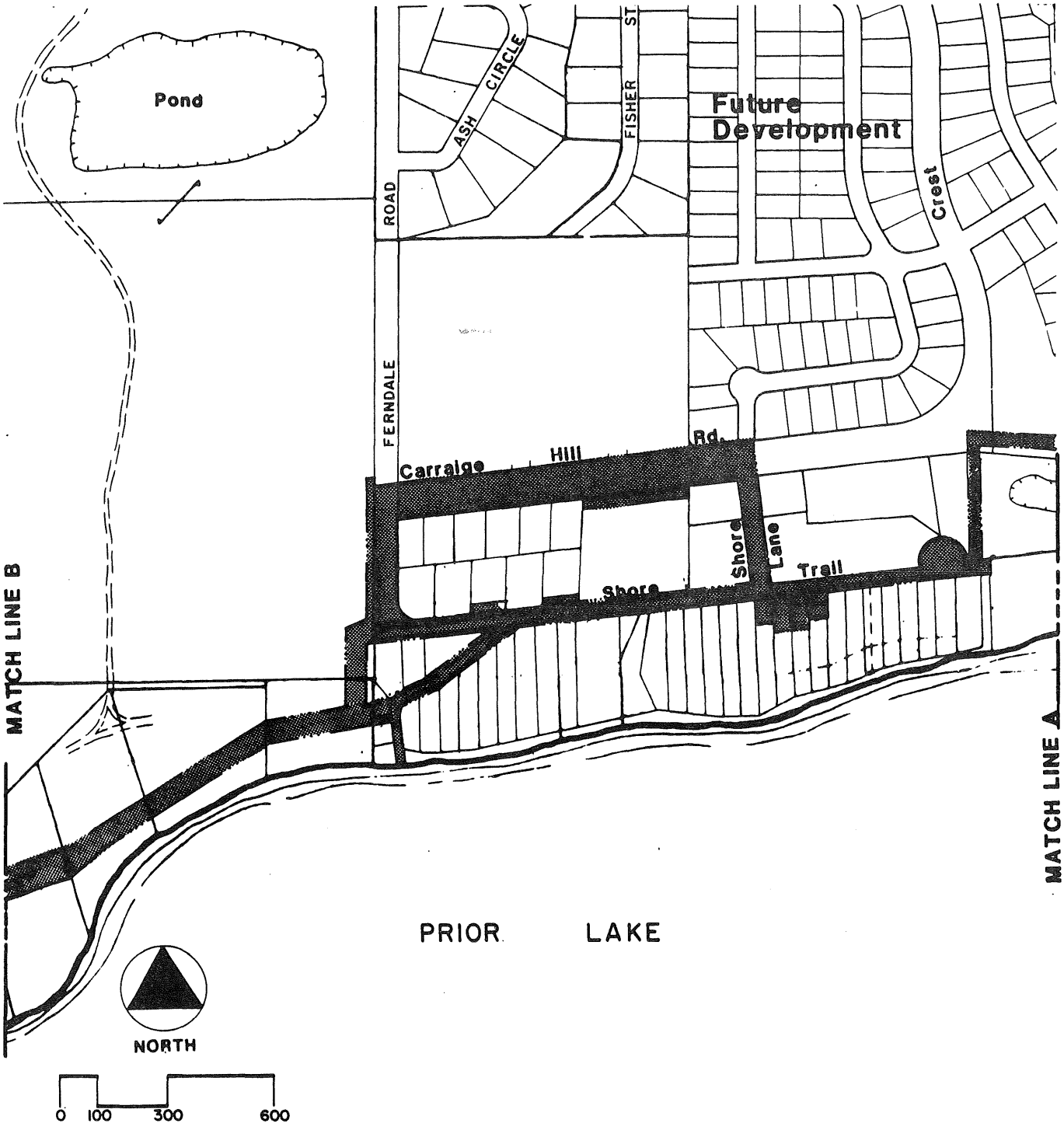


Figure 3-2b: Original Route

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

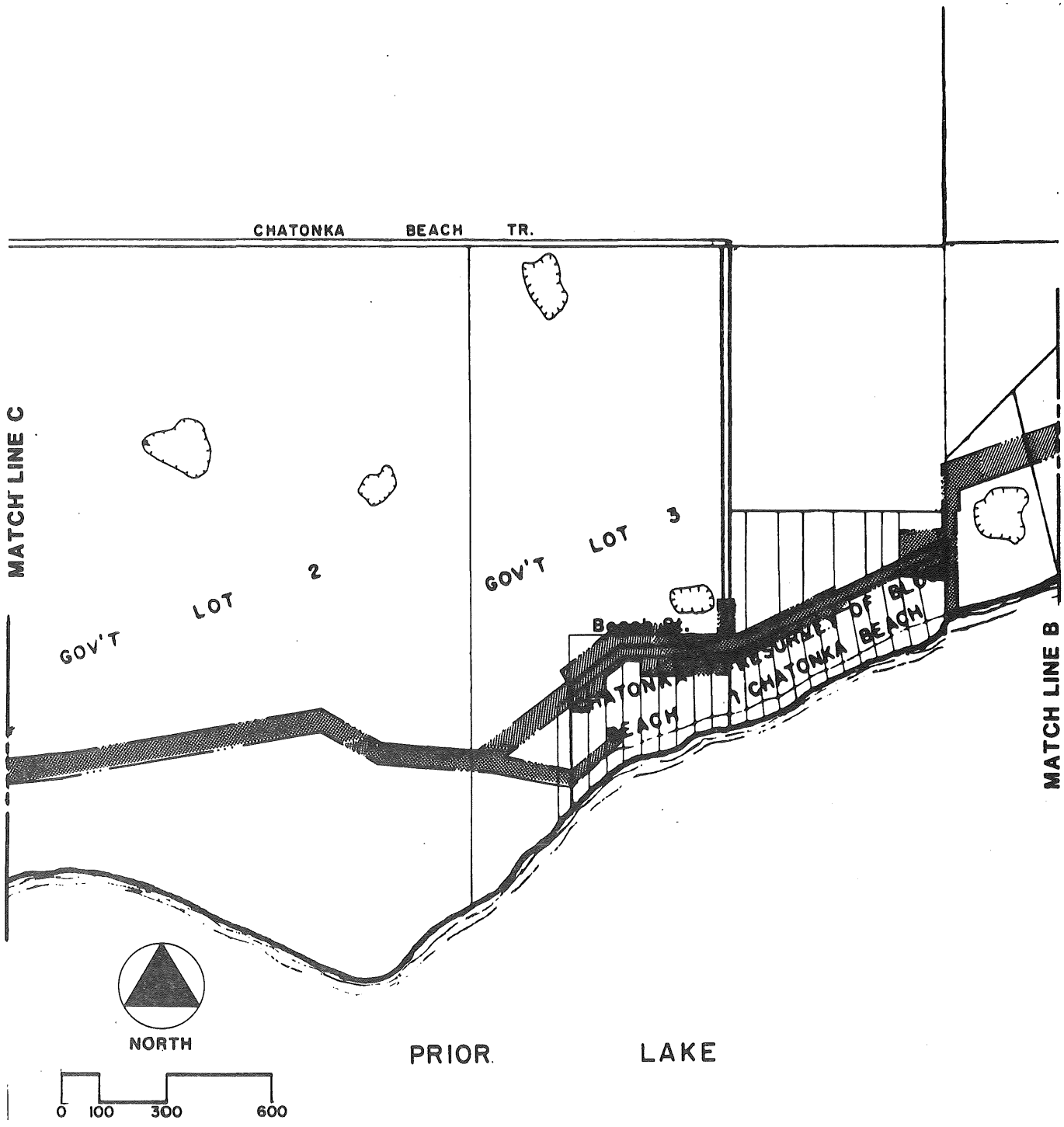


Figure 3-2c: Original Route

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

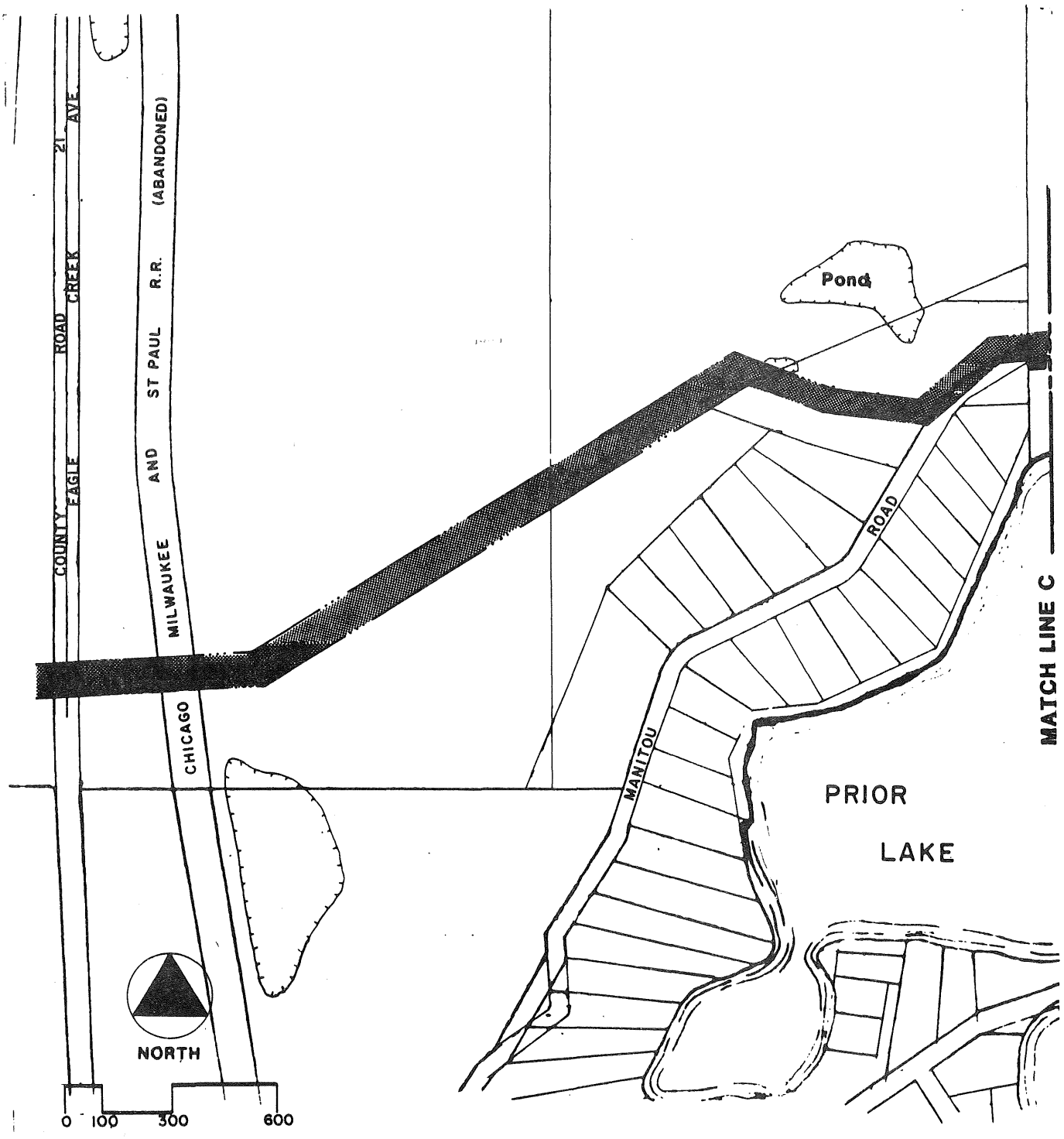


Figure 3-2d: Original Route

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

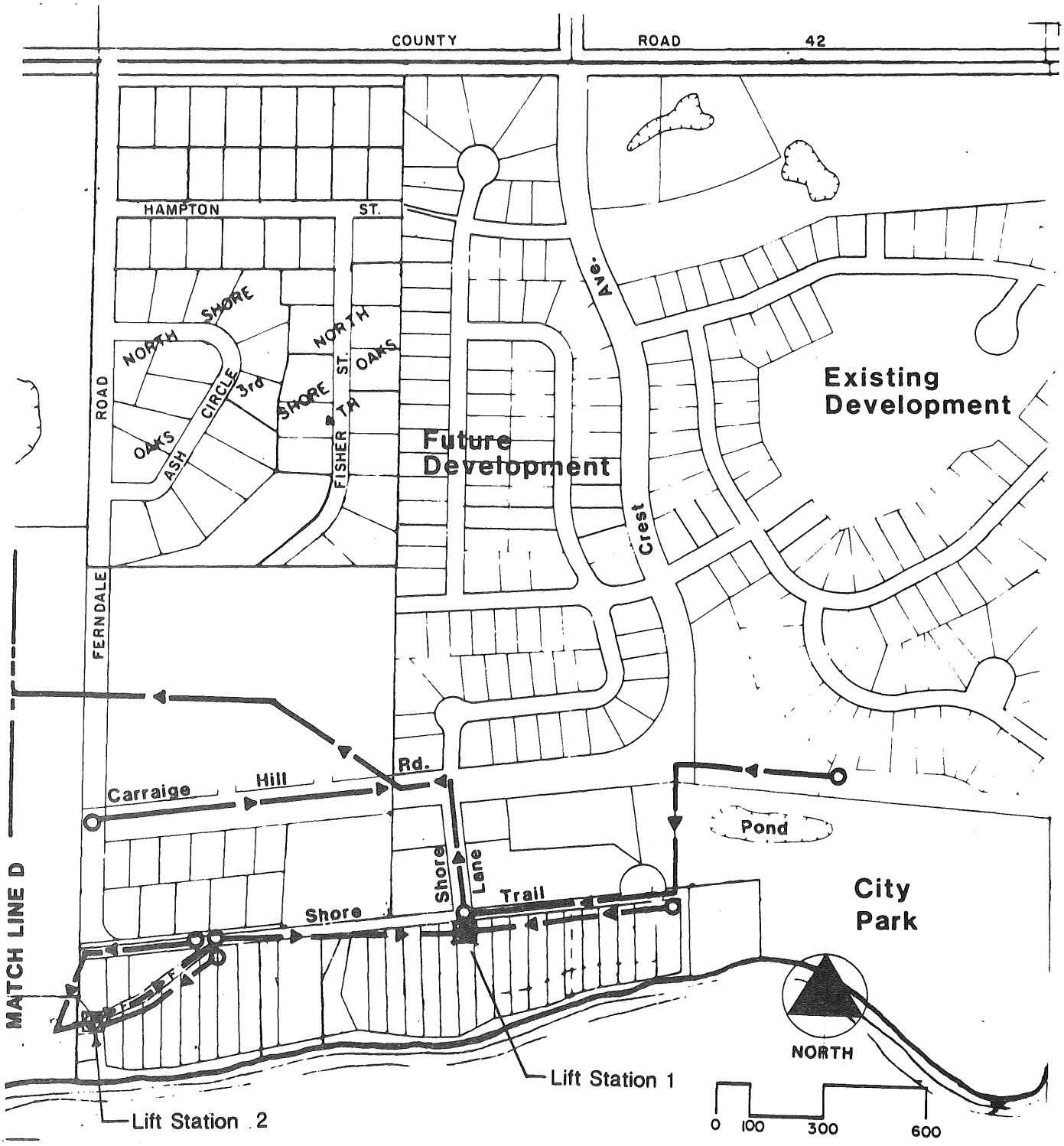


Figure 3-3a: Alternative 1
Prior Lake Northshore Trunk Sewer EIS

MPCA

Legend

—◄— Proposed Sanitary Sewer

— F — Proposed Forcemain

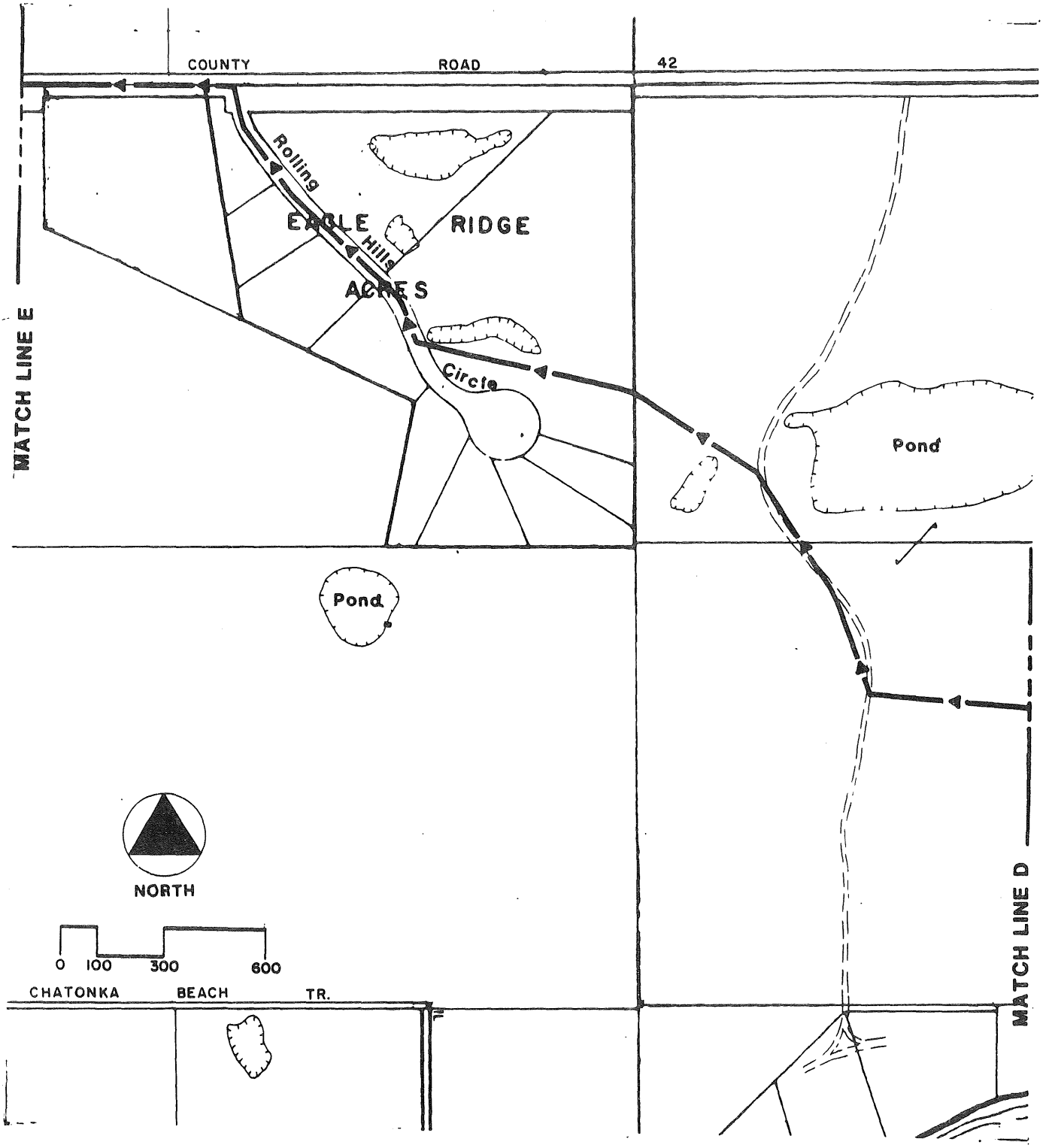


Figure 3-3b: Alternative 1

Prior Lake Northshore Trunk Sewer EIS

Legend

—◄— Proposed Sanitary Sewer

MPCA

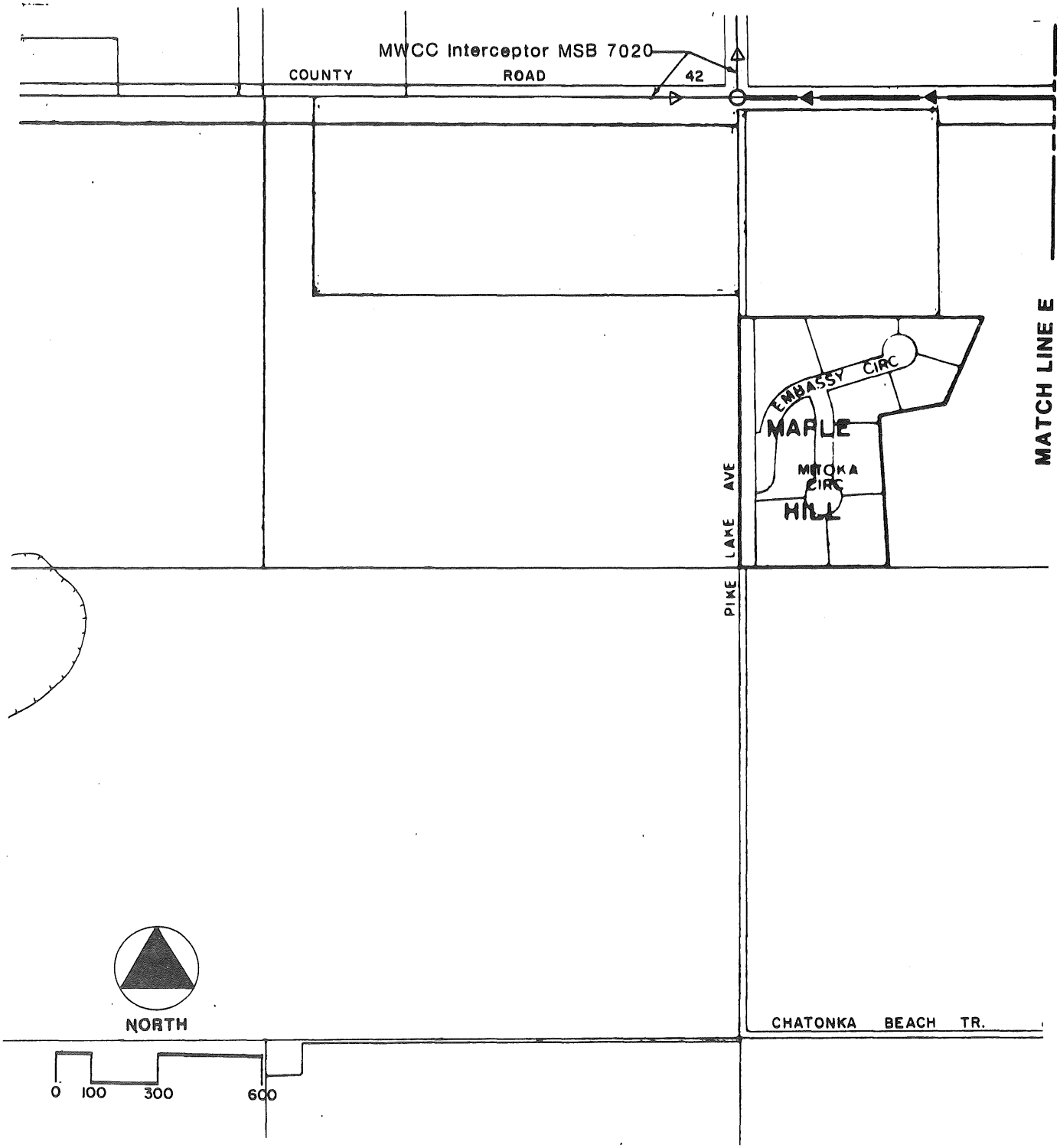


Figure 3-3c: Alternative 1
Prior Lake Northshore Trunk Sewer EIS

Legend

—◄— Proposed Sanitary Sewer

MPCA

trunk line where the trunk enters the Rolling Oaks Circle right-of-way. The depth of the trunk sewer would not be sufficient to serve the North Shore Oaks development by gravity.

Construction of Alternative 1 would involve depths varying between approximately 6 feet and 34 feet. At depths between 6-25 feet, the width of the surface disturbance would vary from approximately 20-55 feet. At depths of 25-34 feet, the width of surface disturbance would be approximately 60-78 feet. These estimates assume 1:1 sideslopes, with approximately 10 feet for access of equipment and supplies and for width of the bottom of the trench. Figure 3-4 shows the approximate extent of the easement acquisition that would be required for the installation of Alternative 1 and associated laterals.

Present land use along and adjacent to the Alternative 1 alignment is residential housing, agriculture, and undeveloped open space. From the Sand Pointe development to Shore Trail, and along Rolling Oaks Circle, land use is residential housing. Between Shore Trail and Rolling Oaks Circle and along County Road 42, existing land use is agriculture and undeveloped open space.

All of the land within the service area of Alternative 1 is zoned Residential (R-1) with three exceptions: a low marshy area between Rolling Oaks Circle and Carriage Hill Road, and the Sand Pointe Park are both zoned Conservation (C-1), and the Sand Pointe development is zoned Planned Unit Development (PUD). Figure 2-2 shows existing zoning.

3.3 ALTERNATIVE 2 TRUNK SANITARY SEWER ALIGNMENT (PIKE LAKE TRAIL - CARRIAGE HILL ROAD - CHATONKA BEACH TRAIL) LIFT STATION OPTION

As shown in Figure 3-5, Alternative 2 would serve the west portion of the Sand Pointe development, which is presently served by a temporary sewer connection to the east. Discharge flows from the Sand Pointe development are as described for the Original Route. Construction of Alternative 2 would reduce the volume of waste reaching an existing lift station but would not result in the elimination of the lift station. The Alternative 2 trunk sewer would have a total length of approximately 13,003 feet.

From the connection point at the Sand Pointe development, the trunk line would run west and then south to the east end of Shore Trail, then continue west along Shore Trail to Shore Lane. At Shore Lane, a lateral would enter the trunk sewer from the west, serving areas east of Pine Drive on Shore Trail.

At the intersection of Shore Trail and Shore Lane at lift station would lift discharges to a gravity line in Shore Lane. From there, the trunk sewer would go north to Carriage Hill Road, then west to the west end of Carriage Hill Road, then south to Shore Trail, where a lateral serving the west end of Shore Trail would enter the trunk sewer from the east. From the west end of Shore Trail, the trunk sewer would go south between some houses until just west of the end of Pine Drive. At that point, a lateral serving Pine Drive would enter the trunk sewer from the east.

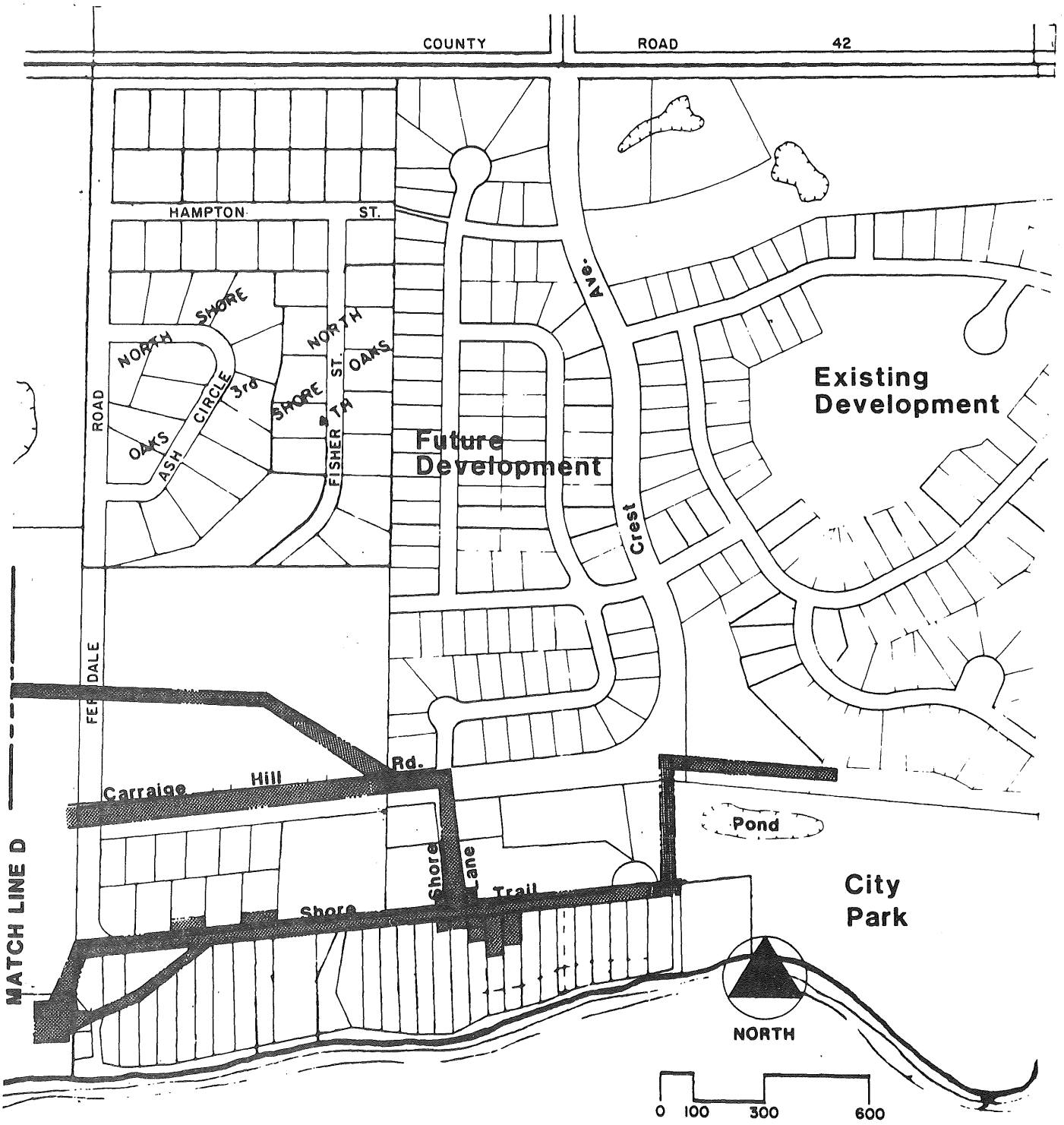


Figure 3-4a: Alternative 1

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

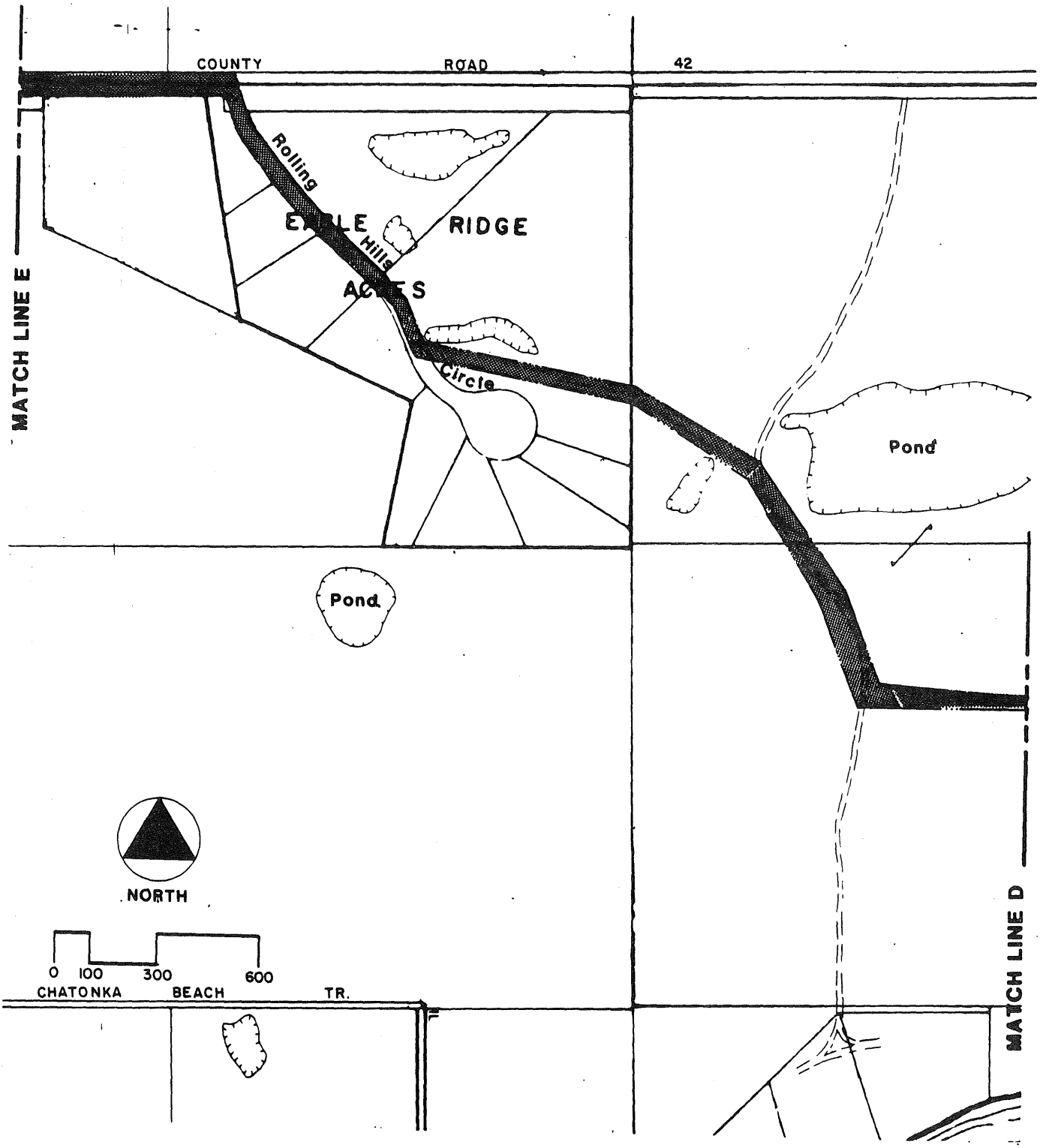


Figure 3-4b: Alternative 1

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

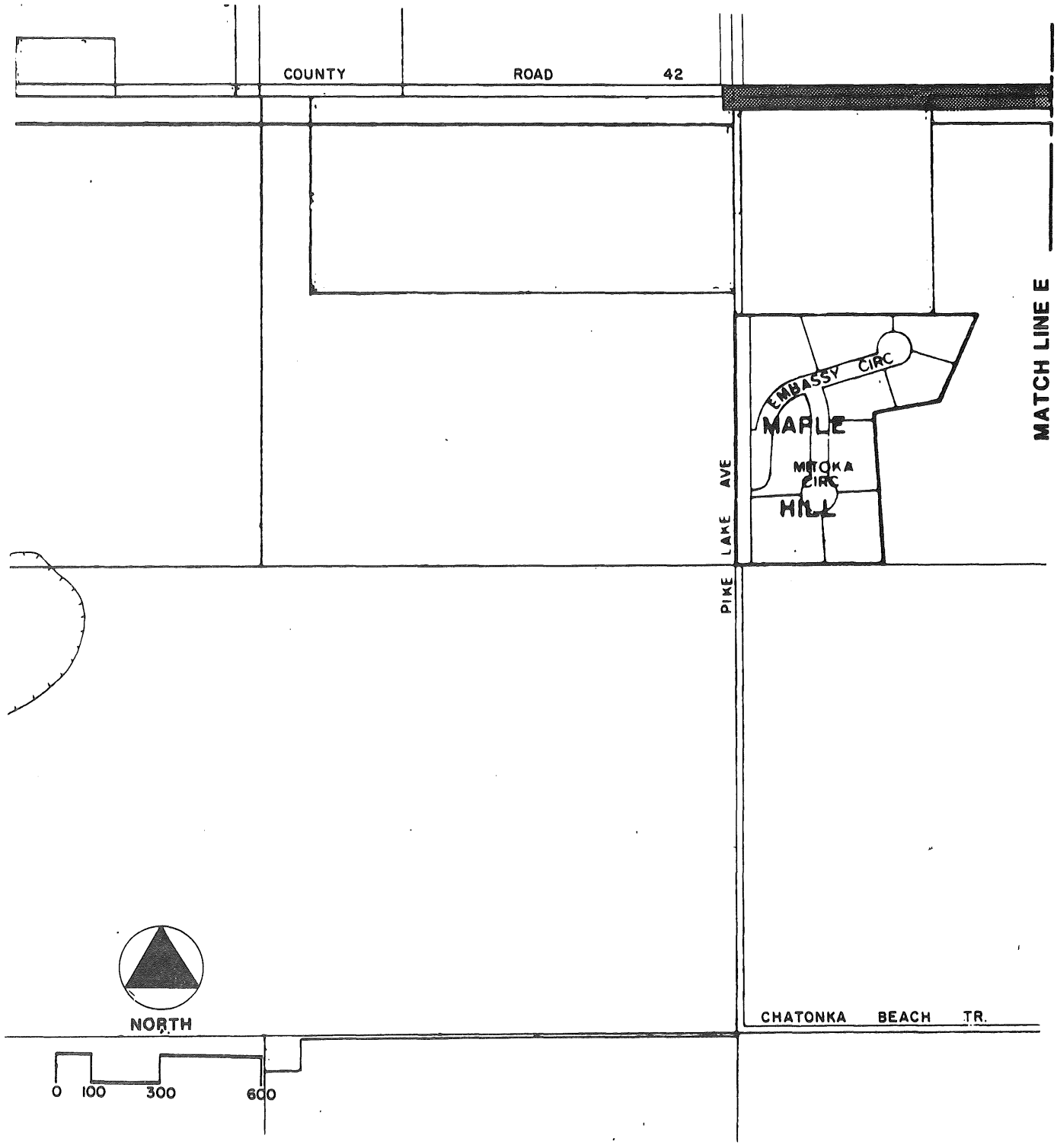


Figure 3-4c: Alternative 1

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

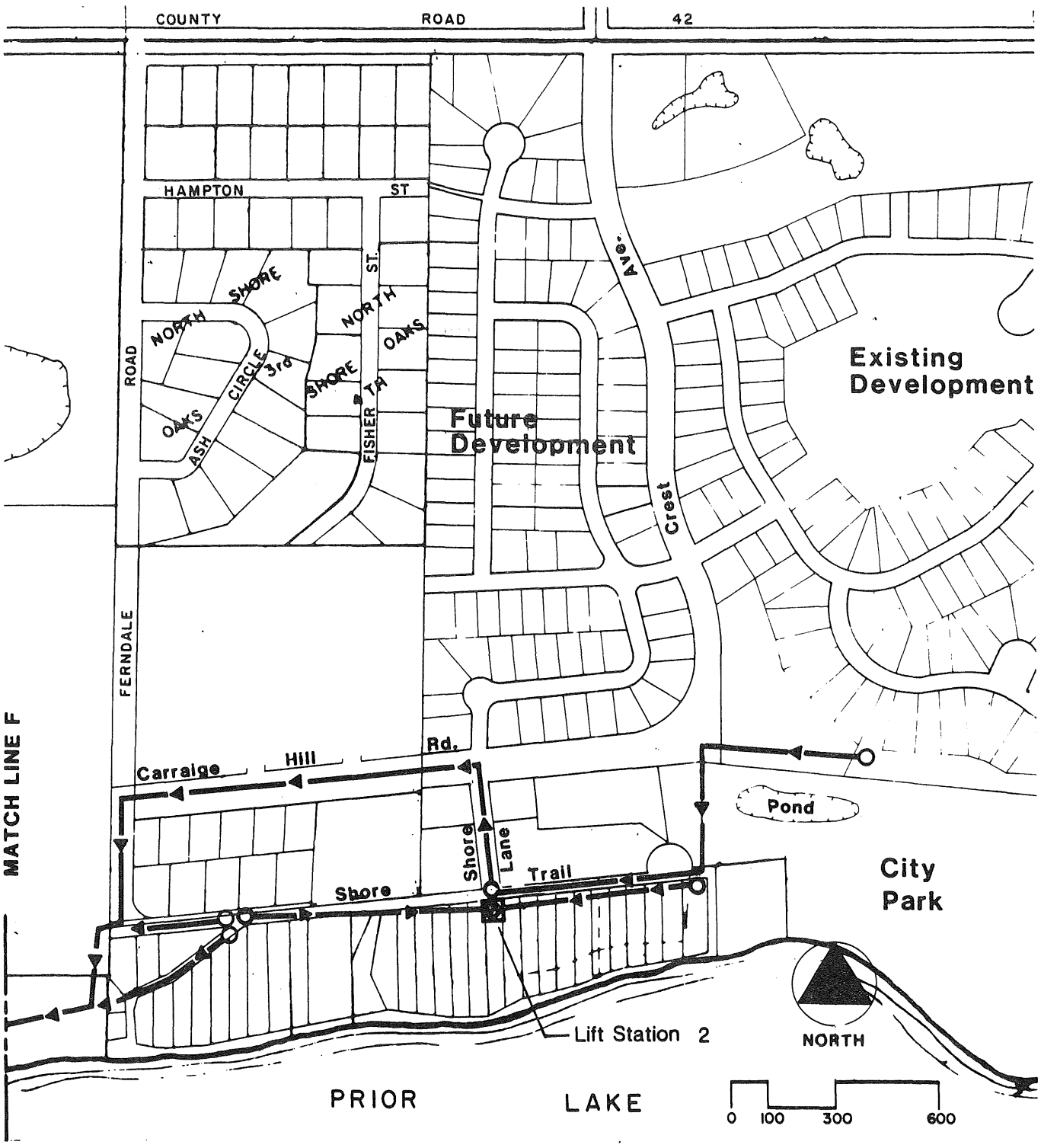


Figure 3-5a: Alternative 2

Prior Lake Northshore Trunk Sewer EIS

Legend

— ◄ — Proposed Sanitary Sewer

MPCA

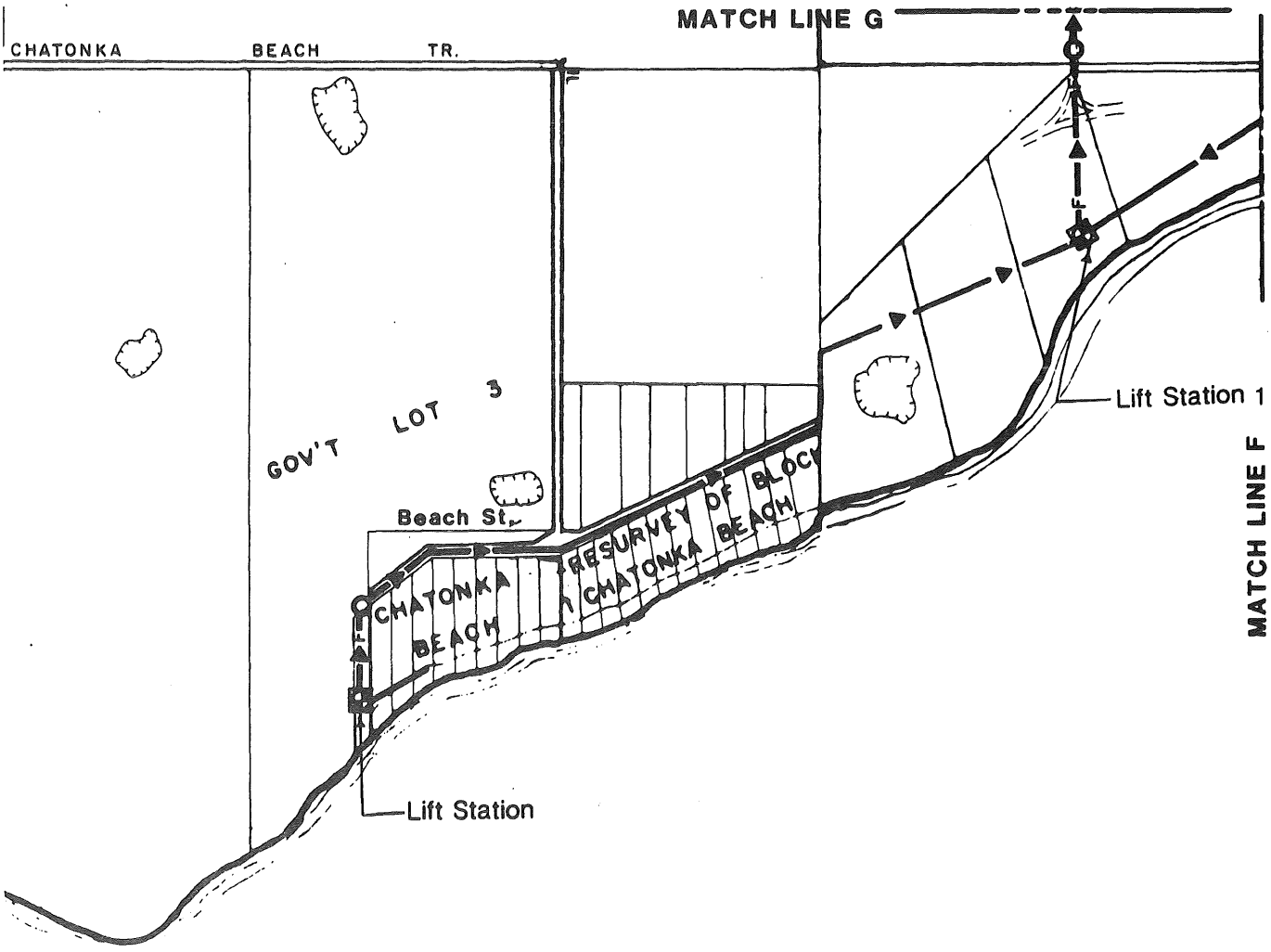


Figure 3-5b: Alternative 2
Prior Lake Northshore Trunk Sewer EIS

MPCA

Legend

—◄ – Proposed Sanitary Sewer

—F ◄– Proposed Forcemain

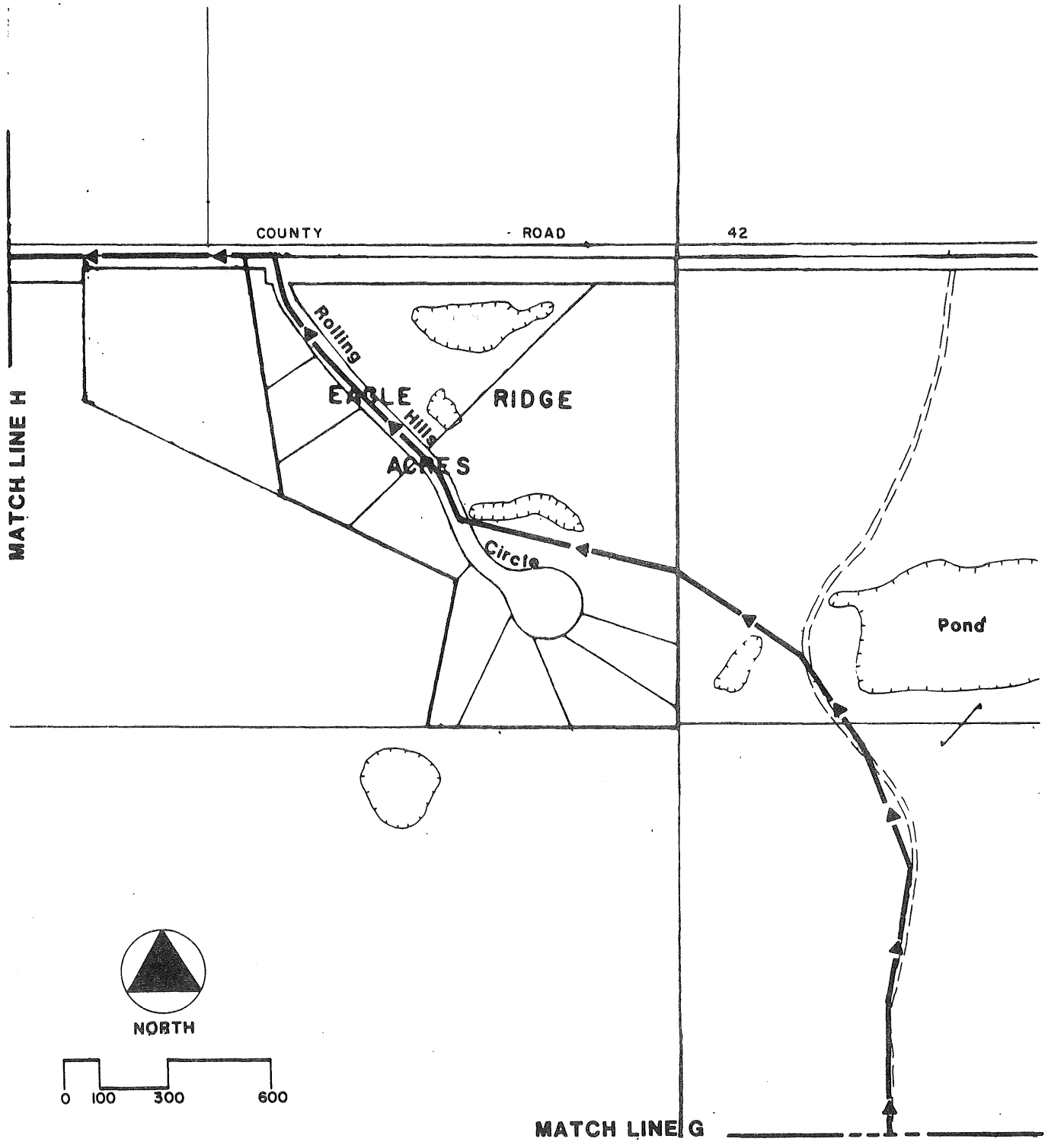


Figure 3-5c: Alternative 2

Prior Lake Northshore Trunk Sewer EIS

Legend

Proposed Sanitary Sewer

MPCA

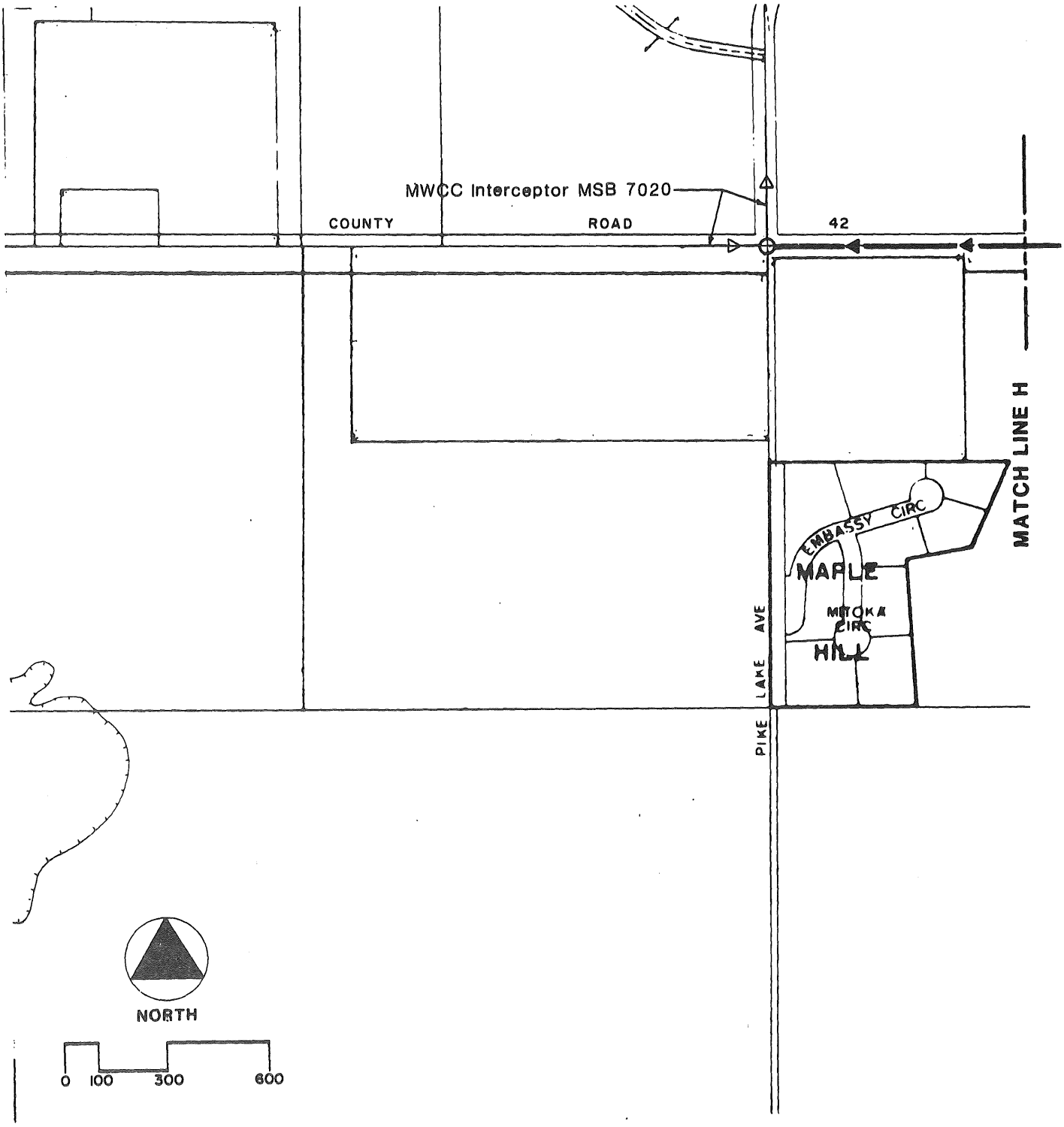


Figure 3-5d: Alternative 2

Prior Lake Northshore Trunk Sewer EIS

Legend

Proposed Sanitary Sewer

MPCA

From the west end of Pine Drive, the trunk sewer would go west along the lake to a large lift station located approximately half way between Beach Street and Pine Drive. At that point, a lateral serving Beach Street would enter from the west. A small lift station would be required to serve the westerly three homes on Beach Street.

The large lift station would pump discharges north to the drainage divide, at which point gravity flow could be attained. From there, the trunk sewer would run north and west to Rolling Oaks Circle, northwest along Rolling Oaks Circle to County Road 42, and then west along County Road 42 to the MWCC interceptor sewer line (MSB 7020) at Pike Lake Trail. Alternative 2 would not enable gravity wastewater collection from North Shore Oaks, owing to its insufficient depth.

Construction of a trunk sewer system along the Alternative 2 would involve depths varying between approximately 4 feet and 34 feet. At depths between 4-25 feet, the width of the surface disturbance would vary from approximately 20-55 feet. At depths of 25-34 feet, the width of surface disturbance would be approximately 50-78 feet. These estimates assume 1:1 sideslopes, with approximately 10 feet for access of equipment and supplies, and for width of the bottom of the trench. Figure 3-6 shows the approximate extent of easement acquisitions that would be required for the installation of Alternative 2 and its laterals.

Present land use along and adjacent to Alternative 2 is distributed between residential housing, agriculture, and undeveloped open space. From the Sand Pointe development to Beach Street, land use is residential housing. From the residental shoreline property between Beach Street and Shore Trail, north to Rolling Oaks Circle, land use is for agriculture and undeveloped open land. Along Rolling Oaks Circle, land use is residential housing. From Rolling Oaks Circle to the interceptor sewer at Pike Lake Trail, land use is undeveloped open space.

All of the land uses within the Alternative 2 service area are as described for Alternative 1.

3.4 ALTERNATIVE 3 TRUNK SANITARY SEWER ALIGNMENT (PIKE LAKE TRAIL - CARRIAGE HILL ROAD - CHATONKA BEACH TRAIL) GRAVITY LINE OPTION

Alternative 3 would serve the developed sections of the North Shore community with a gravity trunk sewer, following the same alignment as that of Alternative 2. The Alternative 3 trunk sewer and associated laterals would have a total length of approximately 13,170 feet.

As shown in Figure 3-7, Alternative 3 would serve the west portion of the Sand Pointe development which is presently served through a temporary connection to the east. Discharge flows from the Sand Pointe development are as described for the Original Route. Construction of Alternative 3 would reduce the volume of waste reaching an existing lift station but would not result in the elimination of the lift station.

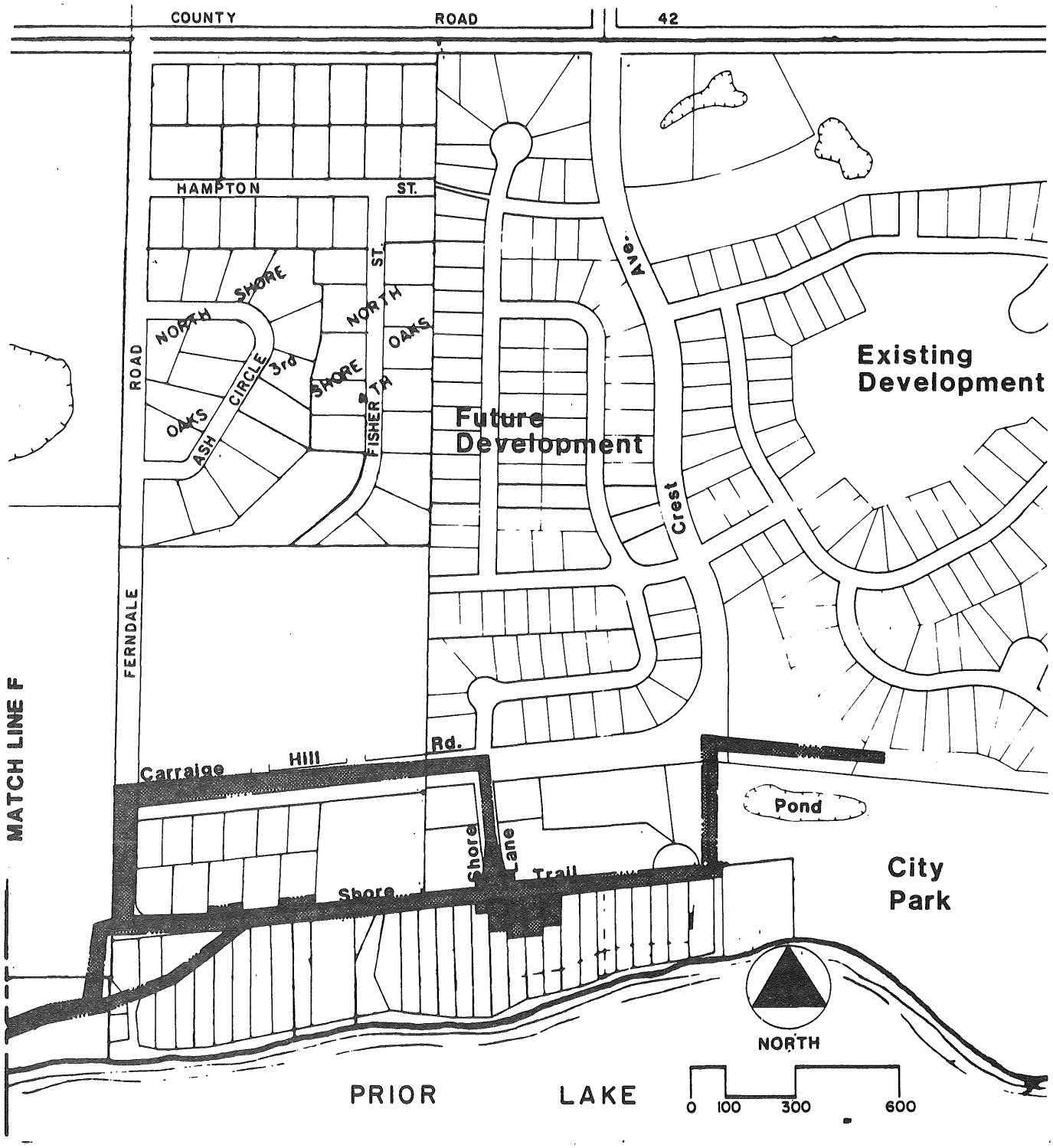


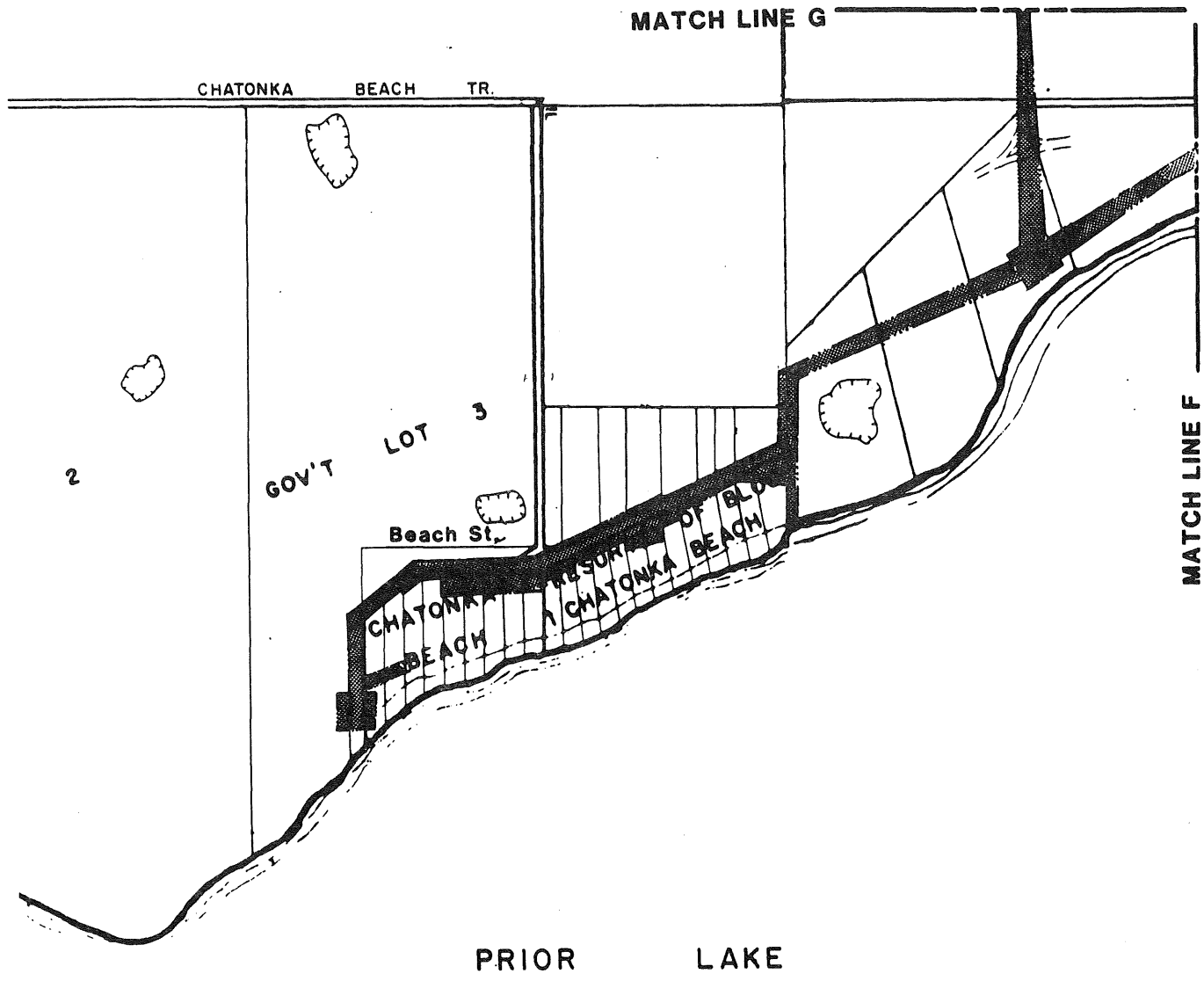
Figure 3-6 a: Alternative 2

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA





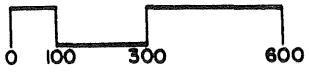


Figure 3-6b: Alternative 2

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

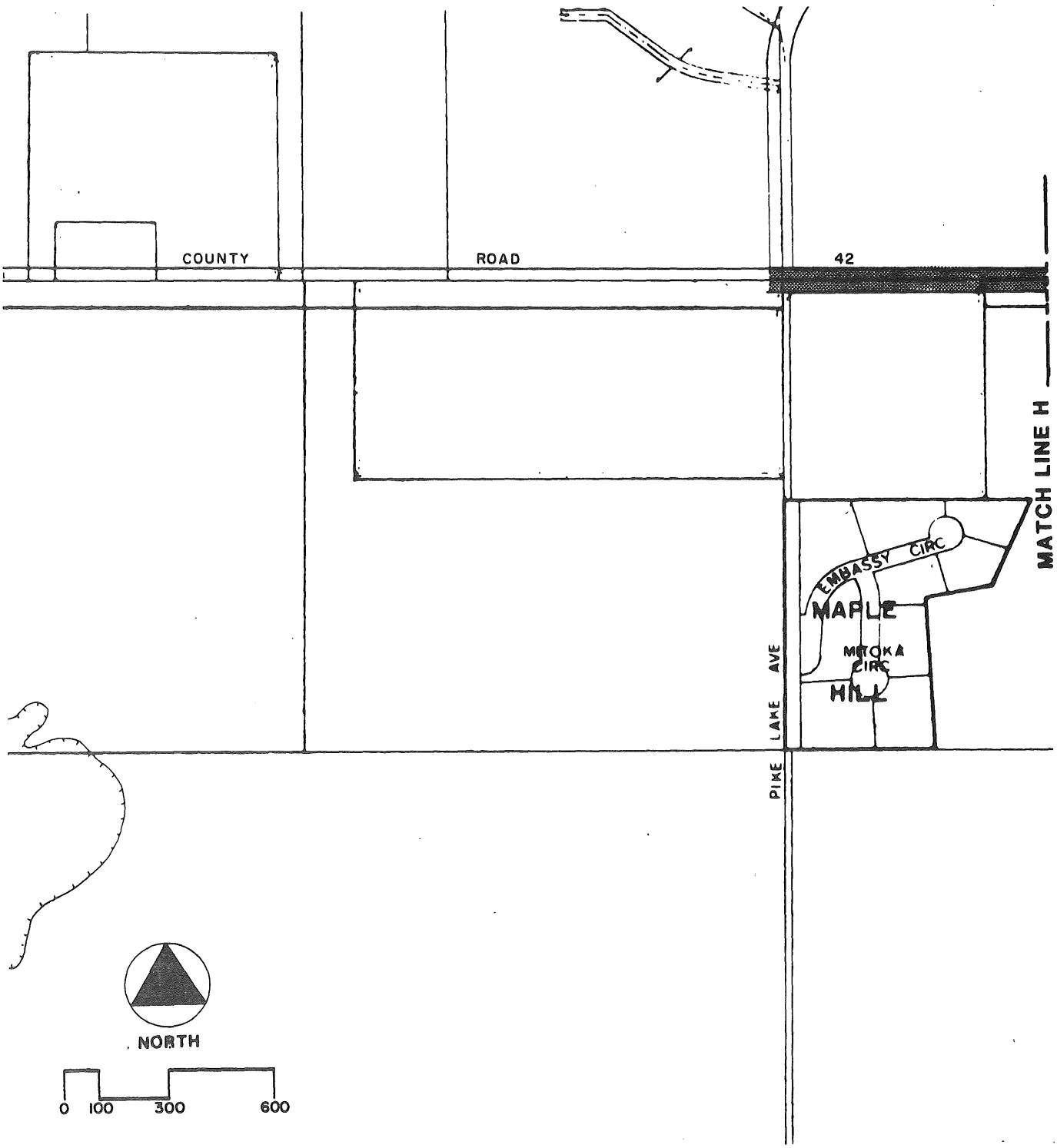


Figure 3-6c: Alternative 2
Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

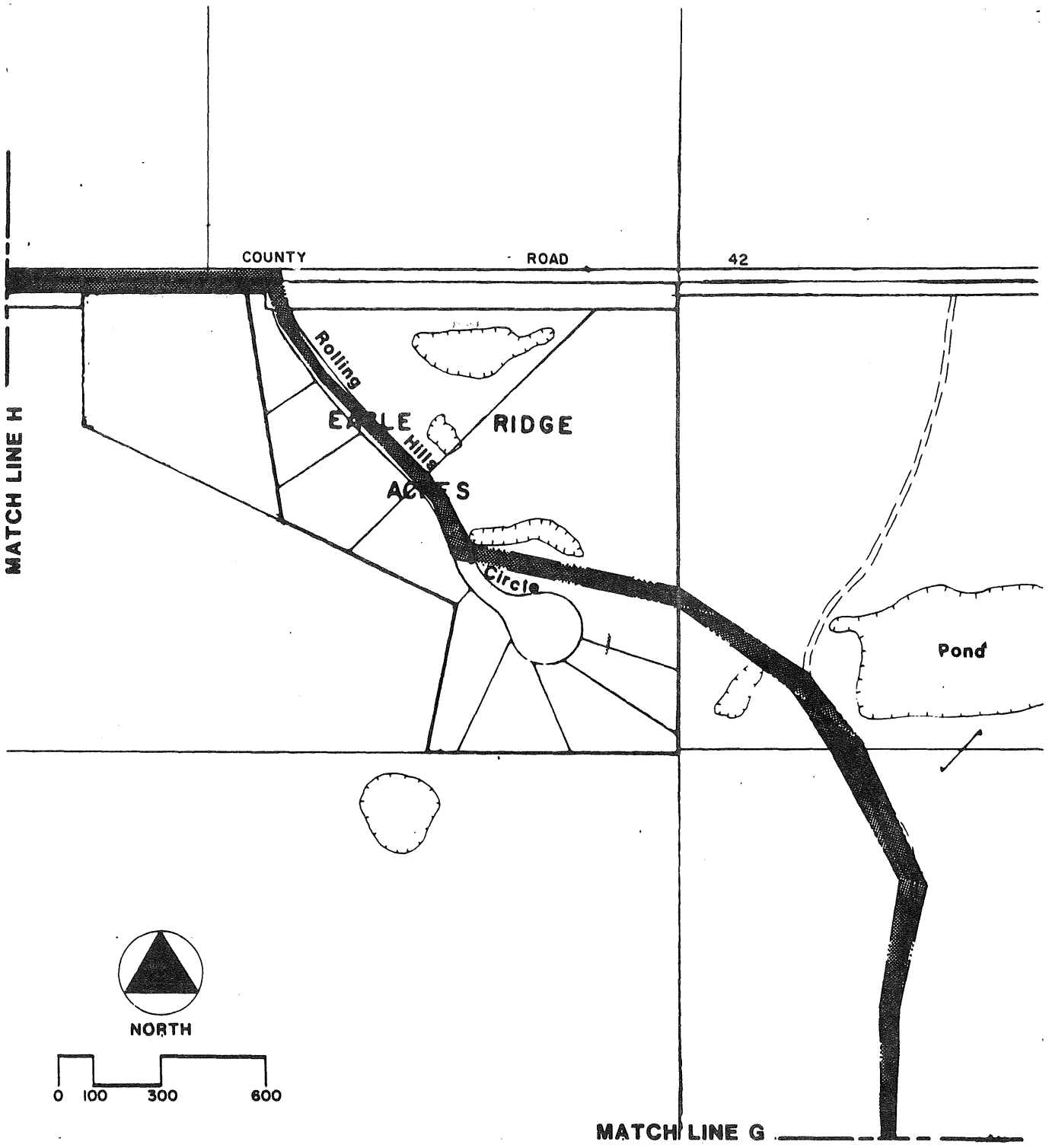


Figure 3-6d: Alternative 2

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

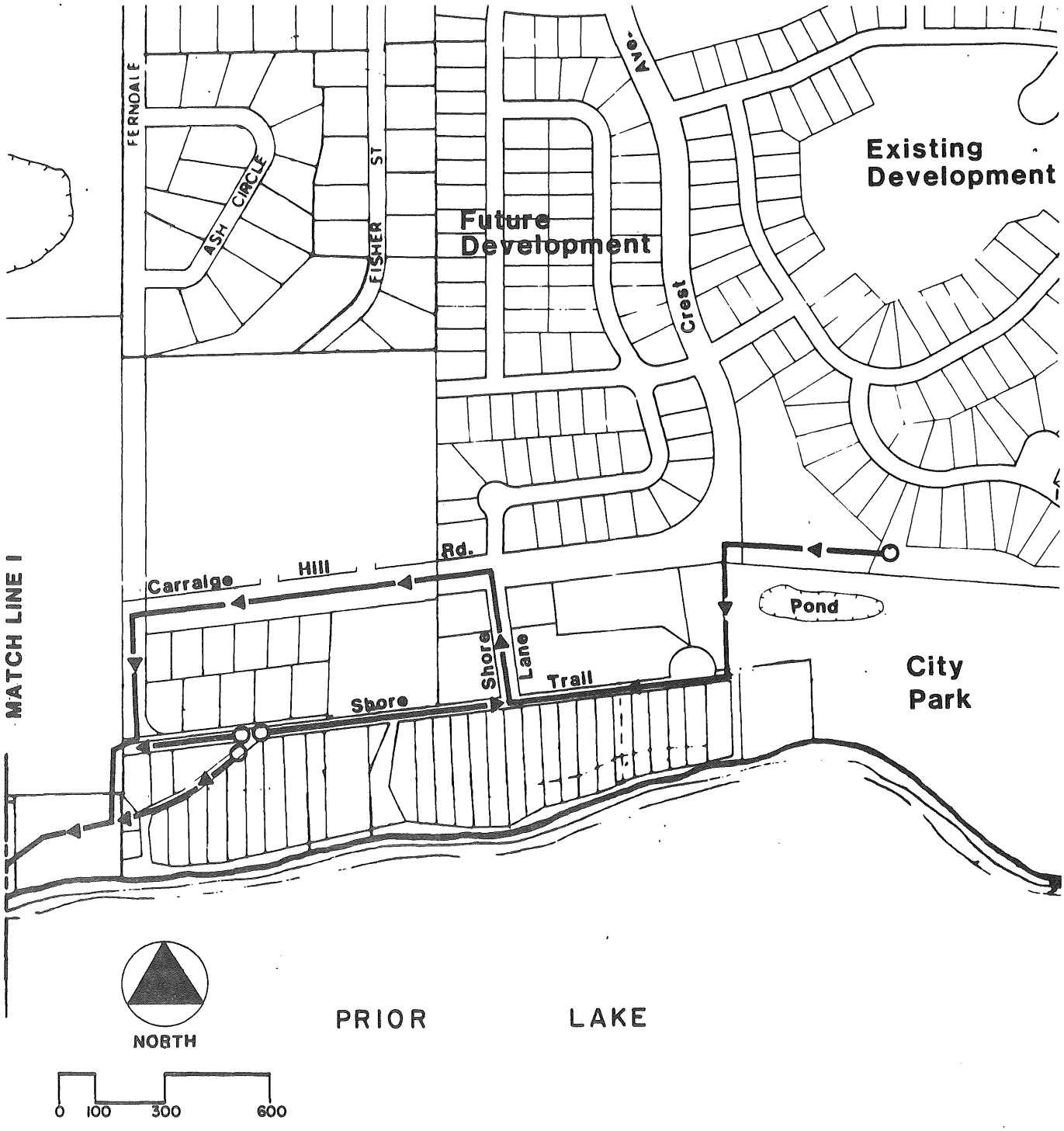


Figure 3-7a: Alternative 3

Prior Lake Northshore Trunk Sewer EIS

Legend

—◄– Proposed Sanitary Sewer

MPCA

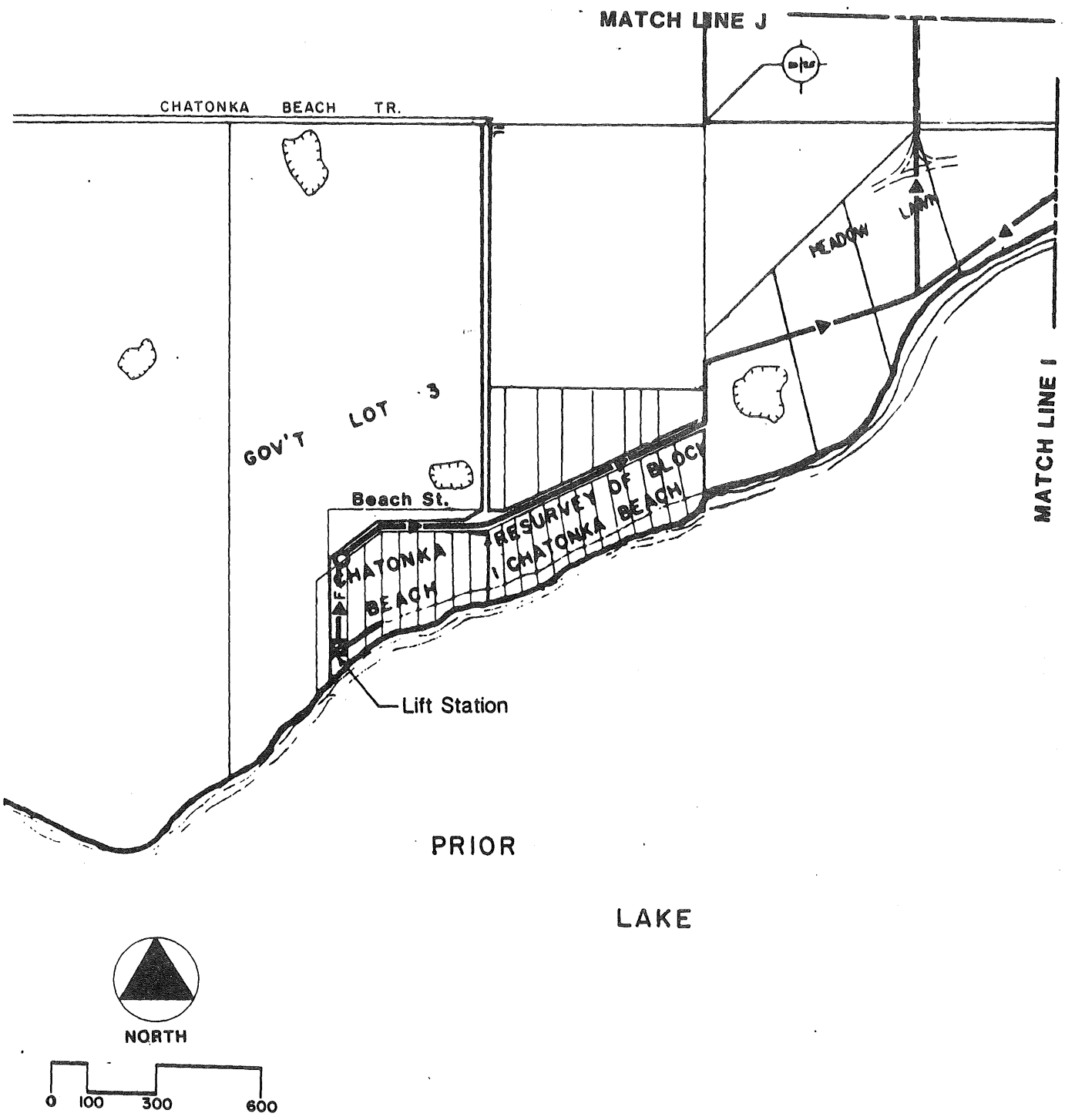


Figure 3-7b: Alternative 3
Prior Lake Northshore Trunk Sewer EIS

MPCA

Legend

— ◄— Proposed Sanitary Sewer

—F◄— Proposed Forcemain

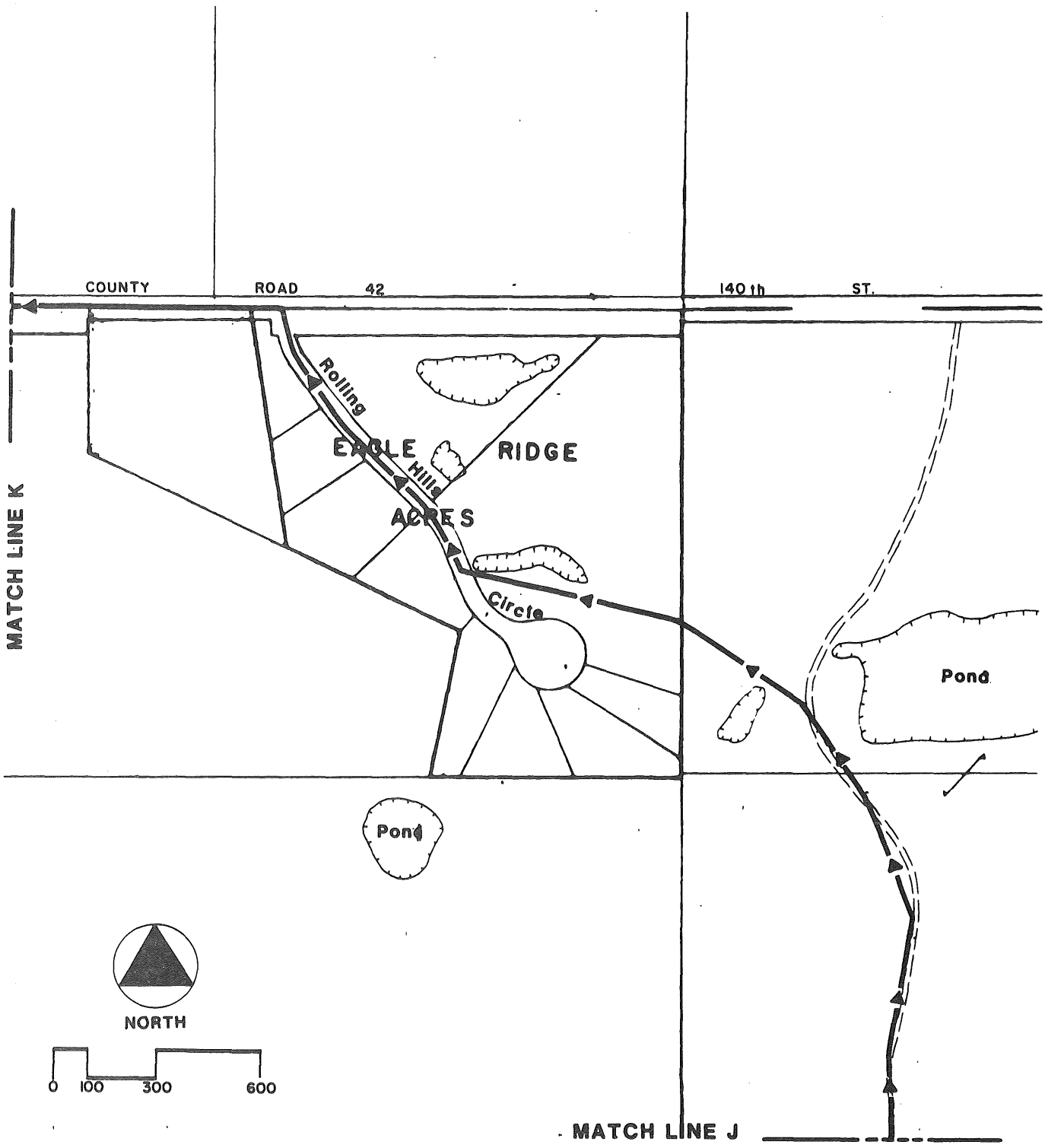


Figure 3-7c: Alternative 3

Prior Lake Northshore Trunk Sewer EIS

Legend

— ◄ – Proposed Sanitary Sewer

MPCA

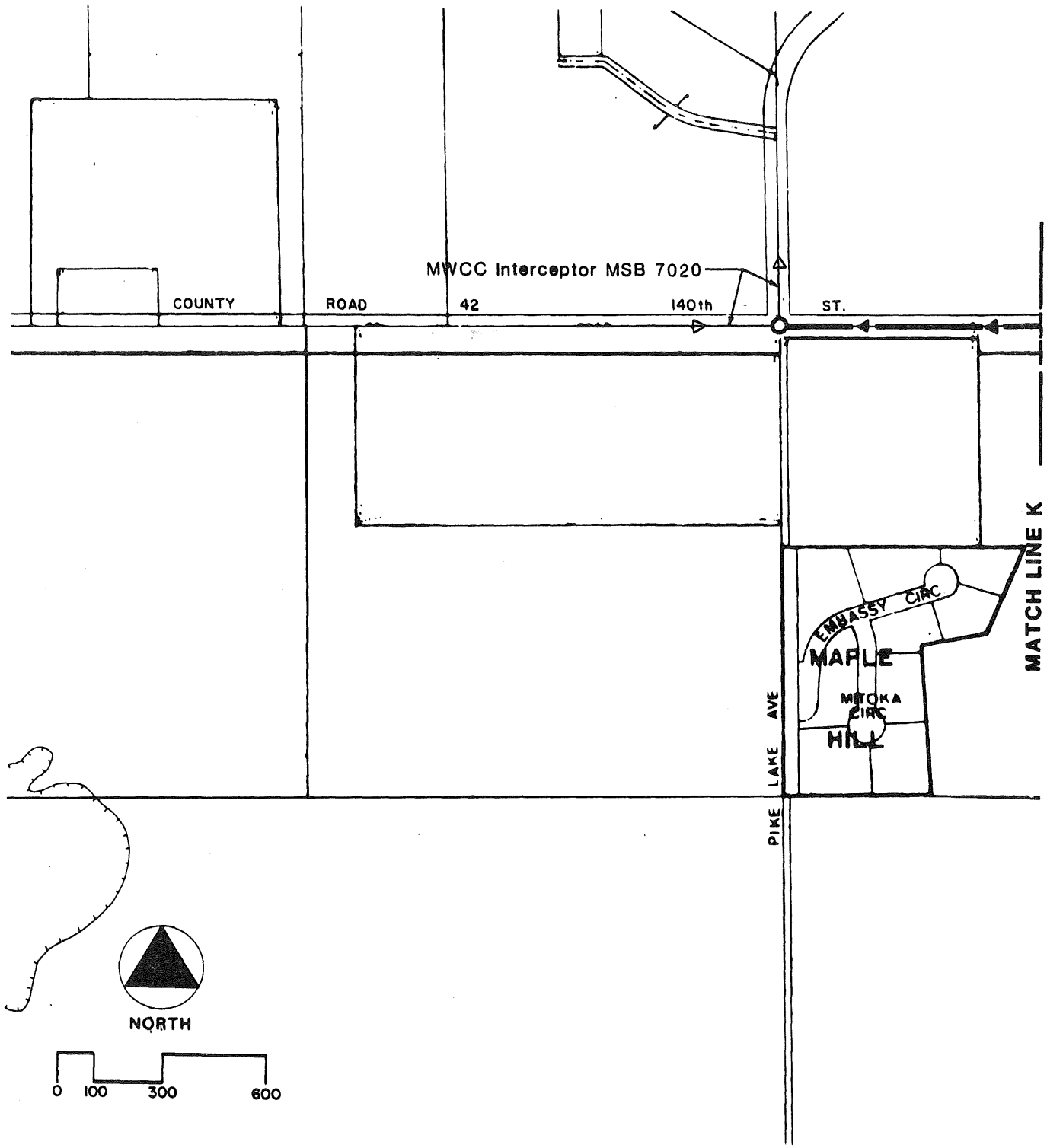


Figure 3-7d: Alternative 3

Prior Lake Northshore Trunk Sewer EIS

Legend

Proposed Sanitary Sewer

MPCA

From the connection point at the Sand Pointe development, the trunk line would run west and then south to the east end of Shore Trail, then continue west along Shore Trail to Shore Lane. At Shore Lane, a lateral would enter the trunk sewer from the west, serving areas east of Pine Drive on Shore Trail.

From the intersection of Shore Trail and Shore Lane, the trunk sewer would go north to Carriage Hill Road, then west to the west end of Carriage Hill Road, then south to Shore Trail. At Shore Trail, a lateral serving the west end of Shore Trail would enter the trunk sewer from the east.

From the west end of Shore Trail, the trunk sewer would go south between some houses to a point just west of the end of Pine Drive. At that point, a lateral serving Pine Drive would enter the trunk sewer from the east.

From the west end of Pine Drive, the trunk sewer would go west along the lake to a point approximately half way between Pine Drive and Beach Street. At that point, a lateral serving Beach Street would enter from the west. A small lift station would be required to serve the western-most three homes on Beach Street. This lift station could be eliminated if sanitary sewer service would ever be extended from the west to serve properties west of Beach Street.

From the point half way between Beach Street and Pine Drive, the trunk would go north, and then northwest to Rolling Oaks Circle. The trunk sewer would run northwest along Rolling Oaks Circle to County Road 42, and then west along County Road 42 to the MWCC interceptor sewer line (MSB 7020) at Pike Lake Trail.

Construction of gravity Alternative 3 would involve depths varying between approximately 6 feet and 62 feet. At depths of 6-25 feet, the width of the surface disturbance would vary from approximately 20-55 feet. At depths of 25-62 feet, the width of surface disturbance would be approximately 60-134 feet. These estimates assume 1:1 sideslopes, with approximately 10 feet for access of equipment and supplies and for width at the bottom of the trench. Figure 3-8 shows the approximate extent of easement acquisition that would be required for the installation of the Alternative 3 trunk sewer and its laterals.

At the present time, land use along and adjacent to Alternative 3 is distributed between residential housing, agricultural, and undeveloped open space. From the Sand Pointe development to Beach Street, land use is residential housing. From the residental shoreline property between Beach Street and Shore Trail, north to Rolling Oaks Circle, land use is for agriculture and undeveloped open land. Along Rolling Oaks Circle, land use is residential housing. From Rolling Oaks Circle to the interceptor sewer at Pike Lake Trail, land use is undeveloped open space.

All of the land uses within the Alternative 3 service area are as described for Alternative 1 with three exceptions: a low marshy area between Rolling Oaks Circle and Beach Street, and Sand Pointe Park are zoned Conservation (C-1), and the Sand Pointe development is zoned Planned Unit Development (PUD). Figure 2-2 shows existing zoning.

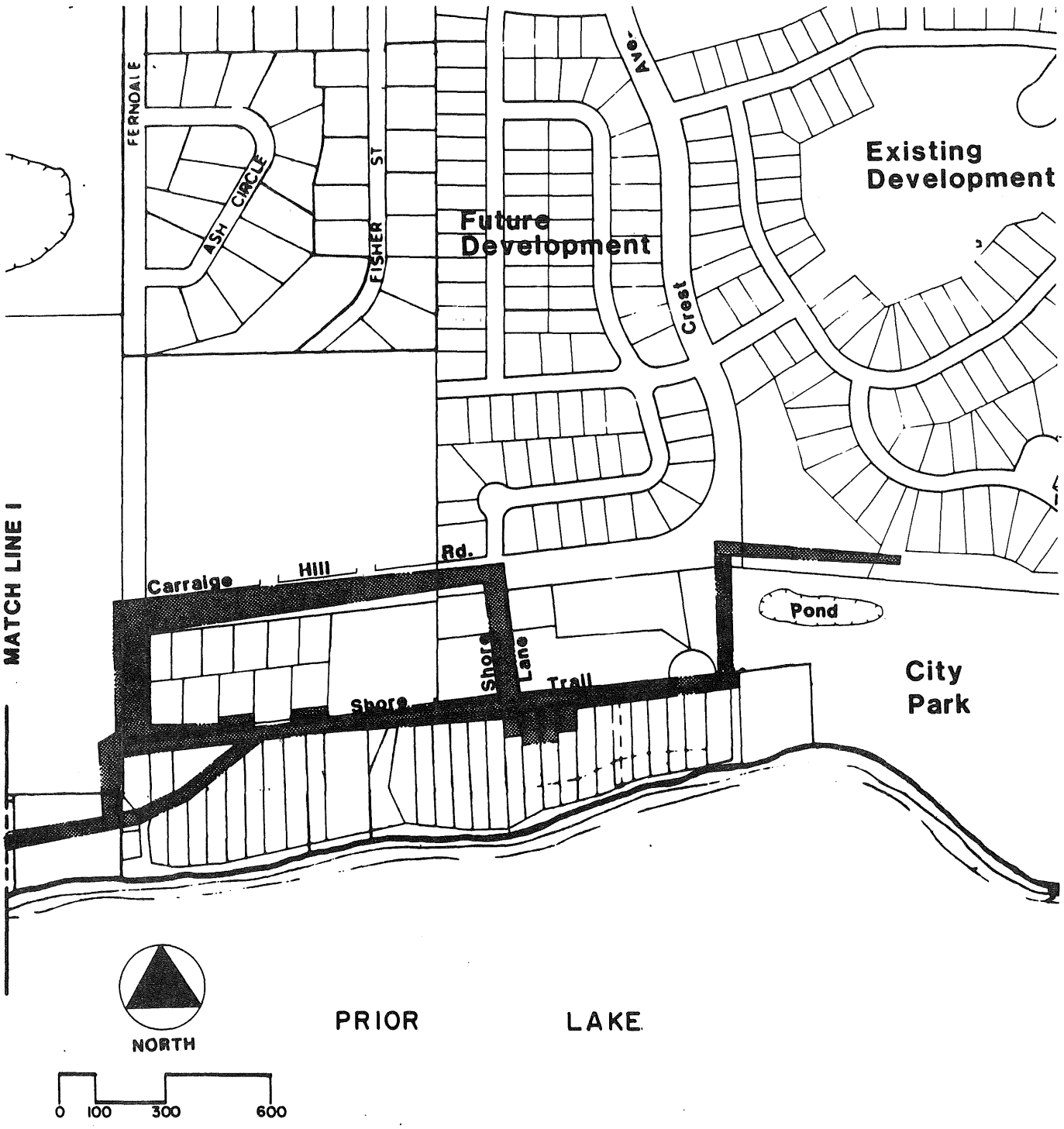


Figure 3-8a: Alternative 3

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

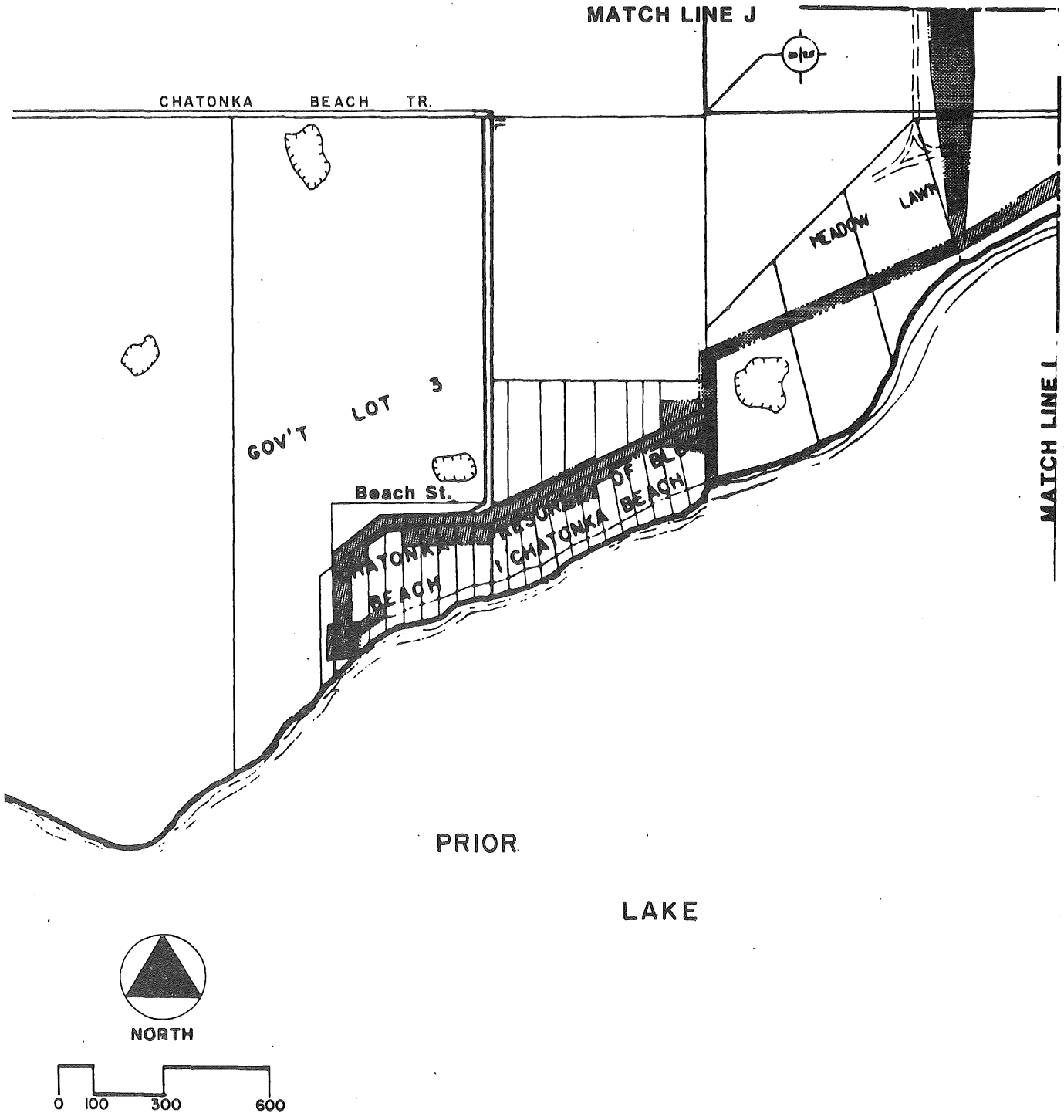


Figure 3-8b: Alternative 3

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

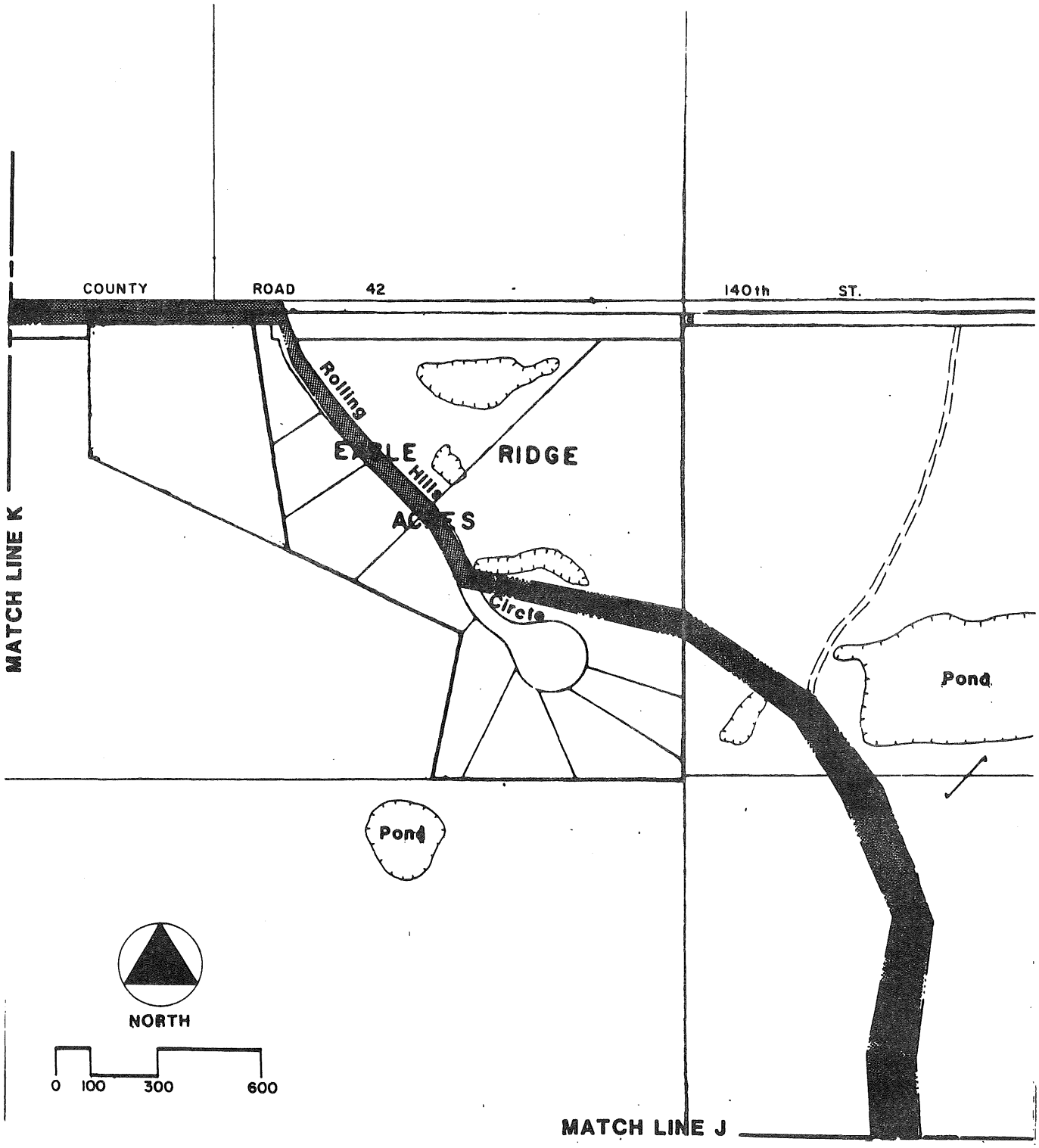


Figure 3-8c: Alternative 3

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

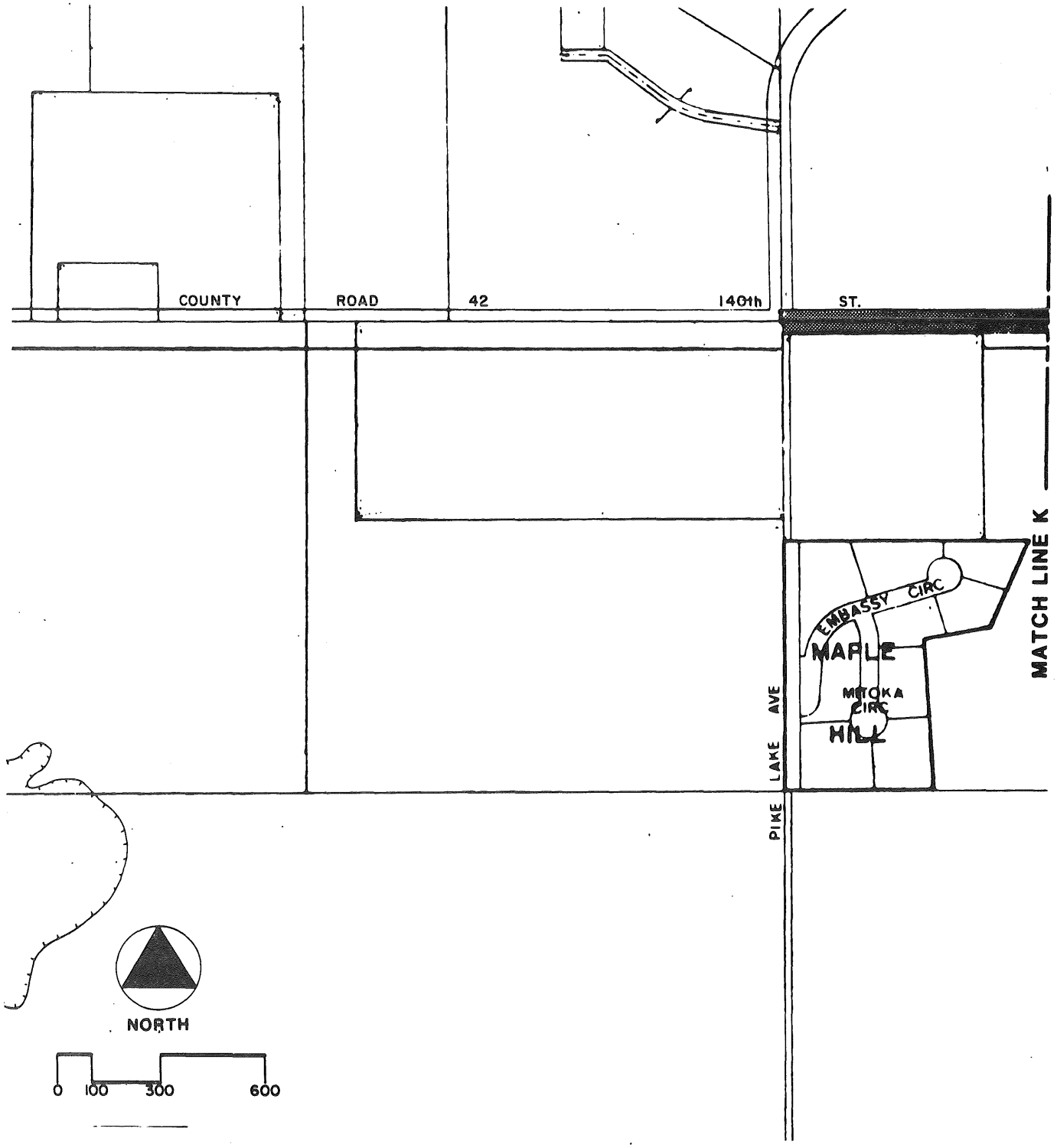


Figure 3-8d: Alternative 3

Prior Lake Northshore Trunk Sewer EIS

Legend

Easement

MPCA

3.5 NORTH SHORE WATERMAIN LOOPING PROJECT

The North Shore Watermain Looping Project is proposed by the City of Prior Lake to be constructed under the same contract as the North Shore Trunk Sewer. This improvement was recommended by a study of the City water system.

The North Shore Watermain Looping Project, as proposed by the City of Prior Lake, would be constructed along the same route as the North Shore Trunk Sewer (Original Route). It would consist of 12-inch ductile iron pipe (DIP) running from a connection in the Sand Pointe development west along the north shore of Lower Prior Lake to a connection point at the east end of Manitou Road.

In addition to this improvement, the City has proposed to construct two additional segments of watermain looping on the south side of Lower Prior Lake, and to pay for these additional loops out of general funds. One loop would be 20-inch DIP running from Red Oaks Road to West Avenue. The second segment would be 20-inch pipe from Crossandra Lane to Candy Cove Trail. The location of the proposed improvements is shown in Figure 3-9.

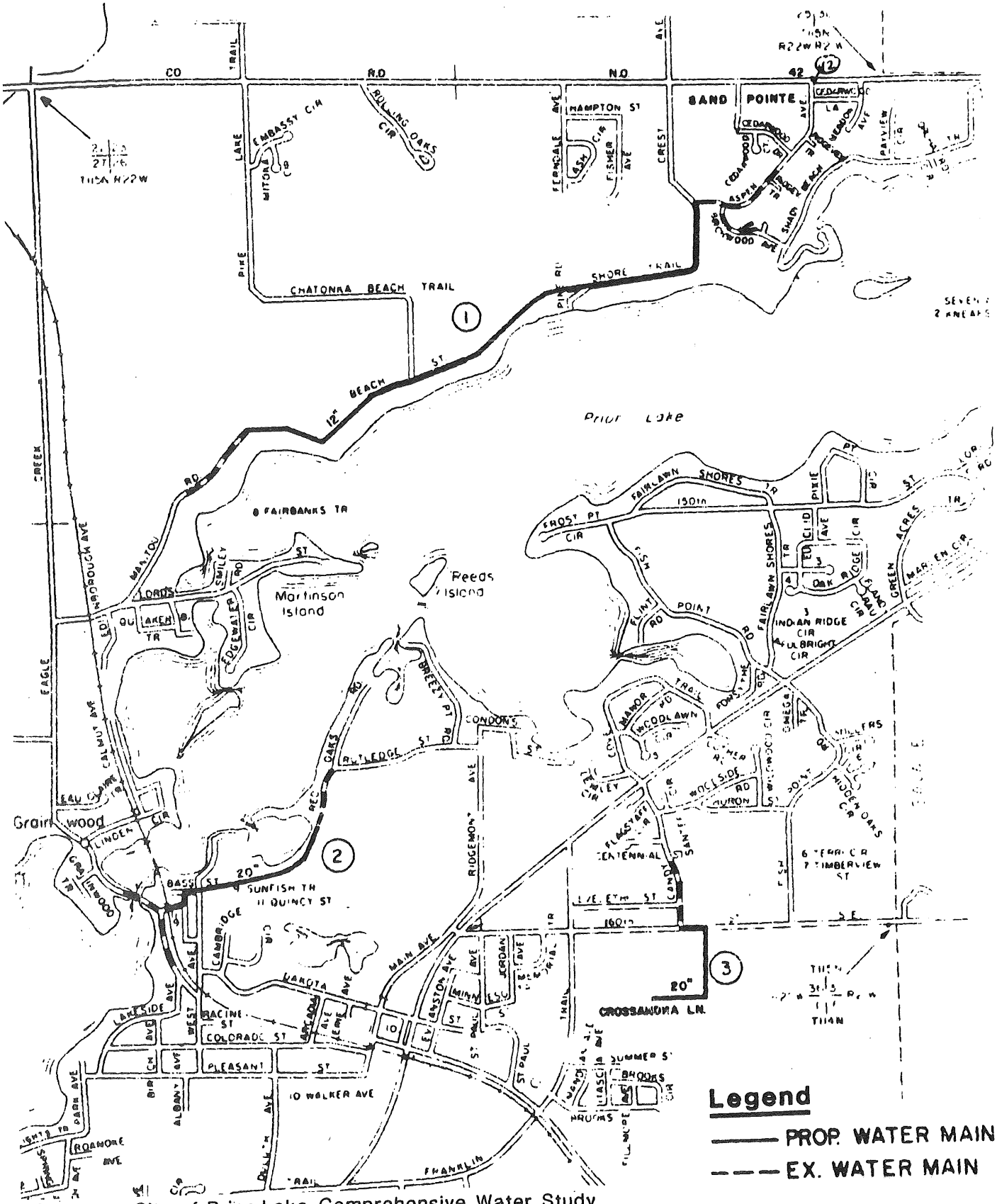
The purpose of these improvements is two-fold: to serve existing homes along the North Shore with public water supplies, and to alleviate an existing low pressure situation at the end of the existing City water supply system.

In 1977 when the City water system was contaminated, a study of the existing system was completed to locate potential problem areas in the City's water system, and to identify remedial measures to prevent future system contamination. The study concluded that during fire flow conditions at some locations, negative pressures could occur at points near the end of the water system in the Sand Pointe development. Among the study recommendations were improvements to the North Shore water system.

It should be noted that the water system study showed that if improvements 2 and 3, as shown in Figure 3-9 were constructed without construction of the North Shore Watermain (Improvement 1), the pressure at the end of the North Shore system would be adequate under existing development conditions. It concluded that under fire flow conditions, pressure at the end of the lines would be approximately 25 psi. Health Department recommendations are for at least 20 psi under fire flow conditions. As development on the North Shore continues, however, and the water system continues to expand, a point will be reached where the North Shore loop will be required.

Construction of a watermain along the North Shore alignment would involve depths varying between 7.5 feet and 10 feet. At these depths, the width of surface disturbance would vary from approximately 20-25 feet. These estimates assume 1:1 sideslopes, with approximately 4 feet for width at the bottom of the trench.

The watermain looping project (See Figure 3-9), as proposed by the City of Prior Lake, would follow the same route as that of the proposed Original Route. The depth of the watermain would generally follow the ground contours. Due to its greater depth, the width of disturbances for the trunk sewer would generally be greater than that of the watermain. Consequently, if the trunk sewer were to be constructed as proposed, the additional surface disturbed for construction of the watermain would be minimal.



Source: City of Prior Lake Comprehensive Water Study

Figure 3-9: Existing and Proposed Water Main

Prior Lake Northshore Trunk Sewer EIS

MPCA

If the North Shore watermain looping project were constructed in conjunction with Alternatives 1, 2, or 3, the additional areas impacted by construction of the watermain would be limited to the area between Beach Street and Manitou Road for Alternatives 2 and 3, and the area between Pine Road and Manitou Road for Alternative 1. Where the watermain would be installed along the trunk sewer, the width of surface disturbance would be no greater than if only the trunk sewer were constructed. The additional forested areas impacted by installation of the watermain in conjunction with Alternatives 2 or 3 would be the same for the North Shore Alignment. Under Alternative 1, however, the watermain would impact the area from the west end of Beach Street to the west end of Pine Road, in addition to the forested area at the west end of Beach Street.

In addition to disturbances caused by installation of the watermain would be those caused by water and sewer service hookups. These disturbances are usually limited to a total of approximately 20 feet in width and, because they are made by the homeowners themselves, they are not evaluated in this document.

In constructing the North Shore watermain, the contractor would manage the material in such a way as to minimize the number of times it had to be handled. Consequently, if the watermain were constructed in conjunction with a trunk sewer, the watermain would be placed in the trench dug for the sanitary sewer where practical. In areas where the contractor had to excavate especially for the watermain, soil would be piled next to the hole, to be replaced and compacted back in the same excavation where the pipe was laid. Because of the impractibility of placing the watermain in the same trench as the sewer in many areas (due to depth differences) and because the cost differences would be difficult to quantify and would be small with respect to the cost of the project alternatives, these cost differences were not addressed.

Access to the pipe-laying operation would be along the permanent easement. Materials and equipment would be delivered to the pipe-laying operation at a point just behind the backhoe. The backhoe would then be used to lift supplies into, and out of the trench. Access to the easement would be from existing roadways.

At the present time, land use along and adjacent to the North Shore watermain is residential housing, from the Sand Pointe Development to Beach Street. Between Beach Street and Manitou Road, land use is agricultural, with the land used mainly for pasturing livestock.

All of the land east of Manitou Road along and adjacent to the proposed watermain, is zoned Residential (R-1) with the exception of the Sand Pointe development which is zoned Planned Unit Development (PUD), and the Sand Pointe Park which is zoned Conservation (C-1). Figure 2-2 shows existing zoning.

3.6 RELATED IMPROVEMENTS

Construction of the trunk sanitary sewer, as proposed, would alter the character of the streets along the proposed project. Along Beach Street, many trees would be removed in order to construct the trunk sewer. At the present time, Beach Street is a single lane gravel driveway winding between the trees. During construction, the width of the construction swath would approach 130 feet at the west end. In order to improve access to lakeshore and other developed lots

along the sewer route, the City proposes to pave the streets once the trunk sewer has been laid

3.6.1 Street Improvements

The City proposes to pave Beach Street, Shore Trail and Pine Road, including curb and gutter. In addition, Chatonka Beach Trail would be widened and graded to drain to the south but it would remain a gravel road.

Beach Street, while a platted right-of-way, has been maintained as private road by the property owners along the right-of-way. If this street is to be widened, additional right-of-way will be required. In addition, the City would require additional street maintenance responsibilities now shared by the resident property owners.

Shore Trail and Beach Street would be 26 feet from outside-of-curb to outside-of-curb (O.C.). Pine Road would be 24 feet O.C. Chatonka Beach Trail would be 26 feet from shoulder to shoulder.

Pavement for Shore Trail, Beach Street, and Pine Road would be constructed of 6 inches of Class 5 aggregate base, 3 inches of bituminous base, and 1-1/2 inches of bituminous wear course. Curb and gutter would be of the mountable concrete type.

The original alignment proposed by the City included a substantial reconfigureration of the terrain at the west end of Beach Street, which would result in the removal of approximately 10 feet in height, and a surface impact area of approximately 40 feet in width.

3.6.2 Stormwater Management System

In 1979, the City of Prior Lake and the Prior Lake/Spring Lake Watershed District completed an overall Watershed Management Plan (WMP) which included the project area. The WMP identified existing drainage patterns and stormwater detention areas, defined the discharges within the major drainage basins and analyzed outflow from detention areas under ultimate development conditions. Any alterations or revisions to the plan must be reviewed and evaluated to assure that the overall rate of discharge and water quality of the discharge does not change. The proposed project is not in complete conformance with the WMP.

The proposed stormwater management plan for this project shows three individual stormwater collection systems which discharge into Prior Lake.

System 1

System 1 is located along Chatonka Beach Trail and Beach Street. As shown in the plans, Chatonka Beach Trail would be regraded to drain south to Beach Street. Beach Street would be regraded to drain east, with a substantial lowering of the street elevation on the westerly two-thirds of the street. The

new proposed grade on Beach Street would place the road below an existing stormwater retention area located at the intersection of Chatonka Beach Trail. Stormwater runoff from the street and ditch areas is proposed to be collected at this intersection and discharged east through a 15-inch pipe to a detention pond located at the east end of Beach Street. From there, the stormwater would be discharged into Prior Lake through a 24-inch pipe.

In comparing the proposed system with the WMP, it was determined that the proposed drainage scheme would eliminate the retention area at Beach Street and Chatonka Beach Trail, and increase the discharge rate to Prior Lake. The net effect of these changes would be a peak discharge rate increase of approximamately 20 cfs into Prior Lake. The increased discharge rate, coupled with less detention volume, would increase the sediment and nutrient loadings going into Prior Lake.

The City Engineer has indicated that the City intends to fulfill the objectives of the watershed management plan, and has said that the City would reduce the size of this outlet and enlarge the detention area to the appropriate size.

System 2

System 2 would be located near the intersection of Pine Road and Shore Trail. A low point in Shore Trail would be drained via a series of 15-inch to 21-inch pipes along the proposed sanitary sewer, west, then south, and then east to the southerly end of Pine Road where two catch basins would be located. From there, the pipes would run south along a concrete boat launch and discharge into Prior Lake.

The WMP shows this area with no tributary areas, no detention areas are shown in this area, and the discharge rate to Prior Lake is uncontrolled in the WMP. Consequently, System 2 would fulfill the objectives of the WMP.

It should be noted, however, that costs for System 2 could be reduced by eliminating the pipe bends, and two of the manholes, which have no apparent use. In addition, the catch basins proposed for the end of Pine Drive would catch little water at a 13 percent grade. While the west manhole is required to make the direction change, the east catch basin is not required, and could be eliminated. Finally, consideration should be given to redesigning the pipe slopes to allow use of 15 inch pipe the entire length of the system. Savings achieved through these changes would amount to approximately $9,000.00.

System 3

System 3 would be located at the east end of Shore Trail. Stormwater would be collected in three catch basins and transported east and then south via 15-inch pipes to Prior Lake.

3.7 "NO-BUILD" ALTERNATIVE

If none of the alternatives were implemented, the trunk sewer system and the watermain looping would not be constructed. Development would proceed in the undeveloped areas of the project area, with on-site septic systems and individual wells. There would be no trunk sewer construction related impacts in the project area. Site-specific impacts would occur on each lot as homeowners installed their own septic systems. The actual extent of these impacts would be about the same as for installation of water and sewer services.

Although the North Shore neighborhood is now only 6 percent developed, its location, natural features, and relationship to arterial roads give it a high probability for residential development. Also, with the Shakopee racetrack opening only a few miles to the northwest, it is anticipated that County Road 42 will provide access to the racetrack for many visitors approaching from the southeast along I-35 and U.S. 52. This could increase development pressure for land adjacent to County Road 42. Also, the remaining undeveloped land in the Martinson neighborhood between County Road 21 and the west shore of Prior Lake, is under single ownership and offers good opportunity for development.

The Comprehensive Plan defines total residential population capacities for the North Shore (between CR 42 and the lake) of 2340, with 570 for Martinson (approximately half of Martinson is within the study area.). This assumes average development densities of 2 dwelling units (DU)/acre (low density) and 6 DU/acre (medium density), and eventual residential development of all Green Acres land shown, with the exception of the Vierling property fronting on Prior Lake which is zoned R-1 but probably would not be developed in the forseeable future. These assumptions form the basis for both the build and no-build alternatives presented here.

3.8 FUTURE DEVELOPMENT

3.8.1 Development under the Build Alternative

The pace of future residential development varies based upon the set of growth projections used and the assumptions made about which neighborhoods will capture certain proportions of total residential development. The following are the assumptions used here.

1) Although there appear to be six neighborhoods with significant vacant land within the City, the North Shore neighborhood is better situated and is assumed to be in a position to capture approximately half of the market rate units developed on vacant land.

2) City housing policy would be followed and 25 percent of the housing units would be committed to low and moderate income households and primarily located in infill areas of the City.

3) Ten percent of the market-rate units would be in infill areas (mostly multi-family units).

4) The residential development pace would be either 150 units/year (Prior Lake estimate) or 90 units/year (Metropolitan Council Estimate).

5) Full development of platted lots, (152 total) would occur in both the build and no-build alternatives.

6) To calculate the highest level of development requiring utilities, all land zoned R-1 is assumed to eventually be developed, regardless of current Green Acres designation.

7) Under the build alternatives, it is assumed land presently designated Green Acres and zoned residential (except the Vierling property), would be developed sequentially as development pressures increase. When all non-Green Acres land has been developed in the area, it is assumed that the Green Acres parcel with the greatest pressure to develop would be developed next.

Following is an analysis of future development under both build and no-build alternatives. They can be compared to assess the differences between the two alternatives. Figure 3-10, Land Development Areas, shows the areas of development on platted land in an infill manner and areas of development on unplatted vacant land.

Development of platted land:	152 units
Development of vacant land zoned R-1: (including Green Acres land)	810 units
TOTAL DWELLING UNITS	962 UNITS

Vacant land Development R-1 (Total of ± 253 acres)

Medium Density:	76.7 acres @ 6 D.U./acre*	=	460 DU
Low Denisty:	176.3 acres @ 2 D.U./acre*	+	350 DU
	TOTAL		810 DU

*Note: These densities are average densities used in the Comprehensive Plan for future residential development and have been rounded to the nearest tens.

Given previous assumptions regarding the development pace, it could take between 19 and 34 years to completely develop the residentially zoned land in the study area based on the Prior Lake and Metropolitan Council projection rates respectively.

A. Prior Lake Rates: 150 D.U./year

Market rate units on vacant land = 98 units (65% of 150 DU.)
Assumed capture in Study Area = 49 units (50% of 98 DU.)

$$\frac{\text{Capacity Total}}{\text{Pace}} = \frac{965}{28 \text{ D.U./yr.}} \pm 19.6 \text{ years}$$

B. Metro Council Rate: 90 D.U./year

Market rate units on vacant land = 59 units (65% of 90 DU.)
Assumed capture in Study Area = 28 units (50% of 59 DU.)

$$\frac{\text{Capacity Total}}{\text{Pace}} = \frac{965}{28 \text{ D.U./yr.}} \pm 34 \text{ years}$$

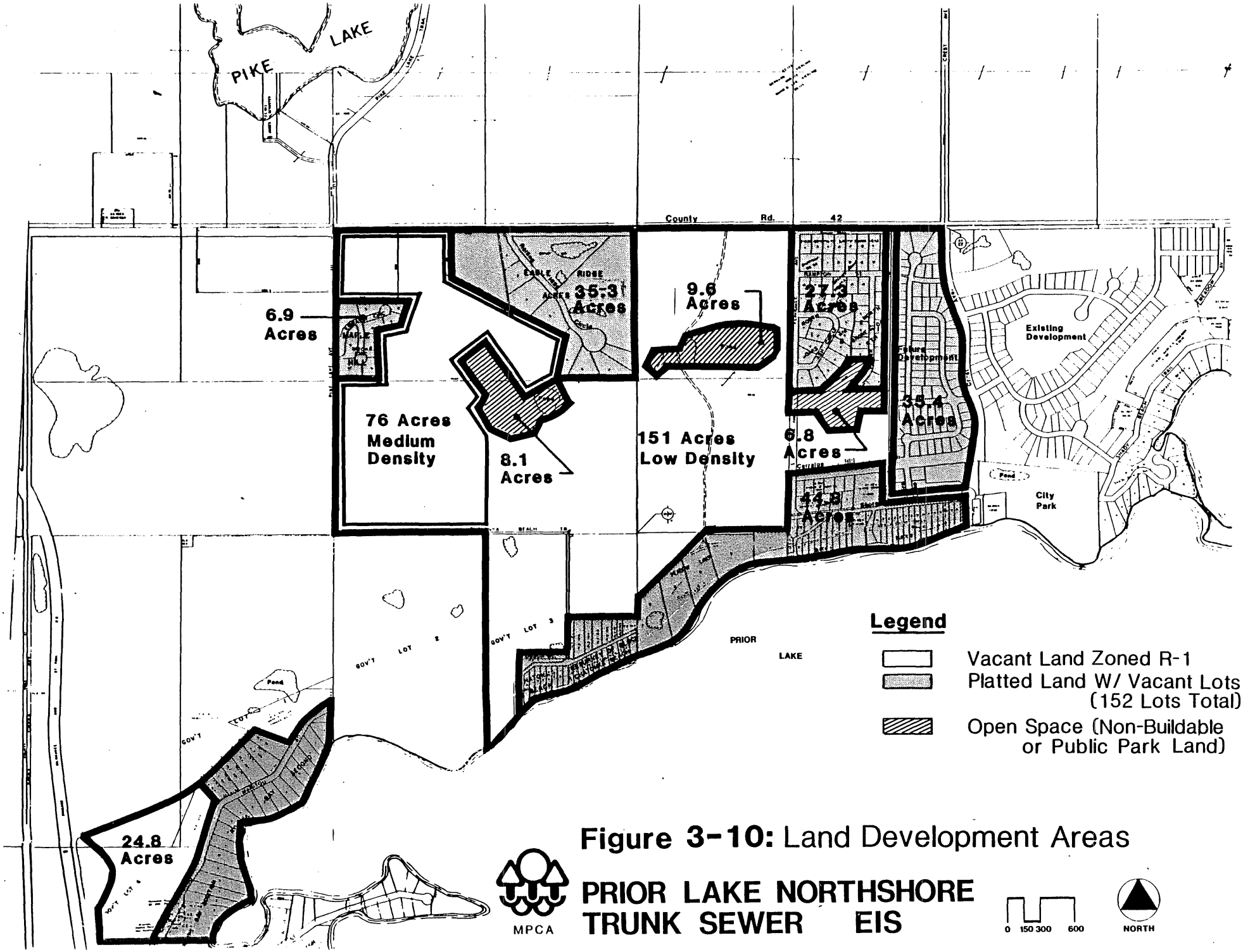


Figure 3-10: Land Development Areas

PRIOR LAKE NORTHSHORE TRUNK SEWER EIS

3.8.2 Development under the "No-Build" Alternative

Development of platted lots:	152 units
Development of raw land:	
± 253 acres @ 4 D.U./40 acres	25 units
TOTAL DWELLING UNITS DEVELOPABLE	177 units

In 1984, the City of Prior Lake changed its zoning ordinance so that without sewer and water improvements, no subdivision is possible, and development can occur only under Agricultural Preserve zoning requirements which limit density to 4 dwelling units per 1/4 1/4 section (40 acre minimum lot size). All lands previously platted were "Grandfathered in," however, so that these lots could be developed with on-site sewer and water.

The No-build alternative specifies that under current zoning regulations and without sewer and water services, vacant land would remain essentially in agricultural use. Given the previously stated assumptions regarding the development pace within the study area, infill of vacant land could take between 4 and 6 years, depending on Prior Lake or Metropolitan Council growth rates respectively.

In order to allow comparison between alternatives, a separate development projection was made for each trunk sewer alternative. A 20 year development period was assumed (based on the City of Prior Lake's growth projections), with development moving generally westward (as it historically has taken place in this sector of Prior Lake). Based on these assumptions, an estimation of residential development within the service areas of the four trunk sewer alternatives and their complementary sewers was made. These estimates are shown in Table 3-1. Service areas and their complements are discussed in Section 4.2.

Table 3-1 Estimated Residential Development Within the Alternative Route Sewer and Water Service Areas

Alignment	Total DU's 1985	Total DU's 1990	Total DU's 1995	Total DU's 2000	Total DU's 2005	Total DU's 2010	Total DU's 2015
Original North Shore Alignment	39	250	370	500	595	595	595
North Shore Comp. Area	28	70	200	320	440	440	440
Alternative 1	54	250	460	710	850	850	850
Alternative 1 Comp. Area	0	50	90	90	90	90	90
Alternative 2	67	270	480	735	945	945	945
Alternative 2 Comp. Area	0	50	90	90	90	90	90
Alternative 3	67	270	480	735	945	945	945
Alternative 3 Comp. Area	0	50	90	90	90	90	90
No-Build (N.S. & N.S. Comp. Area)	67	200	245	245	245	245	245

4.0 ENVIRONMENTAL AND ECONOMIC EFFECTS

4.1 CONSTRUCTION IMPACTS

The four build alternatives would have some activities and effects which apply generally and would occur regardless of which build alternative would be selected. Construction methods would generally be similar except as noted in the discussion of the respective alternatives. Other similar effects include depth and width of excavation, size and location of soil stockpiles, provisions for access of equipment and materials, and extent of vegetation removal. The extent of construction impacts is indicated by the width of the construction easement, and is primarily related to surface disturbance.

4.1.1 Construction Methods

The trunk sewer and associated laterals would be installed using standard sewer construction practices including clearing and grubbing of trees and brush, excavation, backfill, and compaction. Due to the close tolerances required on the slope of the pipe, laser instruments would be used for setting pipe grades.

Construction of a trunk sewer in the project area would be more complex than the construction of most city trunk sewers. In order to supply sewer service to existing homes along Prior Lake with a gravity system, the trunk sewer grade must be below the elevation of those homes. With the high rolling topography in the project area and the low relative elevation of some of the homes along the lake, a gravity trunk sewer would be quite deep in some locations. When deep excavations are required to lay pipe, special techniques are utilized to minimize the quantities excavated and the area of surface disturbed.

In areas where the pipe depth would be less than approximately 25 feet, standard backhoe excavation could be employed. Where the excavation is greater than 25 feet, scrapers would be used to get within 25 feet of the final excavation depth. At that point, the width at the bottom of the hole would be approximately 60 feet, wide enough for the backhoe to turn around, with room for setting up laser equipment (for vertical and horizontal control), and for access of materials and equipment. From that point down to where the pipe would be laid, standard backhoe excavation could be employed. After the pipe is laid, special care would be exercised to compact the backfill material to prevent settlement.

In addition to disturbances by installation of the trunk sewer, would be those caused by water and sewer service hookups. These disturbances are usually limited to approximately 20 feet in width (total) and because they are made by the homeowners themselves, they are not evaluated in this document.

During and after construction, erosion would be controlled through the use of straw bales, erosion control fabric, mulch, etc. Special attention would be given to erosion control along Prior Lake and beside wetlands. Restoration after construction would include seeding with grass, planting trees, and restoring fences, driveways and gravel roadways.

4.1.2 Size and Location of Soil Stockpiles

In constructing the trunk sewer, a contractor would manage the excavated material in such a way as to minimize the number of times and the extent to which it had to be handled, in order to minimize the costs involved. As a result, the method of operation would involve stockpiling material beside the trench in areas where trees or topography are not limiting and the excavation is less than 25 feet. In areas where limitations force the contractor to haul the material, every effort would be made to haul the material to a location where it could be permanently deposited. Soil excavated from in front of the pipelaying operation would be back-cast into trucks and hauled to a point behind the pipe-laying operation where it would be placed and compacted. A small stockpile would be required to store the volume of material displaced by the pipe-laying operation. This material could be stored on the temporary construction easement at other locations.

Piles adjacent to the trench would vary in height and width depending upon the depth and width of excavation. Usually piles are 15 feet or less in height.

4.1.3 Provisions for Access of Equipment and Materials

Access to the pipe-laying operation would be along the permanent easement. Materials and equipment would be delivered to the pipe-laying operation at a point just behind the backhoe. The backhoe would then be used to lift supplies into and out of the trench. Access to the easement would be accomplished utilizing existing roadways.

4.1.4 Maximum Extent of Vegetation Removal

The extent of clearing and grubbing is determined by the depth of excavation, surface topography, and the necessary access and operation of equipment. The vegetation section describes the nature and extent of vegetation removal required for the construction of the various alternatives.

4.1.5 Construction Noise

Construction related noise would be short-term and temporary occurring only during the time that the trunk sewer, watermain, storm sewer and street improvements were being done. Conditions of the sewer extension permit to be issued by the Minnesota Pollution Control Agency (MPCA) could require that construction be limited to the daytime hours (7:00 AM to 8:00 PM). Proper noise control devices are generally required on all equipment by contract specifications. In the vicinity (within 200 yards) of any given residence, construction of the sewer line and related improvements are expected to take between two to four weeks. Construction noise would include sounds of earth moving equipment, trucks, chainsaws and similar equipment. Noise levels at a distance of 50 feet from such equipment vary between 70 and 95 dBA. Not all equipment present will be operating simultaneously. State noise standards require the use of properly muffled equipment.

4.1.6 Construction Dust

Construction of any of the build alternatives would result in a temporary impact on levels of suspended particulates near the project site. Construction activities disturb the vegetative ground cover and cause soil material to become airborne. Sources of construction-related dust include site grading activities, the movement of construction vehicles over unpaved haul roads, and the escape of materials from truck loads. In addition, soil material can adhere to construction vehicles and become deposited on public roadways as construction vehicles move to and from the site.

Minnesota Rule Part 7005.0550 (Formerly APC-6) regulates the control of particulate matter from construction activities. The rule requires construction contractors to use reasonable measures to minimize the amount of particulates which become airborne. Typical measures include road cleaning, haul road watering, and revegetation.

4.2 COST ANALYSIS AND ECONOMIC IMPACTS

This section includes an estimation of costs for construction of the various portions of the proposed project and the alternatives, if constructed in 1985. These estimates are comparable, one to another, and are based on actual construction costs for similar projects that were let in 1984. The construction constraints imposed by maintaining a narrow corridor to protect trees in the North Shore alignment alternative are reflected in higher unit prices for the deep sewer pipe than those of Alternatives 1, 2, and 3.

In addition to the North Shore alignment and the three alternatives, cost estimates for complementary sanitary sewers to serve the areas not served by the respective trunk sewer alternatives have been made. The sewer complementing the North Shore Trunk Sewer alternative would follow the same alignment as the northern half of Alternative 1, while the sewer complementing Alternatives 1, 2 and 3 would follow the same alignment as the western half of the North Shore alignment. In combination with its complementary sewer, each trunk sewer alternative studied herein would serve the same general area and the same total area, with one exception: The Beach Street area would not be served by sanitary sewer under Alternative 1 nor by its complementary sewer.

The North Shore Oaks subdivision is not included in the service areas of any of the Alternatives or their complementary sewers. However, the original alignment and Alternative #3 would be of sufficient depth to serve the North Shore Oaks subdivision. The total costs of the proposed North Shore Trunk Sewer Project and Alternatives 1, 2 and 3 are shown in Table 4-1. These costs do not include the installation of lateral lines to provide services to the homes along Rolling Oaks Circle for Alternatives 1, 2 or 3 or the service area complements.

Table 4-1. Total Cost of Construction Options

	Trunk Sewer Cost	Complementary* Sewer Cost	Total Cost
North Shore Alignment	$1,534,922.00	$434,565.00	$1,969,487
Alternative 1	$ 969,877.00	$506,167.00	$1,476,044
Alternative 2	$1,304,766.00	$506,167.00	$1,810,873
Alternative 3	$1,531,618.00	$506,167.00	$2,037,785

*Alternative 1, 2, and 3 Complementary Sewers are assumed to be identical.

These costs are for sanitary sewer work and minimum restoration including replacement of gravel roads only; they do not include easements, utility removals, driveway pavement, tree replacement, or street improvements.

Cost estimates for construction of watermain, storm sewer, and street improvements, as proposed by the City of Prior Lake, are as follows:

Watermain		$358,594.00
Storm Sewer		$ 99,295.85
Street Improvements		
Beach Street	$ 56,349.00	
Shore Trail West	$ 51,617.00	
Shore Trail East	$ 39,409.00	
Total - Street Improvements		$147,376.00
Total		$605,266.00

These costs are for construction, and do not include easements, utility removals, driveway pavement, etc. A complete listing of the cost estimates is given in Appendix D.

4.2.1 Service Area

The North Shore trunk sewer (Original Route) alternative has a different service area from Alternatives 1, 2, and 3, serving an area of land west of Beach Street. The Original Route does not provide service to a part of the area west of the Sand Pointe Development. According to the City of Prior Lake's Comprehensive Plan, the entire project area would be served by City sewer. As the design of trunk sewer lines must provide for future development of a community, it is important to consider the overall service implications of choosing one trunk sewer alternative over another. In order that comparison may be made of the various alternatives, when the alternatives have different overall service areas, it is necessary to make provisions for ultimately serving the areas that would not be served by each of the trunk sewer alternatives.

Each of the alternatives under consideration would provide some level of sanitary sewer service to the North Shore community, but they are not all strictly comparable relative to their service areas. In order to make provisions for ultimately serving all areas collectively served by the North Shore trunk sewer alternative and Alternatives 1, 2, and 3, complementary trunk sewers have been developed for each of the trunk sewer alternatives. In combination, each trunk sewer alternative and its complementary sewer would provide sanitary sewer service to the areas west of Beach Street and the areas west of the Sand Pointe Development. Consequently, the service area of each of the alternatives is the same, except that Alternative 1, in combination with its complementary sewer, would not serve the area between the west end of Beach Street and the west end of Pine Road.

Table 4-2 shows the areas that would be served by each alternative and its complementary sewer. These areas are further defined in terms of present land use and proposed land use. The service areas for each alternative and its complement are shown in Figures 4-1 through 4-4.

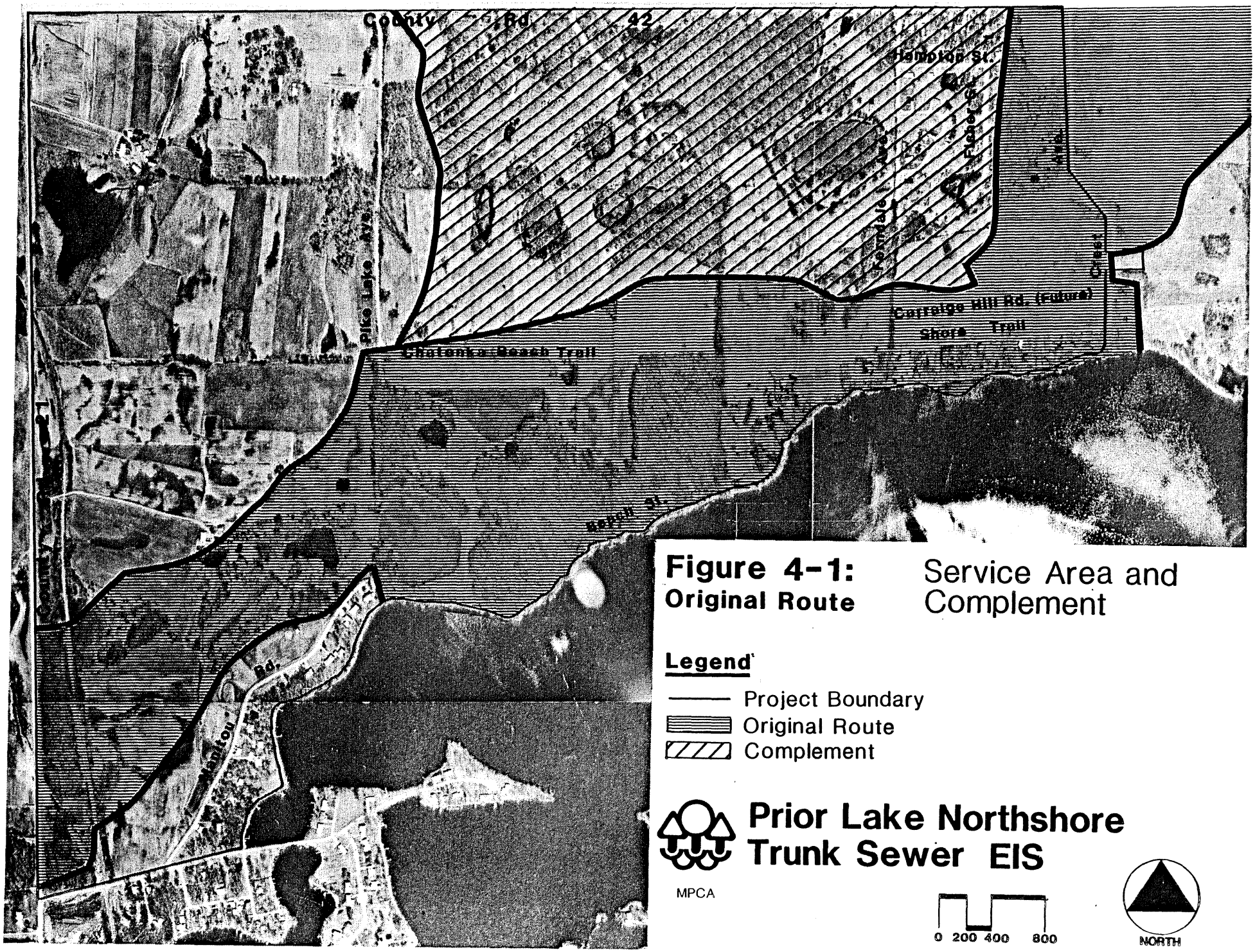


Figure 4-1: Service Area and Complement
Original Route

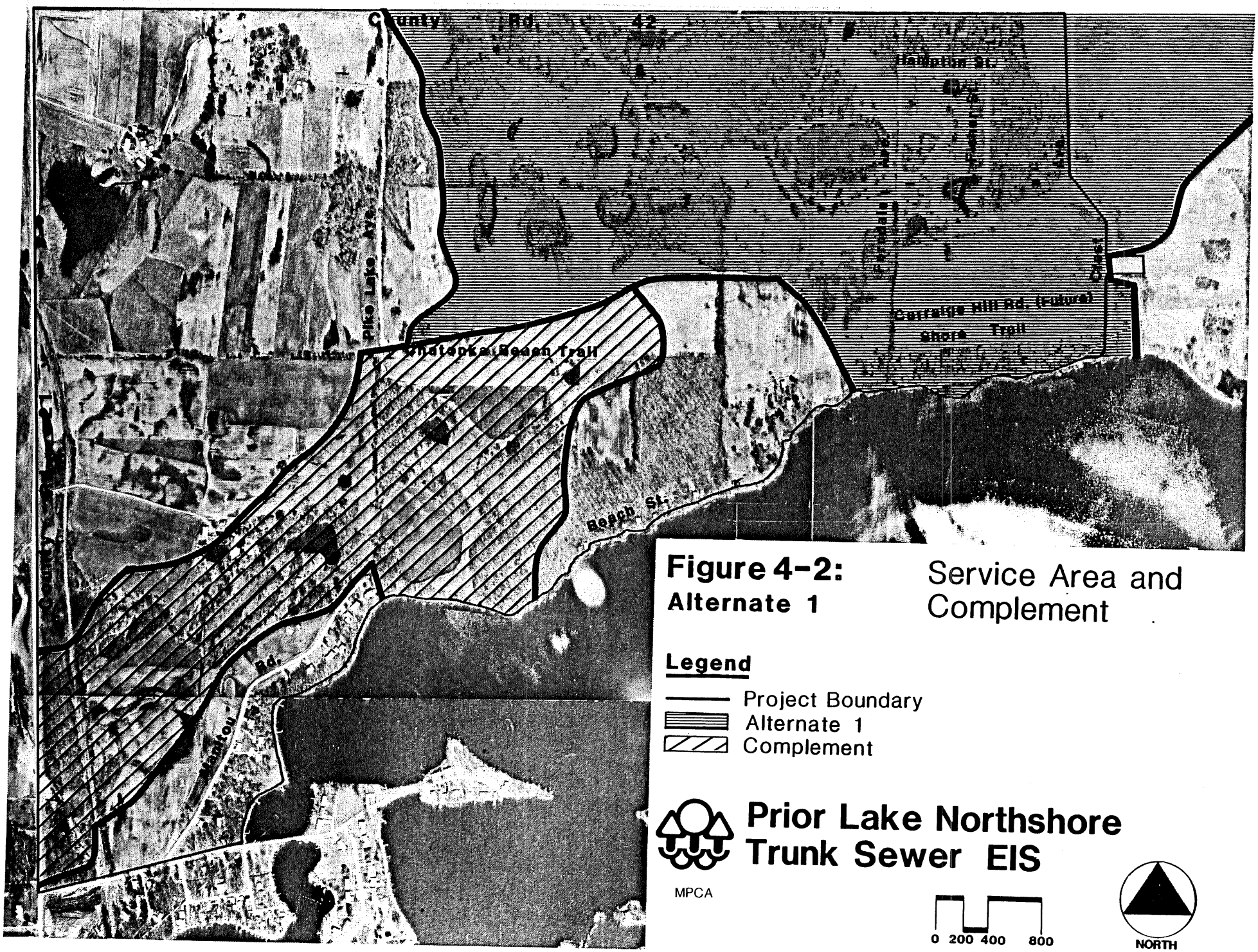


Figure 4-2: Service Area and Complement
Alternate 1

Legend

- Project Boundary
- Alternate 1
- Complement

Prior Lake Northshore Trunk Sewer EIS

MPCA

0 200 400 800

NORTH

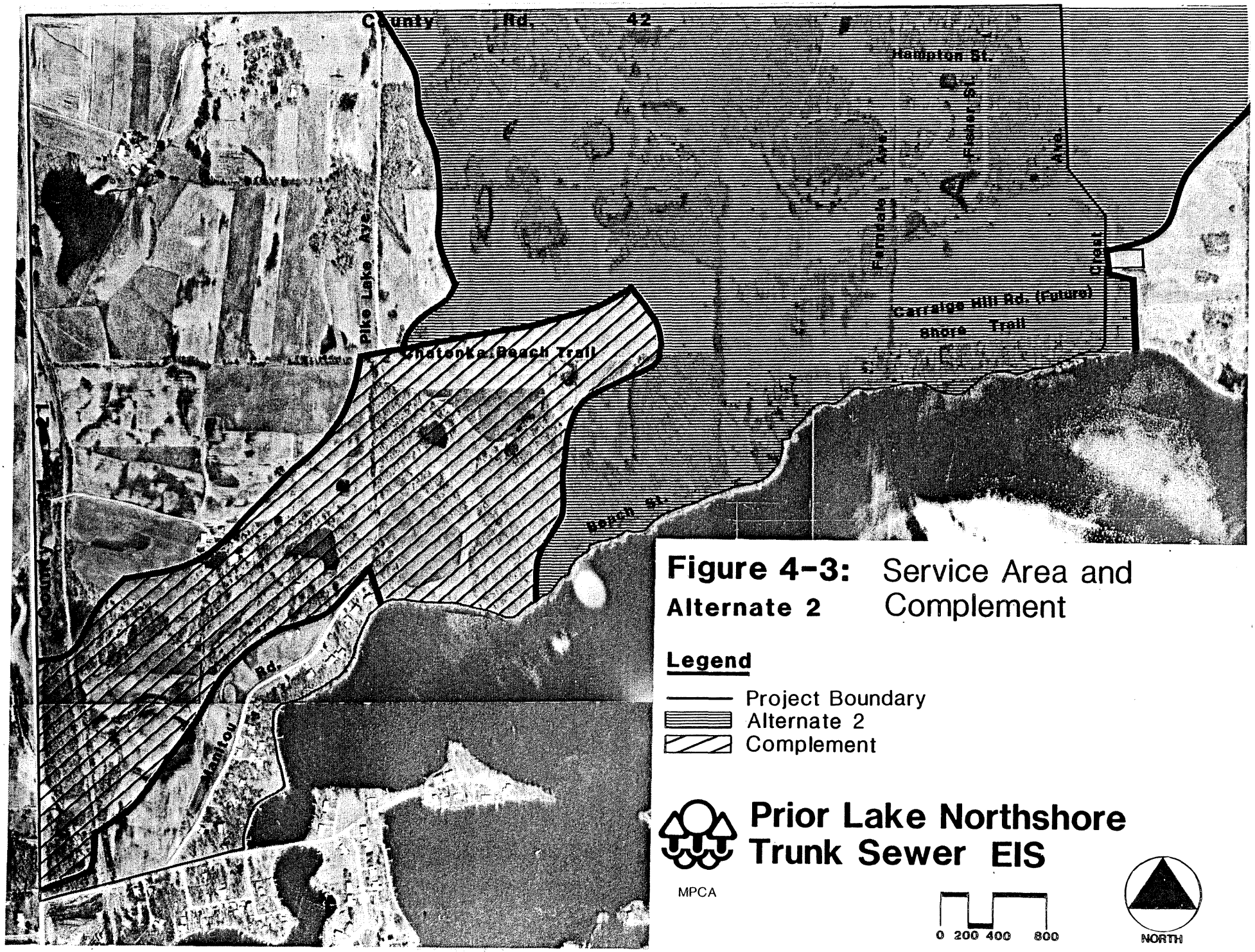


Figure 4-3: Service Area and Complement
Alternate 2

Legend

- Project Boundary
- Alternate 2
- Complement

Prior Lake Northshore Trunk Sewer EIS

MPCA

0 200 400 800

NORTH

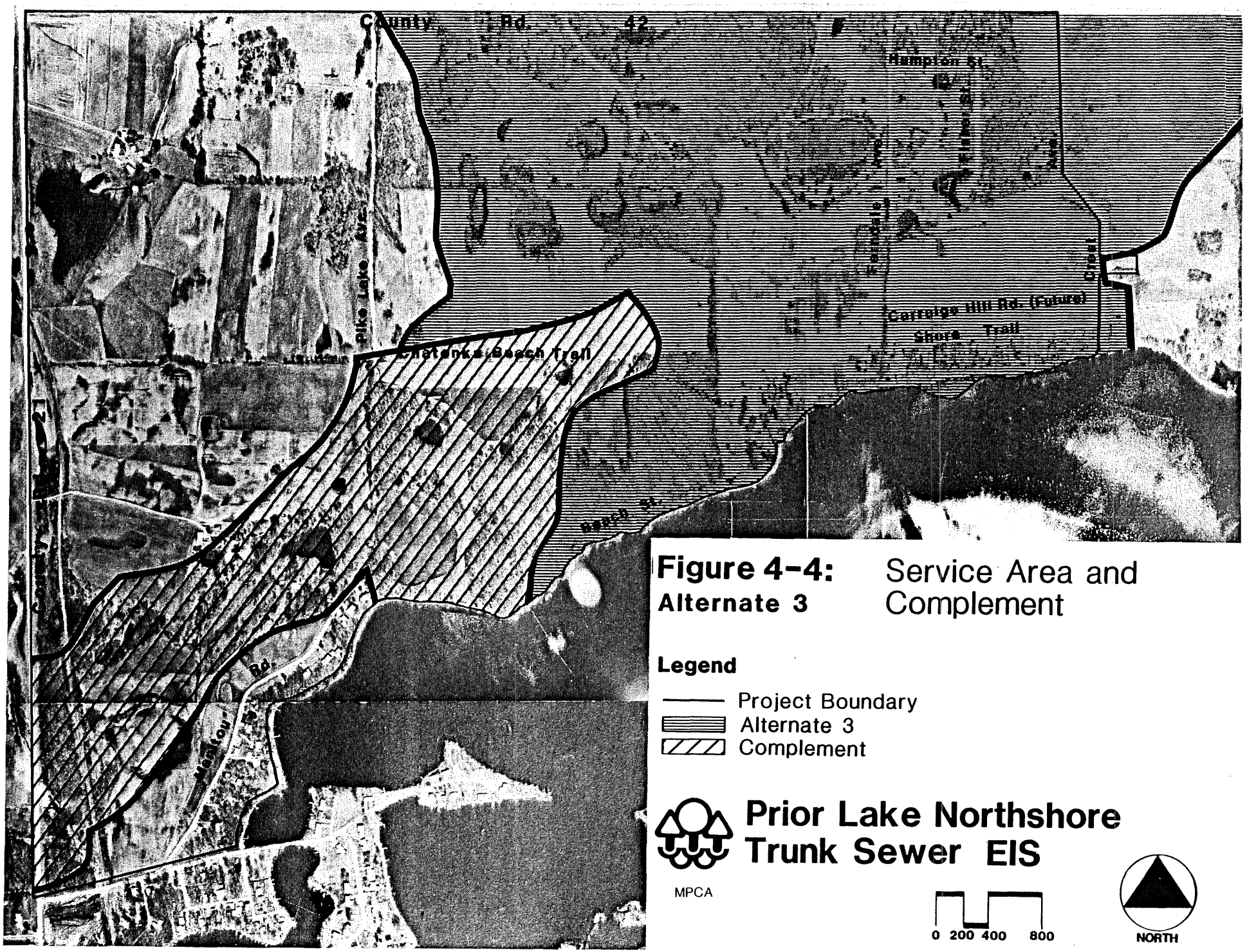


Figure 4-4: Service Area and Complement
Alternate 3

Legend

- Project Boundary
- Alternate 3
- Complement

Prior Lake Northshore Trunk Sewer EIS

MPCA

0 200 400 800

NORTH

Table 4-2 Existing and Proposed Land Use Area Comparison for Construction Alternatives

Alignment	Total Acres	Present Land Use (Acres)			Proposed Land Use (Acres)	
		Green Acres Agricultural	Non-Green Acres Unplatted	Residential	Public and Undeveloped Open Space	Residential
Original North Shore Alignment	319.9	86	139.3	94.6	82	237.9
Alternative No. 1	279.1	94.5	52.7	131.9	17.7	261.3
Alternative No. 2	354.5	110	98.8	145.7	29.3	325.2
Alternative No. 3	354.5	110	98.8	145.7	29.3	325.2
Original North Shore Complementary Area	185.7	81.2	54.0	51.5	17.7	169.0
Alternatives No. 1, 2, 3 Complementary Area	152.1	57.2	94.9	0	57.2	94.9

4.2.2 Cost Comparison

The cost estimates for each of the alternatives are given in Section 4.2. These costs are for serving different service areas, however, and therefore, are not directly comparable. In order that the annual costs of each alternative can be compared. The total equivalent uniform annual disbursements of each trunk sewer alternative are presented in Table 4-3. These annual costs are based on a 50 year life for gravity sewer sections and 20 year life for lift stations. (Cost of lift stations include cost of emergency generator for operation during power failures.)

Table 4-3 Annual Cost Comparison

Original Route (50 year life)	
Cost Recovery = $1,535,000(A/P, 8%, 50) = $1,535,000(.08174)	$125,471
Operation and Maintenance	1,000
Total Equivalent Uniform Annual Disbursement	$126,471
Alternative 1	
Gravity part for system (50 year life)	
Cost Recovery = $850,000(A/P, 8%, 50) = $850,000(.08174)	$ 69,479
Operation and Maintenance	1,000
Lift Station 1 (20 year life)	
Cost Recovery = $70,000(A/P, 8%, 20) = $70,000(.10185)	7,130
Operation	110
Maintenance and pump replacement @ 7 years	7,000
Lift Station 2 (20 year life)	
Cost Recovery = $35,000(A/P, 8%, 20) = $35,000(.10185)	3,565
Operation	90
Maintenance and pump replacement @ 7 years	5,000
Total Equivalent Uniform Annual Disbursements	$ 93,374
Alternative 2	
Gravity portion (50 year life)	
Cost Recovery = $1,110,000(A/P, 8%, 50) = $1,110,000(.08174)	$ 90,731
Operation and Maintenance	1,000
Lift Station 1 (20 year life)	
Cost Recovery = $135,000(A/P, 8%, 20) = $135,000(.10185)	13,750
Operation	800
Maintenance and pump replacement @ 7 years	15,000
Lift Station 2 (20 year life)	
Cost Recovery = $35,000(A/P, 8%, 20) = $35,000(.10185)	3,565
Operation	120
Maintenance and pump replacement @ 7 years	5,000
Total Equivalent Uniform Annual Disbursements	$129,966

Table 4-3 Cont.

Alternative 3 (50 year life)

Cost Recovery = $1,532,000(A/P, 8%, 50) = $1,532,000(.08174)	$125,226
Operation and Maintenance	1,000
Total Equivalent Uniform Annual Disbursements	$125,226

In consultation with City planners, the Metropolitan Council, and the County Land Assessor, projections were made regarding population growth and development in the area north of Lower Prior Lake for each alternative. On the basis of those projections, the annualized cost of each of the alternatives to the ultimate service area capacity was determined. The results of this and the distrubution of those costs in terms of area charges, front footage charges, and connect charges are shown in Table 4-4.

Table 4-4 Annualized costs of Alternatives and Distributions of costs

Alignment	Ultimate D.U. Served	Annualized Project Cost	Cost Per Ultimate D.U. Served	Length (ft.)	Trunk Sewer Assessable: 75% of Gross Developable Area (Non-Green Acres)	Trunk Sewer Assessable: Green Acres Deferred Costs	Trunk Sewer Assessable: Total Acreage Costs Assessable
NS	595 (755)***	126,500	$ 213 $(163)***	11,606	$ 219,000	$ 80,600	$ 300,000
#1	850	93,374	$ 110	10,853	$ 173,000	$ 88,600	$ 262,000
#2	945	129,966	$ 138	13,003	$ 229,000	$ 103,000	$ 332,000
#3	945	126,200	$ 134	13,170	$ 229,000	$ 103,000	$ 332,000
No Build*	245	80,827	$ 330				

Alignment	Available Connect Charges**	Length of Sewer	Assessable Front Footage (75%)	Front Footage Assessment	Assessment Per Foot
NS	$ 6,825	11,606	17,409	$1,228,097	$71
#1	$ 9,450	10,853	16,280	698,427	43
#2	$ 11,725	13,003	19,504	961,041	49
#3	$ 11,725	13,170	19,755	$1,186,448	$60

* Based on 133 units added between 1985 and 1990 and 45 units added between 1990 and 1995, at $6,000/unit, with a 20 year life at 8%.

** Based on the number of DU's which could be immediately served.

*** If the Vierling property is developed, the ultimate number of dwelling units would increase, and the cost per dwelling unit would decrease to the Figures shown in parentheses.

Trunk Sewer Cost Assessable

Platted: total area of lots (not streets)
Unplatted: total area x .75

4.2.3 Assessment Policies

The assessment policies for the City of Prior Lake are shown in Appendix A. The City could divide the cost of a project equally among all of the lots (i.e. each .25 acre lot would pay the same assessment as a 40 acre parcel), or it could break the costs up into area charges, front footage charges, and connection charges. This second method is the way the City would assess the proposed project according to City administrative staff. This method is the one used by most municipalities to fund similar projects.

Utilizing the proposed assessment distribution method and some typical parcel sizes, the project costs for the four trunk sewer alternatives were calculated. These assessments, as distributed between area charges, front-footage charges, and connect charges are shown in Table 4-5, both for a 50 foot lot (.3 acre) fronting on the trunk sewer, and for a 10-acre parcel which has the trunk sewer going through it.

It should be noted that assessment costs are not the only costs of a sanitary sewer system. As shown in Table 4-3, the annual costs of a system are based on the amortized cost of construction plus maintenance and operation costs. Gravity alternatives (the North Shore alternative and Alternative 3) have little operation and maintenance costs. Consequently, while their front end costs are higher than the lift station alternatives, the life-cycle costs (annualized costs) of the systems are much more comparable. For the same service areas, gravity Alternative 3 has an annual cost of $126,200 compared with lift-station Alternative 2, which has annualized costs of $129,966. It is important to note that construction costs are paid by property owners in the project service area, while operational costs are spread over the entire community. At the present time, the City of Prior Lake has many lift stations which would be supported, in part, by the homeowners who would be assessed for this project, whether or not a lift station alternative is constructed.

It should also be noted, however, that lift stations occasionally fail, causing sewage to back up and damage homes. Costs of these potential damages have not been included in the annualized cost of the lift station alternatives. The costs of standby power generation (in the event of a power failure) are included for Alternatives 1 and 2, and are reflected in Table 4.3.

The total financial impact of the proposed North Shore Project, including watermain, storm sewer, and streets, on a typical 50-foot lot, can be seen in Table 4-6. The total sewer Connect Charge would be $350, of which $175 would be an assessment, and $175 would be a maintenance charge which would not be an assessment.

Table 4-5

TYPICAL LOT SEWER ASSESSMENTS

Typical Lot Assessment (North Shore Alignment)	
Lot Size 0.3 acres = $1,250(.3)	$ 375
Connect Charge	175
Front Footage 50' x $71	3,550
Total Assessment	$ 4,100
Typical Lot Assessment (Alternative 1)	
Lot Size 0.3 AC	$ 375
Connect Charge	175
Front Footage 50' x $43	2,150
Total Cost	2,700
Typical Lot Assessment (Alternative 2)	
Lot Size 0.3 AC	$ 375
Connect Charge	175
Front Footage 50' x $49	2,450
Total Cost	$ 3,000
Typical Lot Assessment (Alternative 3)	
Lot Size 0.3 AC	$ 375
Connect Charge	175
Front Footage 50' x $60	3,000
Total Cost	$ 3,550
Typical Larger Parcel Assessment (North Shore Alignment)*	
Parcel Size 10 acres x .75 = 7.5 acres buildable	$ 9,375
Connect Charge (assume no houses)	0
Front Footage (660 x 2 x .75 = 990)	70,290
Total Cost	$ 79,290
Typical Larger Parcel Assessment (Alternative 1)*	
Parcel Size 10 acres x .75 = 7.5 acres buildable	$ 9,375
Connect Charge (assume no houses)	0
Front Footage (660 x 2 x .75 = 990) x $43	42,570
Total Cost	$ 51,945
Typical Larger Parcel Assessment (Alternative 2)*	
Parcel Size 10 acres x .75 = 7.5 acres buildable	$ 9,375
Connect Charge (assume no houses)	0
Front Footage (660 x 2 x .75 = 990) x $49	48,510
Total Cost	$ 57,885

Table 4-5 Cont.

Typical Larger Parcel Assessment (Alternative 3)*	
Parcel Size 10 acres x .75 = 7.5 acres buildable	$ 9,375
Connect Charge (assume no houses)	0
Front Footage (660 x 2 x .75 = 990)	59,400
Total Cost	$ 68,775

* Assumes parcel is square in shape, and trunk sewer goes through the parcel at right angle to a side.

Table 4-6

TYPICAL LOT ASSESSMENT - North Shore Project

Sanitary Sewer	
Lot Size .3 AC - Trunk Charge	$ 375
Connect charge*	175
50' Front Footage - Lateral Charge	3,550
	$ 4,100
Water	
Lot Size .3AC - Trunk Charge	$ 375
Connect Charge	175
50' Front Footage (x $4.29)	214
	$ 764
Street and Storm Sewer	
50' Front Footage (x $23.00)	$ 1,150
TOTAL ASSESSMENT	$ 6,014

* Total connect charge for sanitary sewer would be $350, but only $175 would be an assessment. The other $175 would be a maintenance charge which would not be an assessment.

4.3 WATER QUALITY IMPACTS

It has been previously stated that the water quality of Lower Prior Lake is highly susceptible to increased inputs of phosphorus. For this reason, any action which can be taken to remove existing phosphorus loading or forestall additional phosphorus loading is justified. However, it must be emphasized that the phosphorus inputs to Lower Prior Lake are multiple, and that the problem cannot be controlled by dealing with any one single source alone. The North Shore Trunk Sewer is not the panacea for acceptable water quality in Lower Prior Lake, as other sources of phosphorus must also be controlled. The purpose of the following section is the evaluation of impacts of the proposal and its alternatives upon phosphorus loading, and thusly upon water quality. To varying extent, each of the alternatives will result in phosphorus loadings from construction runoff, stormwater runoff, and from on-site wastewater treatment systems. Each alternative will have differential impacts upon stormwater runoff from subsequent development.

4.3.1 Construction Runoff

Without erosion and sediment controls, construction activities could contribute significant quantities of sediment and nutrients to Lower Prior Lake. Erosion and sedimentation controls are now routinely required as conditions of construction permits, and those controls are frequently incorporated into contract specifications. These controls, which include staked hay bales, silt fences, mulching, revegetation, and construction of sediment traps, are capable of reducing or eliminating significant impacts on water quality.

Erosion controls will be required on all of the "build" alternatives and the related utility contruction. The "no-build" alternative would not enfail such controls, except as they may be applied to subsequent development. Primarily because of the availability of erosion and sedimentation controls and the distance of the majority of the proposed construction from the lake, it is anticipated that the impact of construction runoff on the water quality of Lower Prior Lake will be negligible, for all the alternatives considered.

4.3.2 On-Site Wastewater Treatment Systems

Each of the "build" alternatives would to at least some degree result in the abandonment of existing on-site systems, and subsequent reliance upon municipal collection of wastewater. The project as proposed represents the last major link in a round-the-lake sewering project, the cummulative impact of which has undoubtedly been the elimination of a considerable phosphorus input. The water quality impact of the North Shore Trunk Sewer project in and of itself, however, is not expected to be as dramatic.

Normally, an on-site treatment system removes phosphorus as wastewater percolates through the unsaturated zone beneath the treatment system. Phosphorus removal is maximized when the treatment system is properly designed and constructed, and located well above the groundwater table. Since phosphorus not immediately immobilized by the soil may be transported by the groundwater, systems should be situated as far as possible from the lake.

It is not possible to determine with any certainty the condition of the on-site systems presently in use along the North Shore of Lower Prior Lake. Approximately 55 systems are in use. Some have been recently permitted, and presumably would not be a source of phosphorus loading. Some systems, while not complying with modern construction standards, are only utilized on a seasonal basis, and may not constitute a significant phosphorus source. Others may be discharging septic tank effluent to groundwater near the lake with little or no treatment. At least one direct discharge of septic tank effluent to the lake has been documented. While quantifications of the contribution of phosphorus from these various systems is not possible, an estimate based upon worst case assumptions will serve to place this contribution in perspective to other sources of phosphorus entering Lower Prior Lake. If it is assumed that none of the existing 55 on-site systems are successful in removing phosphorus (P) and that all dwellings are occuppied year-round by an average of 2.9 persons/du. (Twin Cities Metro Area average) and that the average annual contribution per person is 1.1 lbs. P/year, these systems would contribute a total of approxiamtely 176 lbs. of phosphorus per year. This amounts to less than 10% of the estimated phosphorus loading to Lower Prior Lake (1,955 lbs./year). It appears that existing on-site wastewater treatment systems constitute a minor share of the total phosphorus loading to Lower Prior Lake. Furthermore, it appears unlikely that continued reliance upon on-site systems for new development would have any impact on phosphorus loadings, provided they were properly designed, constructed, maintained, and located with respect to water table and lakeshore.

4.3.3 Stormwater Runoff

The stormwater treatment systems which are proposed to be constructed simultaneously with the wastewater interceptor will not individually contribute significant phosphorus inputs to Lower Prior Lake. The largest of the proposed systems, System 1, will be expanded by the City to assure compliance with the Stormwater Management Plan. If the Stormwater Management Plan is followed, it is not expected that phosphorus inputs associated with stormwater would vary markedly between alternatives. The obvious exception is that the immediate impacts of the no-build alternative would entail no change.

Long-term impacts of the respective actions on phosphorus-loaded stormwater must also be considered, and in fact are of greater significance. Development is occuring and will continue to occur regardless of the type of waste treatment provisions. The land is zoned for residential development and at least some of the landowners involved are planning to develop their property. Each of the build alternatives will tend to result in a higher density of development than the no-build alternative. The latter will result in a relatively low density, but development is still likely to occur. As development increases, so will the rate of phosphorus export from the land. Consequently, each of the alternatives are likely to indirectly result in greater phosphorus inputs to Lower Prior Lake, unless combined with an agressive stormwater control policy. The respective alternatives are not expected to vary significantly with regard to the quantity of phosphorus loading, except that the no-build alternative would likely result in less phosphorus loading than the build alternatives (prior to the control program).

4.4 VEGETATION IMPACTS

Vegetation impacts will be of two types--primary and secondary. Primary impacts will be the direct result of the construction of the trunk sewer and related projects including the watermain, storm sewer, and street improvements. Secondary impacts are those that are the indirect result of the project such as the development of subdivision housing and commercial and industrial development. The analysis of vegetation impacts will focus primarily on the primary impacts and will address the secondary impacts in a more general sense. Table 4-7 describes the impacts of the alternatives relative to project area cover types and Table 4-8 is a description of impacts relative to the cover types within the alternative alignment corridors. Table 4-9 is a summary of the tree species impacted by each alternative and Table 4-10 summarizes the diameter of trees that would be impacted.

Tables 4-7, 8, 9, and 10 do not reflect the impacts of complementary sewers. The direct impacts upon vegetation of the respective alternatives together with their complementary sewers would be essentially the same, with the exception of Alternative 1. Depending upon methods of construction and depth of excavation, the impacts of paved roadways may be greater than <u>any</u> of the respective alternatives in a given impact area.

Estimates of the number of trees 4 inches dbh impacted by each alternative were calculated. The basis of these calculations included actual tree counts made at the locations described in Appendix B. In areas where trees were not counted, estimates were made on the basis of map-derived acreage times the average number of trees per acre from similar plots. Estimated number of trees over 4 inches dbh to be removed are as follows:

Original Route - 415 $\pm$ 5%
Alternative 1 - 250 $\pm$ 10%
Alternative 2 - 425 $\pm$ 10%
Alternative 3 - 475 $\pm$ 10%

4.4.1 Original Route

Relative to total project area, the Original Route (Figure 4-5) would have the greatest impact on the wooded pasture affecting 12.50 percent of the total acreage. Of the old field acreage in the project area 11.55 percent would be affected by this alternative. Other land use/cover type impacts relative to the project area would be on single family residential (8.32 percent) and on the disturbed area presently being developed as single family residential (10.21 percent). Of the 197.68 acres of mature deciduous upland in the project area, 3.92 acres (1.98 percent) is in the alignment corridor. By jacking the sewer line, a distance of 400 feet beneath the hill at the west end of Beach Street, the impact on the woodland would be reduced by one acre and only 1.48 percent of the total mature deciduous woodland would be affected. Table 4-7 lists the cover types within the original route alignment and the percent of the cover type impacted by the alignment and related road improvements.

The original proposal would affect approximately 27.52 acres of the project area. Of this 27 acres, approximately 9 acres (32.53 percent) is classified single family residential, and 5.61 (20.39 percent) agricultural field. The

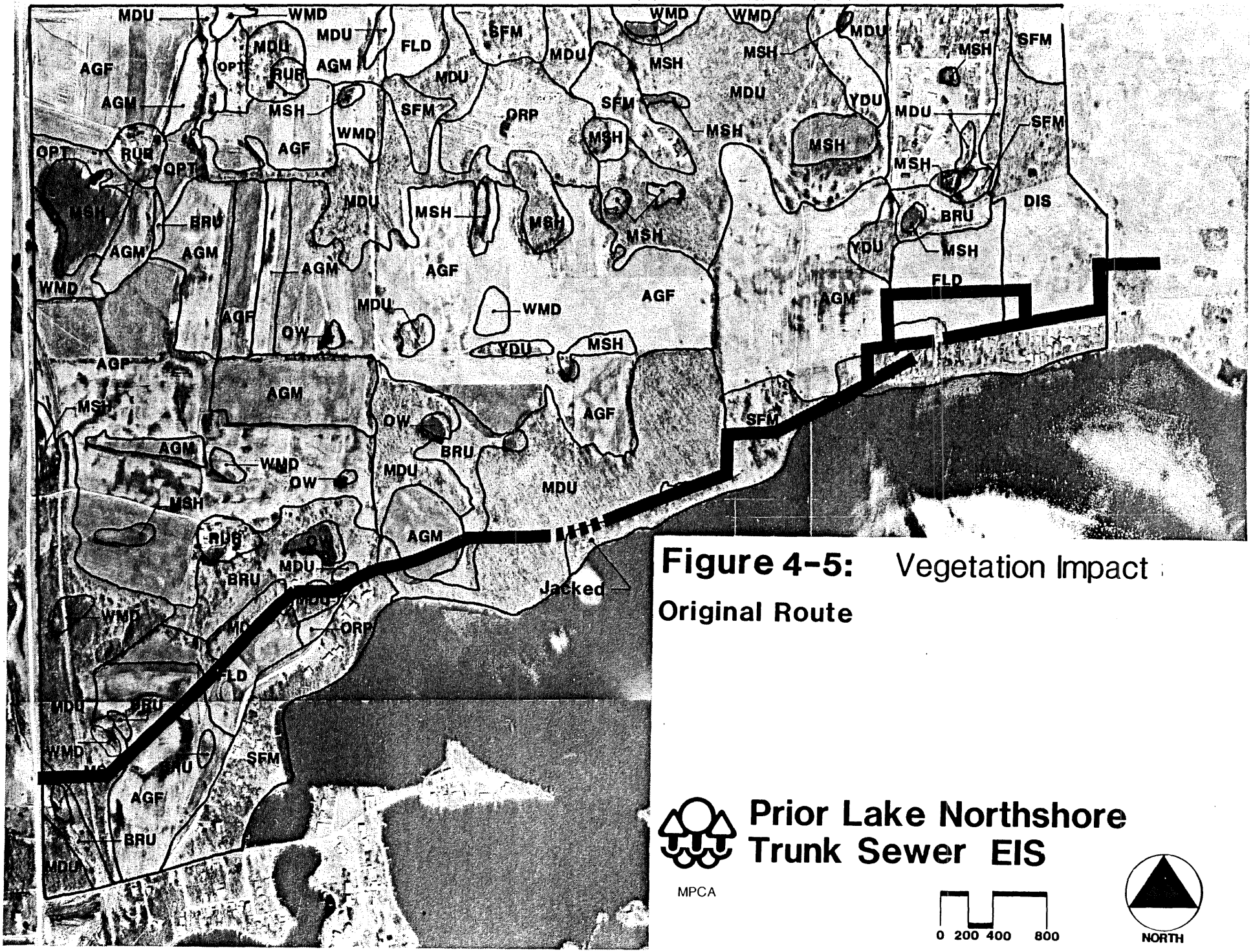


Figure 4-5: Vegetation Impact

Original Route

Prior Lake Northshore Trunk Sewer EIS

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NORTH

mature deciduous woodland in the original route alignment (3.92 acres) is 14.24 percent of the total corridor acreage (Table 4-8). Of the 3.92 acres, approximately one acre would not be disturbed because the trunk sewer would be jacked for a distance of approximately 400 feet beneath a high point in the mature deciduous woodland at the west end of Beach Street in the Chatonka Beach area.

4.4.2 Alternative 1

Relative to the total project area, Alternative 1 (Figure 4-6) would have the greatest impacts (17.52 percent) on the old field type. Over 10 percent of the disturbed area presently being developed for single family residential use would be impacted by this alternative and approximately 8.40 percent of the total young deciduous upland would be affected (Table 4-7). Relative to the 21.21 acres in the corridor, 20.51 percent is mature deciduous upland (4.35 acres), 34.05 percent is single family residential (7.22 acres), and approximately 24.89 percent is Old Field (5.28 acres), and 13.53 percent is in the area disturbed for single family residential development (2.87 acres). Also, 3.25 percent of this alignment is in agricultural meadow (0.69 acres) (Table 4-8).

4.4.3 Alternative 2

For Alternative 2 (Figure 4-7) relative to the total project area, this alignment would have the greatest impact on the single family residential (12.55 percent, 13.75 acres of the total single family residential). Other impacts would occur to the old field type (11.82 percent, 3.56 acres), the disturbed area being developed for single family residential (10.21 percent, 2.87 acres), agricultural meadow (3.76 percent, 3.50 acres), and mature deciduous upland (2.60 percent, 5.15 acres) (Table 4-7). Within the 28.83 acres in the project alignment, 47.70 percent (13.75 acres) is single family residential, 12.35 percent (3.56 acres) is old field, 17.86 percent (5.15 acres) is mature deciduous upland and 12.14 percent (3.50 acres) is agricultural meadow (Table 4-8).

4.4.4 Alternative 3

Alternative 3 (Figure 4-8) would affect 14.34 percent (15.71 acres) of the total single family residential type in the project area, 10.21 percent (2.87 acres) of the area being developed as single family residential, 14.17 percent (4.27 acres) of the old field, 3.14 percent (6.20 acres) of the mature deciduous upland, and 4.52 percent (4.20 acres) of agricultural meadow (Table 4-7). Within the 33.25 acres impacted as a result of construction of Alternative 3, 47.25 percent is single family residential, 12.63 percent is agricultural meadow, 18.65 percent is mature deciduous upland, and 12.84 percent is old field (Table 4-8).

4.4.5 No-Build Alternative

Under the No-Build Alternative, there would be no direct impacts resulting from the construction of a trunk sewer or associated and related watermain storm sewer and street improvements.

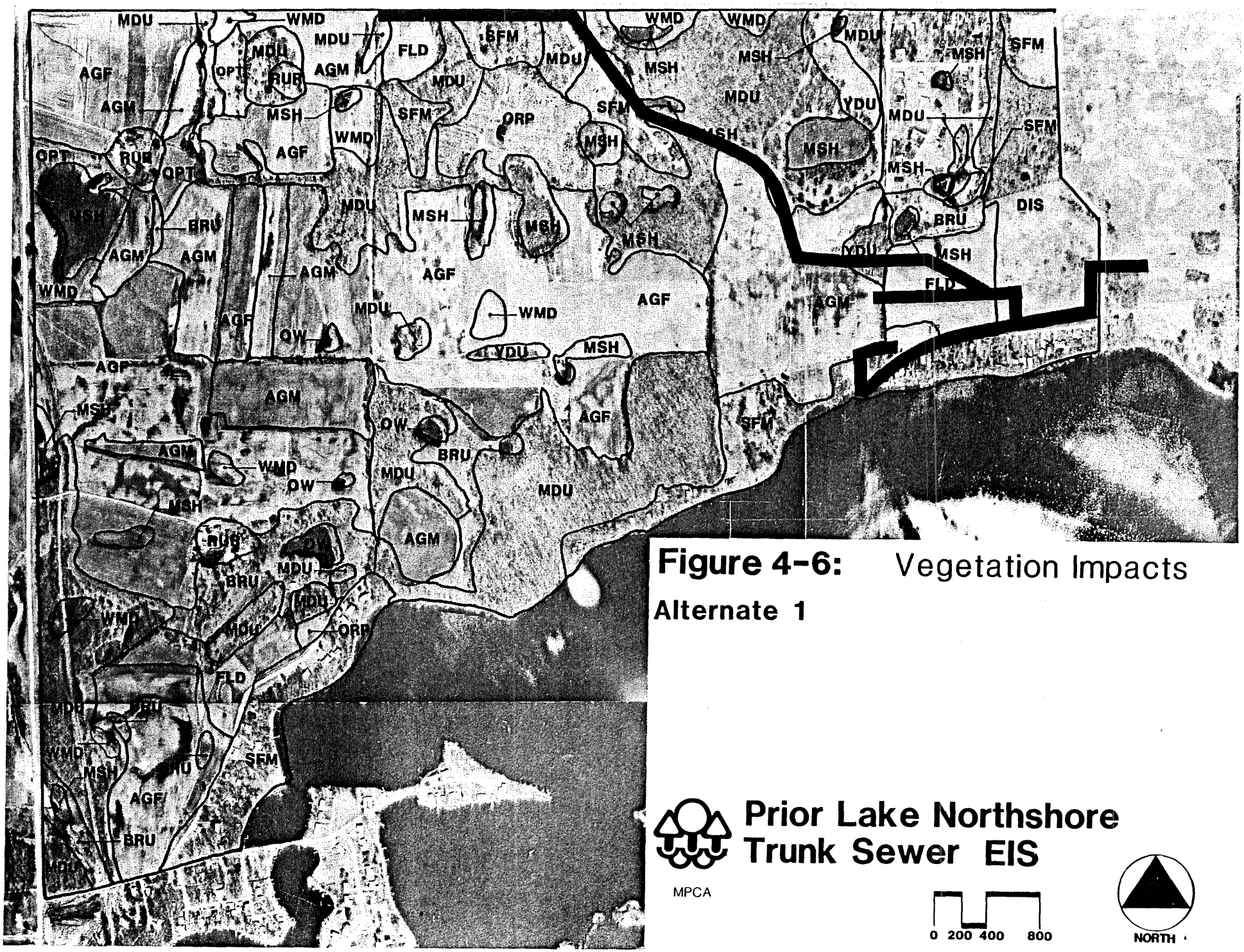


Figure 4-6: Vegetation Impacts

Alternate 1

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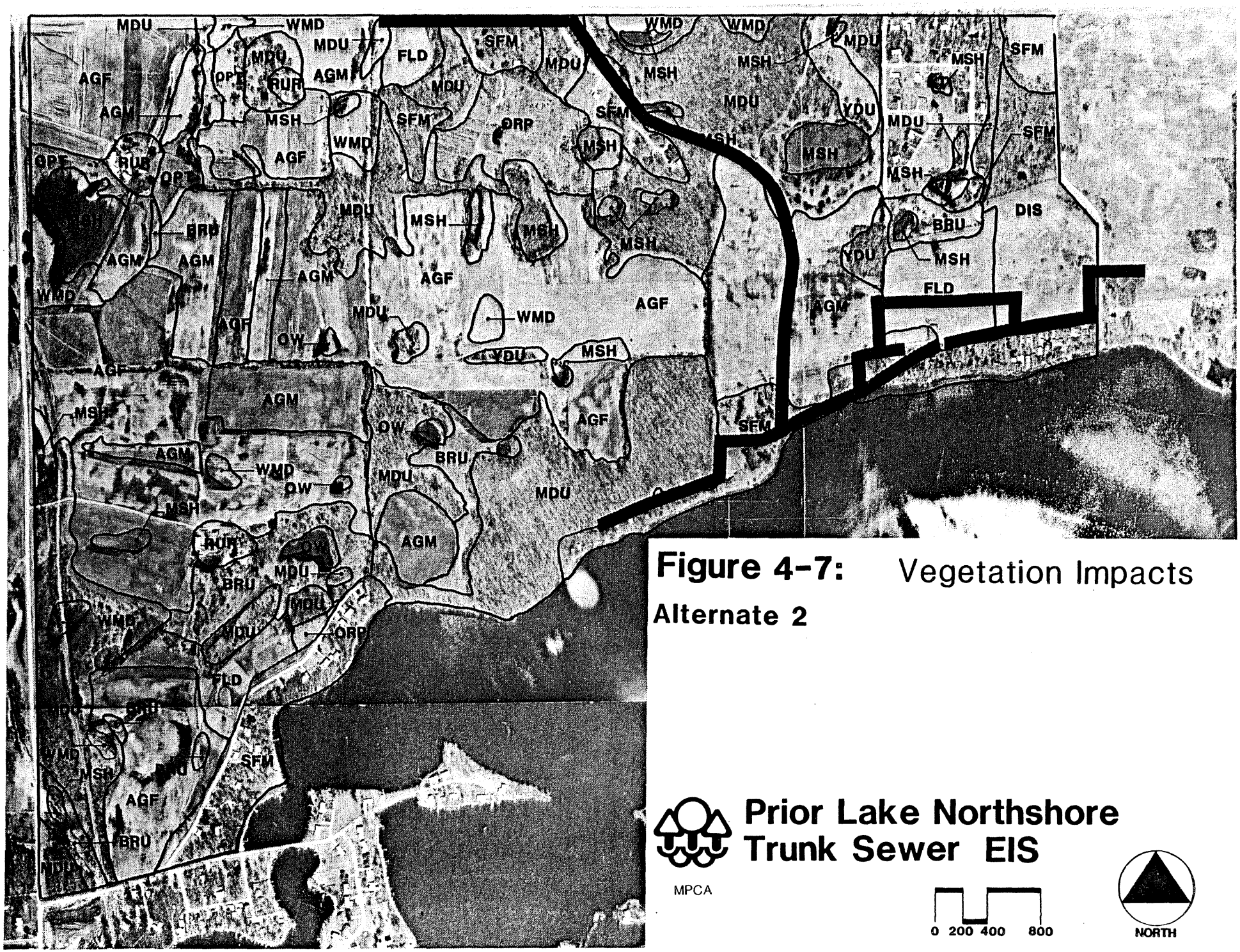


Figure 4-7: Vegetation Impacts

Alternate 2

Prior Lake Northshore Trunk Sewer EIS

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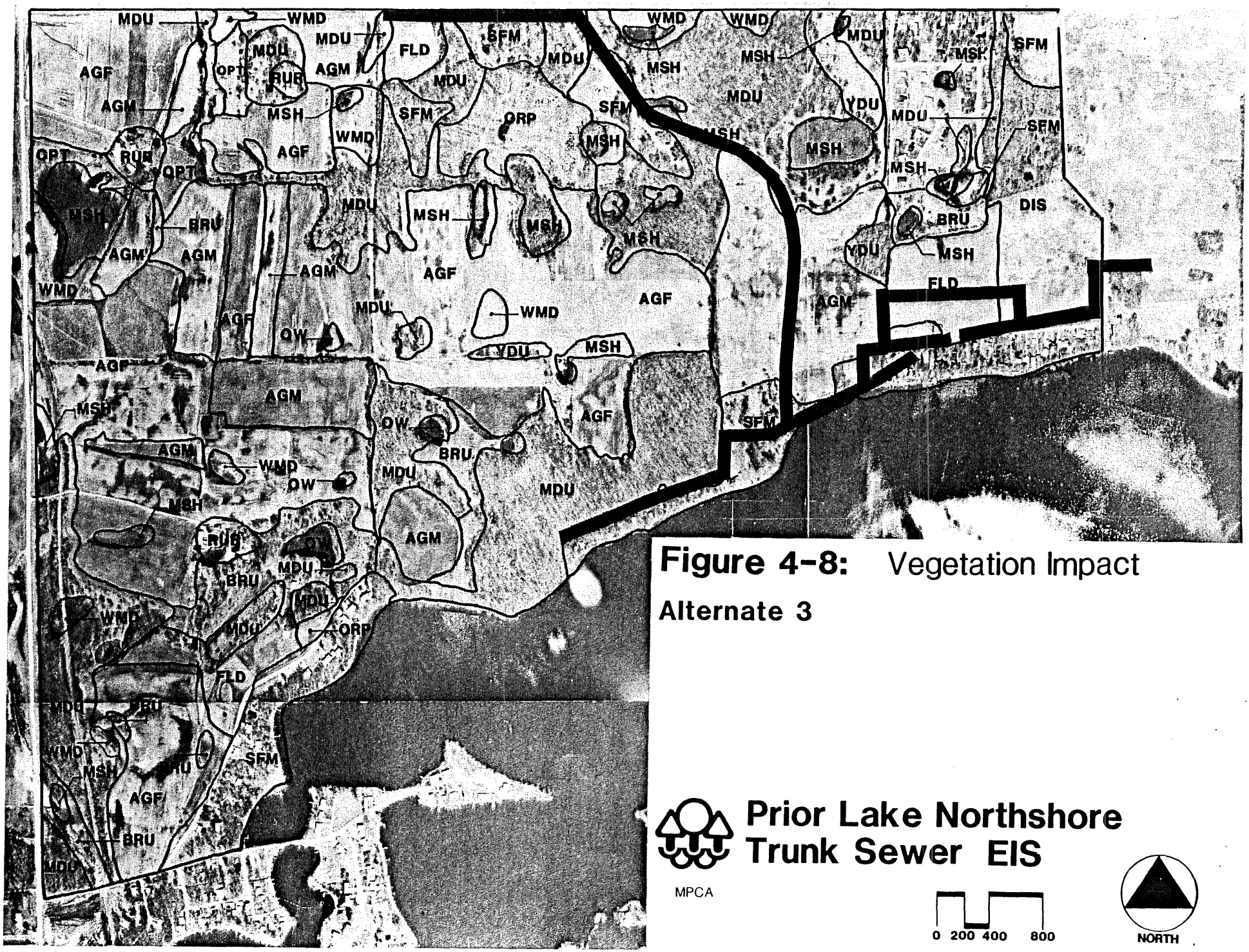


Figure 4-8: Vegetation Impact

Alternate 3

Prior Lake Northshore Trunk Sewer EIS

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4.4.6 Secondary Impacts--Build Alternatives

Secondary impacts resulting from the build alternatives would be accelerated development of the project area and higher densities of housing than might result under a development plan where each lot was served by individual septic systems and water service. As Figure 2-4 shows, the Prior Lake Comprehensive Plan has certain areas set aside as conservation districts and park land. Adherance to the comprehensive plan would result in the preservation and protection of parts of the area in woodland, parkland and conservation open space. With the No Build Alternative and uniform development over the entire project area, it is reasonable to expect that all suitable land would eventually be developed for Single Family Residential purposes albeit at a much lower density than if the area were provided with public sewer and water. Furthermore, maximum development of the project area would occur at a much slower rate than if the public utilities were in palce.

Ultimately under full development, the construction impacts of the original route and one of the three alternatives would be approximately the same. If one of the alternatives is selected, eventually laterals would need to be extended eastward from the MWCC interceptor to serve the western edge of the project area. Alternatively, should the original proposal be selected, sewer and water service would need to be provided to the developments on the north end of the project area. In terms of construction-related disturbances, this EIS has only studied the project alternatives as presently proposed.

4.4.7 Impact Analysis

Relative to the percentage of total cover type most impacted by each alternative, the original route had the greatest impact on agricultural field and wooded pasture, and the least impact on old field and mature deciduous upland when the impacts on mature deciduous upland were adjusted to account for the 400 feet of trunk sewer that would be jacked. Alternative 1 had the least impact on the single family residential area. This reflects the fact that less single family residential area is served by Alternative 1. Also, Alternative 1 had less impact on agricultural meadows than Alternatives 2 and 3. Alternative 2 had greater impacts on mature deciduous upland, single family residential, and agricultural meadow. Alternative 3 had the most impact on agricultural meadows, mature deciduous upland, and single family residential. Table 4-11 is a relative ranking of the percentages of total cover type in the project area impacted by each build alternative.

Impacts on land use and cover types relative to corridor acreage are as follows: The original route had the greatest impact on agricultural field and wooded pastures, and the least impact on agricultural meadow and mature deciduous upland. Alternative 1 affected the greatest relative percentage of mature deciduous upland and a slightly greater percentage of single family residential than the original route. Alternative 1 also has the greatest percentage of old field in the alignment. Alternatives 2 and 3 have the greatest percentage of the single family residential type within the alignments. Alternative 3 had the greatest percentage of agricultural meadow of the proposed routes. Table 4-12 is a ranking of the percentages of cover types within the alignments relative to corridor acreages.

Table 4-7. Alternative Impacts Related to Project Area Cover Types

Cover Types	Original Route		Alternative 1		Alternative 2		Alternative 3		Total Area
	Acres	Percent Of Type*	Acres	Percent Of Type*	Acres	Percent Of Type*	Acres	Percent Of Type*	
Agricultural Field	5.61	2.02	-	-	-	-	-	-	240.67
Agricultural Meadow	.84	.90	0.69	0.74	3.50	3.76	4.20	4.52	93.01
Mature Deciduous Upland	3.92 2.92*	1.98 1.48**	4.35	2.20	5.15	2.60	6.20	3.14	197.68
Young Deciduous Upland	-	-	0.80	8.40	-	-	-	-	9.52
Rural Residential	-	-	-	-	-	-	-	-	8.23
Single Family Residential	8.95	8.32	7.22	6.71	13.75	12.55	15.71	14.34	109.55
Open Pasture	-	-	-	-	-	-	-	-	9.11
Wooded Pasture	1.10	12.50	-	-	-	-	-	-	8.80
Old Field	3.48	11.55	5.28	17.52	3.56	11.82	4.27	14.17	30.13
Marsh	-	-	-	-	-	-	-	-	43.03
Open Water	-	-	-	-	-	-	-	-	11.02
Wet Meadow	-	-	-	-	-	-	-	-	19.12
Open Brush	.75	1.51	-	-	-	-	-	-	49.82
Orchard/Plantation	-	-	-	-	-	-	-	-	18.66
Disturbed	2.87	10.21	2.87	10.21	2.87	10.21	2.87	10.21	28.1
Total	27.52 (26.52)*	3.15 3.03*	21.21	2.43	28.83	3.30	33.25	3.80	874.56

*Percentage of the total project area cover type affected by the proposed alternative.
**Impact area reduced by 1 acre for section of trunk sewer to be jacked at west end of Beach Road.

Table 4-8. Alternative Impacts Related to Corridor Cover Types

Cover Types	Original Route		Alternative 1		Alternative 2		Alternative 3	
	Acres	Percent of Corridor*	Acres	Percent of Corridor*	Acres	Percent of Corridor*	Acres	Percent of Corridor*
Agricultural Field	5.61	20.39	-		-		-	
Agricultural Meadow	.84	3.05	0.69	3.25	3.50	12.14	4.20	12.63
Mature Deciduous Upland	3.92 2.92*	14.24 10.61**	4.35	20.51	5.15	17.86	6.20	18.65
Young Deciduous Upland	-	-	0.80	3.77	-	-	-	-
Rural Residential	-	-	-	-	-	-	-	-
Single Family Residential	8.95	32.53	7.22	34.05	13.75	47.70	15.71	47.25
Open Pasture	-	-	-	-	-	-	-	-
Wooded Pasture	1.10	4.00	-	-	-	-	-	-
Old Field	3.48	12.64	5.28	24.89	3.56	12.35	4.27	12.84
Marsh	-	-	-	-	-	-	-	-
Open Water	-	-	-	-	-	-	-	-
Wet Meadow	-	-	-	-	-	-	-	-
Open Brush	.75	2.72	-	-	-	-	-	-
Orchard/Plantation	-	-	-	-	-	-	-	-
Disturbed	2.87	10.43	2.87	13.53	2.87	9.95	2.87	8.63
Total	27.52 (26.52)*	100.00	21.21	100.00	28.83	100.00	33.25	100.00

*Percentage of cover type acreage as related to the total acreage in the corridor.
**Impact area reduced by 1 acre for section of trunk sewer to be jacked at west end of Beach Road.

Table 4-9. Number of Trees by Species Impacted in Woodland Areas

	Woodland Areas			
Woodland: Impacted by: Species	Chatonka Woods (Original Route)	Woodland 1 (Original Route)	Rolling Oaks* (Alt. 1, 2, 3)	Rolling Oaks (Alt. 1, 2, 3)
Sugar Maple	214	21	20	34
Basswood	39	8	8	7
Red oak	13	49	48	-
White/Bur Oak	9	-	12	-
Oak Sp.				23
Big-toothed Aspen	-	23	2	4
Elms	8	3	4	1
Ironwood	2	5	16	47
Bitternut Hickory	2	10	4	-
Hackberry	3	-	-	-
Boxelder	4	-	-	-
Blackcherry	-	1	1	-
Unknown	-	-	-	7
Total	294	120	115	130
Average Trees/Acre	54	174	78	88

*Tree counts in alignment corridor evaluated by Alexis Duxbury.

Table 4-10. Number of Trees by Size Class Impacted by Alternates

Woodland: Impacted by: Size Class (inches dbh)**	Woodland Areas			
	Chatonka Woods (Original Route)	Woodland 1 (Original Route)	Rolling Oaks* (Alt. 1, 2, 3)	Rolling Oaks (Alt. 1, 2, 3)
4.0 - 7.5	69	47	51	58
7.6 - 11.6	72	62	22	24
11.6 - 15.5	77	8	25	16
15.6 - 19.5	44	2	12	12
19.6 - 23.5	25	1	5	7
23.6 - 27.5	6	-	-	9
27.6 - 31.5	1	-	-	4
Total	294	120	115	130
Average Trees/Acre	54	174	78	88

*Size class of trees in the alignment corridor evaluated by Duxbury.
**Diameter at breast height.

Table 4-11. Selected Land Use/Cover Types Most Impacted by Each Build Alternative Relative to Total Cover Type in the Project Area

	Alternatives			
Cover Type	Original Route	#1	#2	#3
Agricultural Field	1	-	-	-
Agricultural Meadow	3	4	2	1
Mature Deciduous Upland	4*	3	2	1
Single Family Residential	3	4	2	1
Old Field	4	1	3	2

KEY: 1 = Greatest percent of area impacted
4 = Least percent of area impacted

* Adjusted for reduced impacts resulting from jacking 400' length of trunk sewer.

Table 4-12. Selected Land Use/Cover Types Most Impacted Relative to Cover Types Within the Alternative Alignments in the Project Area

	Alternatives			
Cover Type	Original Route	#1	#2	#3
Agricultural Field	1	-	-	-
Agricultural Meadow	4	3	2	1
Mature Deciduous Upland	4*	1	3	2
Single Family Residential	4	3	1	2
Old Field	3	1	4	2

KEY: 1 = Greatest percent of area impacted
4 = Least percent of area impacted

* Adjusted for reduced impacts resulting from jacking 400' length of trunk sewer.

Selection of the original route would have the greatest impact on sugar maple and basswood species. Alternatives 1 and 2 would have greater impacts on oaks. Alternative 3 would have an impact on oaks as well as any maples along Beach Street in Chatonka Woods. Table 4-9 lists the species and number of each in four sampled areas.

The original route would have the greatest impact on trees over 11.6 inches in diameter whereas Alternatives 1 and 2 would have the greatest impact on trees under 11.6 inches in diameter. Alternative 3 would also impact the large diameter trees along Beach Street in Chatonka Woods.

4.5 WILDLIFE IMPACTS

The species composition and density of wildlife in any given area is the product of the quality, distribution, and composition of the habitat. Habitat in turn consists of land use types and vegetation cover types. Wildlife species in any area may be predominantly grassland species, predominantly woodland species, or combinations thereof depending upon the character and dominance of the existing cover and land use types.

The vegetation section previously described the cover types present in the Prior Lake North Shore Trunk Sewer Project area. The cover types which predominate include a combination of agricultural fields and agricultural meadows with scattered relatively large blocks of deciduous woodland. Other habitat types covering smaller areas are scattered throughout the project area.

The abundance and distribution or interspersion of the various cover types present ultimately determines the types of wildlife species in a given area and their relative numbers. In addition to the cover types, the mobility of each individual wildlife species is also important in determining the types of species present. Species such as white-tailed deer, which are quite mobile can occur in areas where the three basic elements for survival and reproduction (food, water, and cover) are distributed over a fairly large spatial area for example, one square mile.

Other species such as mice, moles, voles, shrews and many songbirds have small home ranges and consequently need to have the three basic elements of food, water and cover available in a much smaller spatial area. Any action, either natural or manmade which changes habitat types or cover, its continuity, distribution or abundance will ultimately have an effect on wildlife species composition and populations. In all except in the most extreme cases, wildlife habitat is not lost but rather is converted from a habitat type which supports certain species and population densities to another cover type or land use which supports a different complex of species at a different range of population densities. The question of whether certain activities which affect natural habitat are good or bad is relative to the wildlife species complex which remains.

Management actions taken by natural resource management agencies to benefit certain types of game species, species of special concern such as rare, threatened or endangered wildlife species, or other species of high public value, concern or importance are considered to be good management actions. On the other hand, actions which are taken by other public agencies or private individuals for the purposes of developing agricultural land, housing subdivisions or roadways, may

be activities considered detrimental to wildlife because they reduce the levels of the desirable species and increase the population levels of species considered to be less desirable or undesirable.

Furthermore, habitat alteration activities affecting a relatively small area may, in fact, result in beneficial impacts on wildlife by introducing edge or a different community type into a area of fairly homogeneous cover. This edge can provide food, cover and space for wildlife species which require open areas adjacent to woody or brushy areas and provide foraging areas for birds of prey such as hawks and owls. On the other hand, large-scale alteration of uniform habitat types or a mosaic of habitat types can result in adverse impacts on the wildlife species present in that area and result in a conversion of species and a change in population densities.

Impacts on wildlife populations are the result of some alteration or modification on habitat. These alterations or modifications in habitat can be the direct result of a specific project or may be the indirect result of no specific project but rather the aggregation of individual actions over a long period of time. For this analysis of the impacts on wildlife, the discussion will be broken into two sections, the no-build action and the build alternatives.

Under the no-build plan, that is, where no sewer and water improvements are constructed it is assumed that a certain level of development will occur inevitably. As the alternative description indicates for the purposes of this EIS, it is assumed that the no-build alternative will result in the development of lots each having their own individual well and septic systems. Over the long-term, such development will ultimately affect the species composition and densities of wildlife and result in wildlife species which tend to be cosmopolitan in nature i.e. those species which are relatively tolerant of humans and their activities. A listing of species typically occurring in an urban environment appears in Appendix C.

Given continued population growth and the need to provide homes, jobs and means of transportation for people such growth pressures and ultimate changes in wildlife habitat are inevitable in urbanized and urbanizing areas.

The build alternatives include the original proposal, and Alternatives 1, 2 and 3 as described in Section 4. Impacts related to the build alternatives are of two types, primary or direct impacts which are the result of the actual construction and installation of the storm sewer, sanitary sewer, water lines and street improvements and secondary or indirect impacts which occur as a result of implementation of a build alternative. Each of the two types of impacts - primary and secondary - may further be subdivided into short term and long term effects.

The impacts of each of the build alternatives on cover types in the project area have been described in detail in the vegetation section. The alteration of cover types is an alteration of existing wildlife habitat. This section describes the implications of these cover type changes to wildlife species in the project area.

For all of the build alternatives, impacts on such areas as agricultural meadows, single family residential, and old field will be relatively short-lived

and last only during the construction period itself. Immediately upon completion of construction, the area would be seeded back to a grass mixture and within one year grassland wildlife species utilizing the area prior to construction would reoccupy that area.

Impacts in the brushland types and the wooded habitats would be more long-term. Construction of any of the build alternatives would result in the introduction of a linear open grassland or brushland corridor through a wooded area where such a corridor previously did not occur. Ultimately with no further disturbance in the project corridor, natural succession would gradually replace the grassland habitat with brush and young tree saplings. Eventually the area would again become a mature forest over a period of 50 or more years.

Secondary impacts as a result of the build alternatives are more difficult to quantify. The build alternatives would result in the development of an area presently consisting primarily of agricultural fields, woodlands, and vacant land. The secondary impacts would also ultimately result in a wildlife species complex consisting of primarily cosmopolitan species as listed in Appendix C.

To determine the possible effects of a sewer line corridor through a wooded area, a literature search was conducted to locate studies which might document changes in wildlife species composition as a result of corridor cuts through woodland areas. One study was located (Anderson, 1979) where a transmission line corridor was constructed through an extensively decidous forest community in Tennessee. This study concluded that those species associated with predominantly wooded areas which were breeding migrants were affected most by corridor clearcuts. These species, in the Tennessee decidous forest, included yellow-billed cuckoo, red-eyed vireo, Kentucky warbler, scarlet tanager, summer tananger, blue-gray gnatcatcher, and the pine warbler. Resident species such as blue jays, Carolina chickadees, tufted titmice, and wood thrushes declined following the cut. Cardinals and rufous-sided towhees were present in the study area prior to the cut and their populations did not change following corridor construction.

Species which benefitted from the corridor cut included field sparrows, brown thrashers, eastern kingbirds, indigo buntings, blue grosbeaks, American goldfinch, mourning doves, barn swallows, common flickers, and red-tailed hawks. These are species commonly associated with edge habitats and unstable habitats in a state of transition, i.e. habitats proceeding through successional stages from open grassland to brushland and eventually to mature woodland. Another study completed by Eldridge and Coffin (1983) documented changes in breeding bird populations from a predominantly forested area in 1942 to a suburban area 37 years later. This study was completed in Fairfax County, Viriginia approximately eight miles southwest of the White House in Washington, D.C.

The conclusions of this study were that the species most common in the decidous forest in 1942 such as the red-eyed vireo, ovenbird, wood thrush, scarlet tananger and hooded warbler all declined as the area was gradually converted to suburban residential housing. The species most common in the suburban residential area included the cardinal, mockingbird, song sparrow, blue jay, starling, grey catbird, American robin, house sparrow, mourning dove, Carolina chickadee and tufted titmouse. The red-eyed vireo, ovenbird, scarlet tananger, and hooded

warbler were no longer present in the suburban residential habitat and the numbers of wood thrush declined from 33 territories per 100 acres in the deciduous forest to two territories per 100 acres in the suburban residential development.

The changes in species composition in the Prior Lake Project area will probably not be as dramatic since the area is not currently an extensively unbroken wooded area. The edge type transitional species associated with grassland, farm field and woodland habitats are already present. However, it is likely that some minor impacts on individuals of a given species will be affected. These impacts are primarily a function of range size as described in the introduction to this section. The direct effects of the build alternatives on wildlife in the project area will vary according to each of the wildlife species affected. In general, those birds utilizing the presently undisturbed woodland area would experience some loss of nesting and breeding habitat as a result of construction related clearing. Loss of woodland habitat would be relatively long-term in that it would require approximately 50-90 years to replace the mature decidous upland. This net loss in mature decidous upland habitat would range from 6.20 acres for Alternative 3 to 2.92 acres for the Original Route.
Species utilizing brushland habitats and grassland habitats would be positively affected as a result of this project in that additional acres of open grassland edge and brushland would be created.

Small mammal species such as mice, moles, voles and shrews whose home range is relatively small would also be affected by the build alternatives and some temporary short-term reductions in populations would occur during the construction period. Small mammals occurring exclusively in woodlands would have a net long-term loss in habitat related to the amount of mature decidous upland cover lost. Alternatively, those small mammal species occurring in grassland areas would benefit from the increased grass cover following restoration after construction. Other species which rely on small mammals as prey species such as the American kestrel, the red-tailed hawk, and other hawk and owl species would benefit from the increase in grass cover. These linear grass corridors through wooded areas allow these birds of prey to perch on nearby trees and dead snags and scan the grassy areas for the small rodents living there.

Construction activities would also have some direct impacts on wildlife species present in and immediately adjacent to the corridor. Some disruption in species home ranges and territories will occur especially for those species having relatively small territories or home ranges. Some individuals of the smaller mammal species such as the moles, voles, shrews and mice would probably be directly killed by construction. Other individuals within a construction corridor would become more vulnerable to predators as a result of changes in their microhabitat. Some dislocation of individuals is also likely to result putting stress on the dislocated individual as well as other individuals of the same species whose territories are involved. Because small mammal species are so prolific, no long term negative effects on populations are anticipated.
Depending on the timing of construction, some impacts could occur to breeding and nesting birds in the form of territory boundary alteration and the destruction of nests. Birds will often renest if the nest is destroyed before the eggs are hatched.

Large animals who have a home range covering tens or hundreds of acres will be relatively unaffected by any of the build alternatives. Creation of an open, grassy corridor through wooded areas and the maintenance of grassland in other parts of the project corridor would provide nesting habitat for such species as the ring-necked pheasant, mallard, and blue-winged teal and provide feeding habitat for species such as the white-tailed deer.

4.6 ARCHEOLOGICAL AND HISTORICAL RESOURCES IMPACTS

Systematic surveys of archeological sites in central Minnesota by the Minnesota Historical Society suggest that prehistoric archeological sites tend to concentrate in an area within 1000 feet of large bodies of water. Because the original proposal and portions of some of the alternative routes came within 1000 feet of the shoreline of Prior Lake, the possibility of the presence of archeological artifacts was quite high. Additionally, residents within the project area identified one area within the original proposed corridor which appeared to be pre-Columbian burial sites. As a result of these two factors, the City of Prior Lake contracted with Cougar Consulting of St. Paul, Minnesota to complete a Phase I and Phase II archeological survey of the original North Shore Trunk Sewer route (Lothson, 1984). The survey by Lothson included shovel testing along the entire corridor route as well as the excavation of three one by two meter test pits in the area of the suspected burial site. The Lothson study concluded:

> "The results of these formal test excavations were completely negative. Not one flake or one ceramic sherd or bone fragment was found in any of the units. It would appear that the area tested is not of NRHP (National Register of Historic Places) significance and that the possible mounds may not be mounds at all but glacial features: kames (?). (NOTE: This tested location exists in a area dominated by "knob and kettle" topography and other glacial surface features associated with moranic land forms. It is the feeling of the writer that the initial identification of (the) area as a mound site may be an incorrect interpretation and that the location is more likely to be a natural feature produced by glacial activities" (Lothson 1984:16).

The Lothson study did not find any archeological artifacts in any of the shovel test holes that were dug along the original North Shore alignment proposal. Although he was somewhat surprised by these findings, he concluded that historically the water levels in Prior Lake were considerably lower and that the present high water elevation of the lake may have obscured evidence of prehistoric activity. This has been the case in at least one other area in Minnesota, particularly, Knife Lake located near Pine City, Minnesota.

To avoid impacting this potential site, the City of Prior Lake shifted the alignment of the North Shore Trunk Sewer slightly northward to avoid any possible impact upon the suspected burial mound area. On the basis of the negative results of the shovel testing and data collected by on-site walking surveys, Lothson concluded that the proposed project would not impact any known cultural resources. He further stated:

> "Future studies at the location, ... would be inappropriate and of little value. Prehistoric and historic cultural features and sites of NRHP (significance) do not exist in any frequency at the location" (Lothson 1984:18).

5.0 MITIGATION OF IMPACTS

5.1 CONSTRUCTION IMPACTS MITIGATION

There are four impacts related to construction of the proposed trunk sewer that are unavoidable for this project:

1. Noise
2. Dust
3. Access disruption
4. Surface disturbance area

Noise, dust, and access inconvienence are all short-term impacts associated with construction activities. These impacts could be mitigated to some extent by normal construction practices.

5.1.1 Noise

Most of the irritating noise from heavy equipment operation would be limited to a small part of the project corridor at any one time. This time period would be while the heavy equipment was actually excavating or backfilling and compacting at that location. Otherwise, noise would be limited to that coming from and scrapers driving back and forth along the corridor. Noise of equipment would be controlled through use of mufflers on all equipment, and through restriction of work to the hours of 7:00 a.m. to 8:00 p.m.

5.1.2 Dust

Dust would be an unavoidable problem all along the construction corridor during construction. The contractor would use water trucks to hold down the dust as much as possible. Other mitigations include prompt paving or revegetation of disturbed areas, staging of construction, and cessation of construction during episodes of high wind.

5.1.3 Access

Because there would be many vehicles moving back and forth along the construction corridor during working hours, and at certain times the excavation trench would prevent vehicular access to certain homes, there would be unavoidable access impacts on the community during the construction of the project.

5.1.4 Surface Disturbance

These impacts could be mitigated by requiring the contractor to maintain access for emergency vehicles, and by limiting the amount of open trench to the shortest distance practical. These mitigative measures are normally applied in similar construction projects.

In contrast with the temporary disturbances associated with construction just described, surface disturbance is a more lasting impact on the project corridor. After the construction is over, surface disturbances through wooded areas would remain visible since many large trees would be removed.

Estimates for the areas of surface disturbance were based on use of 1:1 side slopes for the construction trenches. In many areas it may be possible to increase the slopes. If the soil encountered in the trench were a stiff clay, the side slopes utilized could approach 1/2:1. Based on conversations with contractors and inspectors familiar with conditions in Prior Lake, and with construction of deep-pipe excavation (in the areas of 60 feet of excavation depth) it may be possible (with a stiff clay soil) to limit surface disturbance to approximately 80-90 feet. Under less than optimum conditions, such as with other types of soil or where groundwater is encountered, side slopes would unavoidably approach 1:1.

The City Engineer of Prior Lake has indicated that the consideration has been given to use of a box to maintain even narrower surface disturbance. Correct compaction is difficult to achieve when using a box because of the caving that occurs as the box is pulled forward.

After construction, efforts could be made to mitigate the impacts of the surface disturbance caused by deep sewer installations. Revegetation of unpaved areas would be implemented as a part of the erosion-control plan, after completion of the project. Further mitigation could include landscaping and planting of trees and shrubs.

5.2 FINANCIAL IMPACTS MITIGATION

Mitigation of financial impacts can be accomplished by implementing a different alternative with lower construction costs. Implementation of the no-build or no-action alternative would result in the greatest mitigation of financial impacts. Alternative 1, which does not include a portion of the project area, would similarly result in mitigation of financial impacts. Since Alternative 2 includes a lift station, capital costs are lower, so property assessments are also lower. The operational costs of a lift-station alternative are higher, and since these costs are distributed across the community, the total project costs are similarly distributed to a greater extent than with the all-gravity alternatives.

Specific financial impacts upon owners of large properties are mitigated by Green Acres deferments. Qualifying properties are protected from project assessments until such time as they lose Green Acres status.

Another method of financial impact mitigation is through the use of alternative assessment formulae. This method would have the effect of transferring the financial impacts from one group of property owners to another group of property owners.

The various formulae utilized by muncipalities in calculating utility assessments are normally based on a combination of unit charges, front footage charges, and acreage charges. The particular assessment utilized by the City of Prior Lake has been in use for a number of years, and has been applied to all recent sewer and water projects. It is typical of assessment formulae developed by other communities, differing only in the precise numerical relationship between lineal and area elements of the assessment.

Table 5-1 shows the effect of variations in the assessment formula upon "typical" assessments, as applied to sewer and water respectively system costs of the original North Shore Trunk Sewer project. The original assessment formula proposed is shown, together with a variant based completely upon front-footage, and one based completely upon acreage. These two variants represent the extreme limits of variation in assessment formulae.

Table 5-1 also shows the result were the City at large to assume a part of the burden of construction costs. This approach is utilized by some Twin Cities Metropolitan Area Communities. It should be noted that the implementation of such a policy, while mitigating financial impacts on residents in the project area, would also constitute a significant departure from the assessment policies applicable to previous projects. As noted in the EAW, the assessments associated with the North Shore Trunk Sewer project, when corrected for inflation, are quite similar to the assessments associated with previous similar projects in the City.

5.3 WATER QUALITY IMPACTS MITIGATION

Some changes in runoff water quality would result as the project area becomes more urbanized. Adherance to the Prior Lake - Spring Lake Watershed Management Plan and Stormwater Management Plan would protect the water quality of Lower Prior Lake. Impacts on water quality from construction are subject to mitigation by routine construction practices aimed at control of erosion. Impacts from on-site wastewater treatment systems will be non-existent if the Original Proposal or Alternatives 2 or 3 are implemented. Impacts from continued use of on-site systems are not expected to be significant if the no-build alternatives or Alternative 1 are implemented. No mitigative measures other than maintenance and periodic inspection, and enforcement of local sanitary codes would be necessary. The Stormwater Management Plan should be periodically reviewed to assure that it continues to address water quality issues.

5.4 VEGETATION IMPACTS MITIGATION

Several practices can be applied to mitigate or minimize impacts on vegetation as a result of construction-related activities. To avoid impacting agricultural crops, construction in agricultural fields could be completed. Prior to the planting of crops in the spring or after crop harvest in late summer or early to mid-fall depending upon the type of crop planted. Project planning and construction scheduling would take agricultural operations into consideration and efforts would be made to minimize impacts on agricultural crops to the extent possible. Any agricultural meadow affected by construction would be restored and reseeded using a seed mixture which would include the same species as that present adjacent to the construction area. For both the agricultural field and the agricultural meadow, construction activities preferably should be completed during the fall or winter months when soil conditions are relatively more stable and soil compaction as a result of the movement of construction equipment would be less. Impacts on the wooded areas could be mitigated in one of two ways. Upon completion of construction, the area could be seeded down to a grass-seed mixture suitable for wildlife nesting and then left undisturbed over the years. Eventually, as plant succession occurred, the woodland would begin to encroach upon the trunk sewer right-of-way and woody tree species would become reestablished on their own. Alternatively, more desirable trees could be

Table 5-1. Typical Assessments for Alternative Assessment Policies.*

	Sewer		Water	
	.3 acre lot	10 acre lot	.3 acre lot	10 acre lot
100% Acreage-Based	$1,919	$63,955	$ 448	$14,940
100% Lineal-Footage Based	$4,408	$87,290	$1,484	$29,388
City's Present Policy	$4,077	$79,213	$ 764	$13,622
50% Costs shared by City with Remaining Costs based on present City Policy	$1,873	$35,570	$ 550**	$ 9,375**

*These numbers do not include road improvements.
**No Front Footage Charges would be assessed since trunk charges and connect charges would more than cover half the cost of the entire project.

replanted using one or two year-old planting stock selecting those species which are present in the woodland adjacent to the trunk sewer corridor. In residential areas, where ornamental and shade trees are removed, the loss of these trees could be mitigated by replanting 3" caliper stock obtained from landscape nurseries. Plant materials of this size should reach a height of 20 ft. or more within 10 to 15 years after completion of construction of the trunk sewer. The estimated cost of replacing these ornamental trees and shrubs, is approximately $800 per tree. These replacement costs are not included in the project cost estimates.

The impacts of Alternatives 2 and 3 and of the Original Route in the area of Chatonka Woods could be avoided by utilizing Alternative 1 or the no-build alternative, which would have no impacts by virtue of excluding Chatonka Woods from construction. Since the impacts of alternatives through Chatonka Woods is related to a combination of depth and method of excavation and construction of the paved roadway, impacts upon vegetation could be mitigated by foregoing construction of the roadway combined with careful construction of the trunk sewer. This alternative may not be consistent with City policy relative to construction standards for City streets. It would therefore be necessary to retain Beach Street as a private road.

Reseeding the old fields disturbed by construction to a grass-seed mixture recommended for wildlife purposes would minimize any construction related impacts to the old field cover types. In general, where other cover types are disturbed by construction, the wildlife grass-seed mixture should be used to restore and stablize the disturbed top soil as soon as construction is completed.

The impacts of Alternatives 1, 2, and 3 on the mature deciduous upland in the north end of the project area could be reduced by shifting the alignment west 100-200 feet out of the private driveway and into the agricultural meadow. Restoration of the meadow could be achieved in a relatively short period of time whereas replacement of mature trees can take 50 or more years.

5.5 WILDLIFE IMPACTS MITIGATION

Mitigating measures to reduce the impacts on wildlife would be the same for any of the build alternatives. As soon as practicable after completion of construction, the area could be reseeded with a grass mixture including five pounds switchgrass, four pounds alfalfa, and two pounds tall wheatgrass per acre. The reseeded area could be fertilized at a rate of 100 pounds per acre of nitrogen, phosphorous, and potassium fertilizer. Immediate reseeding would stabilize the topsoil, prevent erosion, eventually provide habitat for ground nesting birds, and provide food and cover for a variety of small animals. In areas where it is desirable to maintain woodland cover such as near residences, 3 inch caliper trees could be planted in the disturbed corridor. Replacement species could include red and sugar maple, green ash and basswood. A variety of fruit and berry producing shrubs may be planted in clusters to provide food and nesting cover for various bird species. These shrubs could include such species as chokecherry, dogwood, honeysuckle, juneberry, snowberry, winter-berry, etc. A listing of useful shrub species appears in the publication by Dodge, Breckenridge, and Warner (1971).

Where storm water ponding areas are provided, the pond should be designed so that at least part of the pond would hold 12 - 24 inches of water permanently to allow aquatic emergent vegetation to grow. Furthermore, these ponding areas should have a buffer strip of approximately 75 feet in width. This 75 foot buffer should be measured from the point where a 10 year event during the nesting months of May and June would raise the water level. The previously described seed mixture could be used.

Retention of some of the woodland areas as part of conservation open space areas or as parkland would also be beneficial to wildlife providing travel corridors for the more mobile species and reproductive and survival cover for other species having smaller home ranges.

5.6 ARCHEOLOGICAL AND HISTORIC RESOURCES IMPACTS MITIGATION

To mitigate the impacts of construction of the original proposal upon a suspected burial site, the City of Prior Lake has shifted the sewer alignment to bypass the site location. In addition, the following precaution should be taken during construction. If at any time during the construction period archeological artifacts are encountered in an excavation, construction should cease immediately, and the Minnesota Historical Society, State Historical Preservation Officer should be notified.

APPENDIX A

City of Prior Lake
Assessment Policy

CITY OF PRIOR LAKE

LOCAL IMPROVEMENT GUIDE

Adopted by City Council 7-25-77

Chapter: Assessment Policy

General Statement of Policy:

The assessment on any parcel is not to exceed the benefit to the parcel derived from the improvement. In the event that the cost of providing the improvement to a parcel exceeds the benefit to that parcel, the assessment is to equal the benefit with the difference of cost minus assessment coming from other revenue sources.

Description of Charges:

1. Footage Charge (rate per foot x footage)
2. Acreage Charge (rate per acre x acreage)
3. Connection Charge (unit fee composed of city and metropolitan fees)
4. Unit Charge (Project Cost/# of benefitted parcels)

Item 1 and/or item 2 equal a parcel's assessment.

Item 3 is a one-time charge paid if and when permits are granted for connection to city facilities.

Classes of Assessment:

1. Current Assessment - lien on the property filed with the county auditor to begin repayment immediately.
2. Delayed Assessment - lien on the property for which payment does not immediately follow.

Details of Footage Charges:

1. The footage assessment on parcels of one acre or less will be based on the average width of the parcel. (The average is determined by adding the side abutting the improvement and its parallel side at the property lines and dividing by two.)

2. The footage assessment on parcels of one acre or more will be based on the footage at the minimum setback line.

3. The footage assessment on parcels with two sides abutting an improvement are to be assessed under either number 1 or 2 above, whichever applies on the street address side, plus 10 feet on the corner.

4. The current footage assessment is to be for a maximum of 150 feet. Any footage beyond 150 feet is classed as a delayed assessment subject to the provisions listed under delayed assessment below. Where an improvement abuts two sides of a parcel, the footage on the side charged 10 feet under number 3 above, which is in excess of 150 feet, is classed a delayed assessment.

5. If the topography, access or zoning of a parcel is such that use of the improvement is not feasible, the City Council may delay the assessment for an indefinite period of time, or until it becomes useable, subject to Council review.

6. The frontage assessment on odd-shaped parcels will be based on the average frontage assessment of parcels of comparable size. A parcel is classed odd-shaped if its frontage assessment differs by 20 percent, plus or minus, or parcels of comparable size.

7. The frontage assessment on non-corner parcels with improvements installed on two or more sides will be assessed frontage on the street address side, if the parcel is determined to be non-subdividable.

Details on Acreage Charges:

1. On all platted lots and on outlots in platted areas, acreage will be currently assessed.
2. On all parcels in a registered land survey and all government lots, acreage will be currently assessed.
3. On unplatted areas, acreage will be currently assessed across the abutting footage and back 150 feet. The remaining acreage is classed a delayed assessment.

Details on Unit Charges:

1. The City Council may elect to assess an improvement project on a unit basis.
2. The unit assessment will be the total project cost divided by the number of units in the project area.
3. A unit is defined to be: all parcels platted or otherwise, regardless of existent structures; or a residential unit; or a specified dollar amount.

Delayed Assessments:

1. All delayed assessments will have an interest charge of 8% per year.
2. Where number 3 below does not apply, delayed assessments will become current five years from the date of the improvement projects original assessment hearing, or until the parcel is subdivided, whichever comes first.
3. If the topography, access or zoning of a parcel is such that use of the land is not feasible, the City Council may delay the assessment for an indefinite period of time, or until it becomes useable, subject to future Council review.

Payment Policy:

1. All assessments are to be subject to an interest charge as determined by the City Council.
2. Payment without interest may be made within 30 days of the public improvement assessment hearing without interest.
3. Payment may be made in full in any year by paying the interest for that year and paying the principal for the remaining years without an interest charge.

4a. Assessments for sanitary sewer and watermain, storm sewer projects are to be for a term of 20 years.

b. Assessments for paving are to be for a term of 5 years.

5. Assessments may have a maximum term of 30 years from the year of the assessment hearing.

General Comments:

1. Assessments for nuisances, sidewalks, diseased tree removal, and all other municipal projects not herein covered are to be determined by the Council and added as addendum to this chapter.

2. Reserve capacity of the backbone system shall be assigned to each area served from the central collection point so that no area pays for reserve capacity beyond their area.

3. All provisions contained herein are subject to changes passed by the City Council.

CITY OF

PRIOR LAKE, MINNESOTA

55372

POLICY STATEMENT - DEFERRED ASSESSMENTS

1. All deferred assessments will have an interest charge of 8% per year.

2. Deferred assessments will become current five years from the date of the assessment hearing for the applicable project except as stated below:

   a. If the parcel does not benefit from the improvement, it can be removed from the deferred assessment rolls.

   b. If right of way was given to the City for better routing or to reduce the cost of the project, the City Council may grant a deferrment for up to 10 years from the date of the assessment hearing, or until the parcel is sold or subdivided. which ever comes first.

   c. If the topography, access or zoning of a parcel is such that use of the land is not feasible, the City Council may defer the assessment for an indefinite period of time, or until it becomes useable.

APPENDIX B

Woodland Survey Technical Report

by

Alexis Duxbury

December, 1984

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1.0 OBJECTIVES AND METHODS

The Prior Lake North Shore Trunk Sewer Project Area contains several deciduous forest remnants, ranging up to 25 acres in size (Figure 1). The proposed sewerline alignment crosses two of the remnants and the alternative alignments cross a third. For the purposes of this study these remnants were named Chatonka Woods, Woodland #1, and Woodland #2 (Figures 2 and 3). As a result of changes in the alignment of Alternative 1, 2 and 3 subsequent to the completion of this study, the alignment shown in Figure 4 does not coincide with the censused corridor. A species count and size classification was completed independently of this study for the new alignment. In October, 1984 a survey of these three remnants was conducted. The objectives of the survey were to:

1) determine the loss of trees from the construction of the proposed alignment or its alternatives;

2) qualitatively, and when feasible quantitatively, characterize the remnants;

3) assess the quality of the maple-basswood remnant in Chatonka Woods; and

4) screen and search the proposed and alternative construction corridors in the remnants for the presence of rare, threatened, or endangered species of plants.

Each of the four objectives is further described below.

1.1 Tree Loss

A census of the corridor in each remnant that would be directly affected by the construction of the proposed alignment or its alternative was conducted. The census identified and measured all the trees in each corridor with a dbh, (diameter at 4.3 meters [4.5 feet] above the ground), greater than 10 centimeters (approximately 4 inches). In Chatonka Woods the census corridor coincided with the boundaries of the permanent and temporary alignment easements. The boundaries of the Chatonka Woods easements were surveyed, staked, and flagged prior to the census. In Woodlands #1 and #2, no easement boundaries were marked and the location of the sewer alignments had to be estimated. The census corridor was determined to include the area 50 feet on either side of the estimated alignments. Tables 1-A, 1-B, 2, 3, 6, and 7 summarize the results of the census. These results are discussed later in this report.

1.2 Remnant Characteristics

The three remnants were inspected on at least two separate occasions. During each visit notations were made on each remnant's composition, structure, and history. Data from the tree census was used to supplement these qualitative observations. Additional data was solicited from specialists having first-hand knowledge of the remnants in the project area. Keith Wendt, the plant ecologist for the Minnesota Natural Heritage Program and Allan Olson, the district forester for Scott County and local liaison for the American Tree Farm System provided background information on the maple-basswood stand in Chatonka Woods.

Refer to the Table of Contents for the sections of this report pertaining to the characterization of the individual remnants.

1.3 Significance of the Maple-Basswood Stand in Chatonka Woods

Prior to the study, it had been suggested that the Tree Farm in Chatonka Woods was perhaps a regionally significant example of a south-central (Big Woods), maple-basswood remnant. To address this particular issue, the Minnesota Pollution Control Agency asked the Minnesota Natural Heritage Program to evaluate the natural features of the site. A Heritage staff member conducted an on-site evaluation in September, 1984. The results of this evaluation were summarized in a memorandum to the Minnesota Pollution Control Agency (Appendix 2) and are discussed in Section 2.1.3.

1.4 Rare Plant Inventory

Each censused corridor described in Section 2.1.1 and a band 50 feet wide on either side of the corridor centerline were inventoried for rare plants in early October. The inventory was planned around the following steps.

1) A listing of all the rare plant occurrences documented from Scott County and several counties adjoining Scott County was obtained from the Minnesota Natural Heritage Program.

2) The list and the habitat preferences of each species on the list were reviewed to target the rare species that could potentially occur in the project area's forest remnants. Three species were identified in this step of the inventory: Panax quinquefolius, Carex plataginea, and Carex formosa. Though none of the three were known from the project area, all had previously been collected from mesic deciduous forests in the vicinity of the Twin Cities.

3) Information on the taxonomic features and phenology of the potential occurrences was compiled. This information is summarized in Table 8.

4) Specimens at the University of Minnesota herbarium of each species were examined to further develop an effective search image.

5) The areas of concern in the remnants were searched for rare plants. The searches were conducted at a time when all the targeted plant species were believed to be recognizable in the field.

2.0 RESULTS

2.1 Chatonka Woods

Chatonka Woods is in the southeast corner of the project area on the north shore of Prior Lake (Figure 1). The woods is a maple-basswood remnant of about 25 acres divided among a wide range of land uses. The southern margin of the woods has been developed into a small residential enclave. The western third is either logged or logged and grazed. The northeast 10 acres is managed for timber production under the American Tree Farm System (Figure 3).

The original route alignment intersects Chatonka Woods on the wood's eastern border. It follows this border a short distance to the south and then jogs westward across the length of Chatonka Woods (Figure 2). In this westward jog the alignment roughly follows the length of the gravel road servicing the lakeshore residences, and, after descending a steep logged slope, crosses a relatively open pasture (Figure 3).

The alignment corridor consists of an end-to-end string of irregularly sized temporary and permanent easements. The corridor through Chatonka Woods is approximately .3 mile long and ranges between 50 and 225 feet wide. The boundaries of the Chatonka Woods corridor were surveyed, staked and flagged prior to the study.

2.1.1 Tree Census

A total of 294 trees were tallied in the Chatonka Woods census (Tables 1-A and 1-B). Two hundred and fourteen (73%) were sugar maple (Acer saccharum) and 39 (13%) were basswood (Tilia americana). Trees comprising between 5 and 2 percent of the censused individuals were red oak (Quercus borealis), bur oak (Quercus macrocarpa) and elm (Ulmus americana and Ulmus rubra). Minor constituents in the corridor included ironwood (Ostrya virginiana), yellowbud hickory (Carya cordiformis), hackberry (Celtis occidentalis), and black cherry (Prunus serotina).

The corridor has several relatively large trees. The largest tree was a 70+ cm dbh red oak. (Multiple trunked trees had each trunk measured separately.) Trees in the 40-49, 50-59, and 60-69 cm dbh size classes comprised about 25% of the censused individuals and included 47 sugar maples, 11 basswoods, 10 red oaks, 4 bur oaks, and 2 elms (Table 3). The remaining 75% of the trees were equally divided between 10-19, 20-29, and 30-39 cm dbh size classes (Table 1-A).

It is anticipated most of the trees in the censused area will be lost if the proposed alignment is constructed. Over 60% of these trees grow on either side of the gravel road immediately north of the lakeside residences. A significant proportion of this 60% is comprised of trees growing between the gravel road and the houses. Consequently, construction of the proposed alternative would have its greatest visible impact on this stretch of corridor.

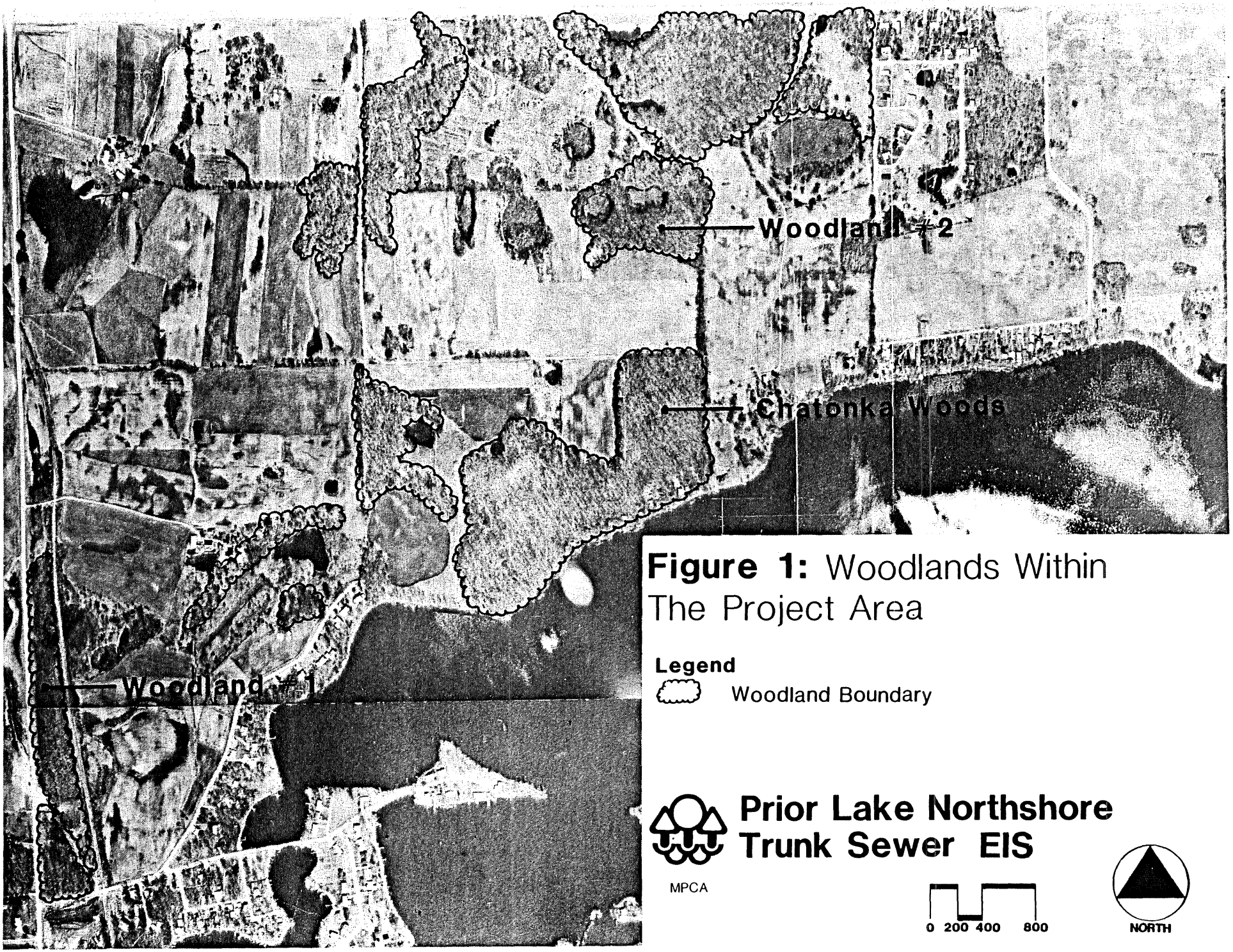


Figure 1: Woodlands Within The Project Area

Legend

Woodland Boundary

Prior Lake Northshore Trunk Sewer EIS

MPCA

0 200 400 800

NORTH

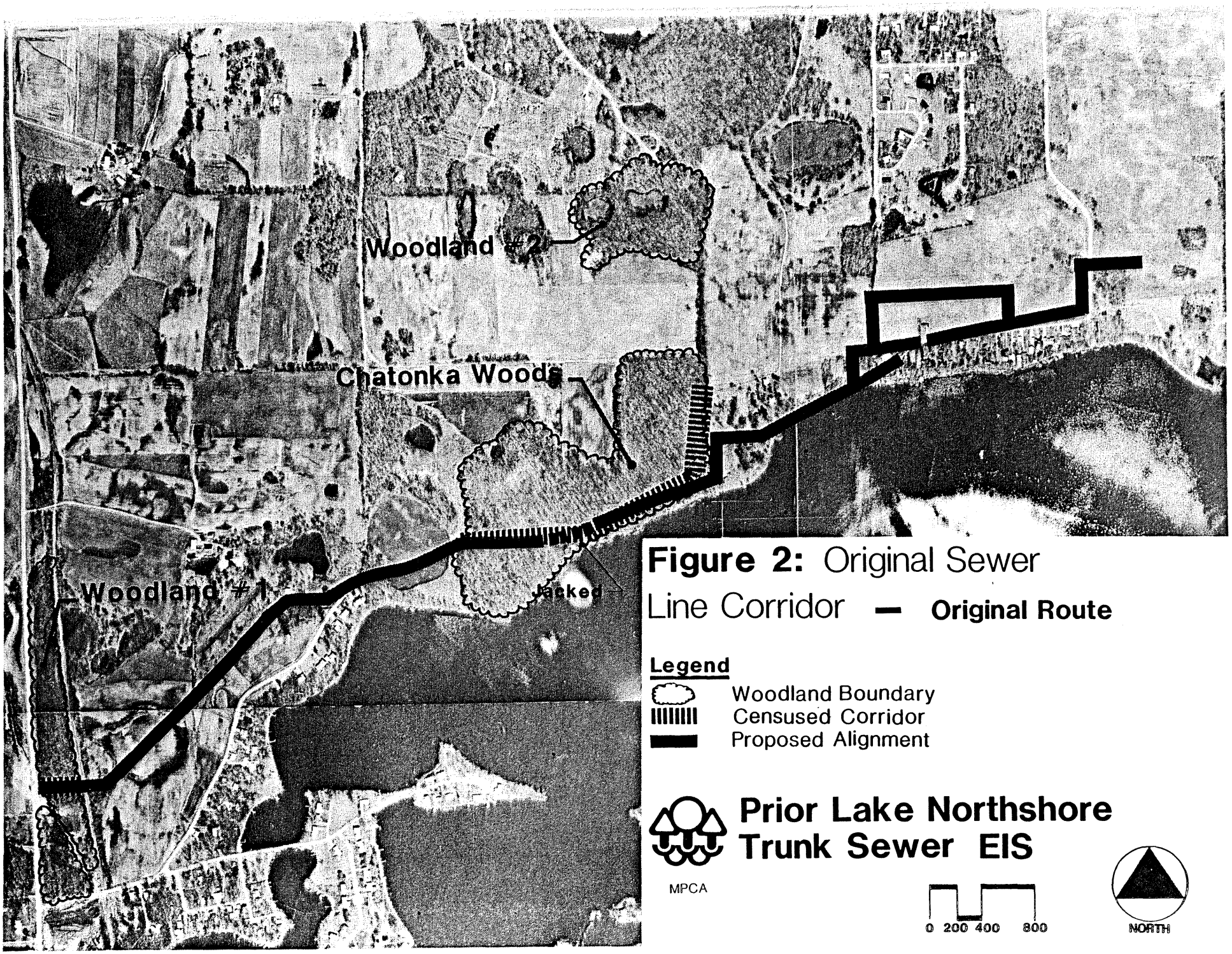


Figure 2: Original Sewer Line Corridor — **Original Route**

Legend

- Woodland Boundary
- Censused Corridor
- Proposed Alignment

Prior Lake Northshore Trunk Sewer EIS

MPCA

0 200 400 800

NORTH

TABLES 1-A AND 1-B

SEWER CORRIDOR TREE CENSUS
NUMBER OF TREES IN CORRIDOR SEGMENTS

TABLE 1-A: Number of Trees by Size Class

Size Class (cm)	# Trees in Chatonka Woods Corridor - Proposed Alignment (Relative Density)	# Trees in Woodland #1 - Proposed Alignment (Relative Density)	# Trees in Woodland #2 - Alternate Alignment (Relative Density)
10-19	69 (23)	47 (39)	51 (44)
20-29	72 (24)	62 (52)	22 (19)
30-39	77 (26)	8 (7)	25 (22)
40-49	44 (15)	2 (2)	12 (10)
50-59	25 (9)	1 (1)	5 (4)
60-69	6 (2)	-	-
70-79	1 (-)	-	-
Total # Trees	294	120	115

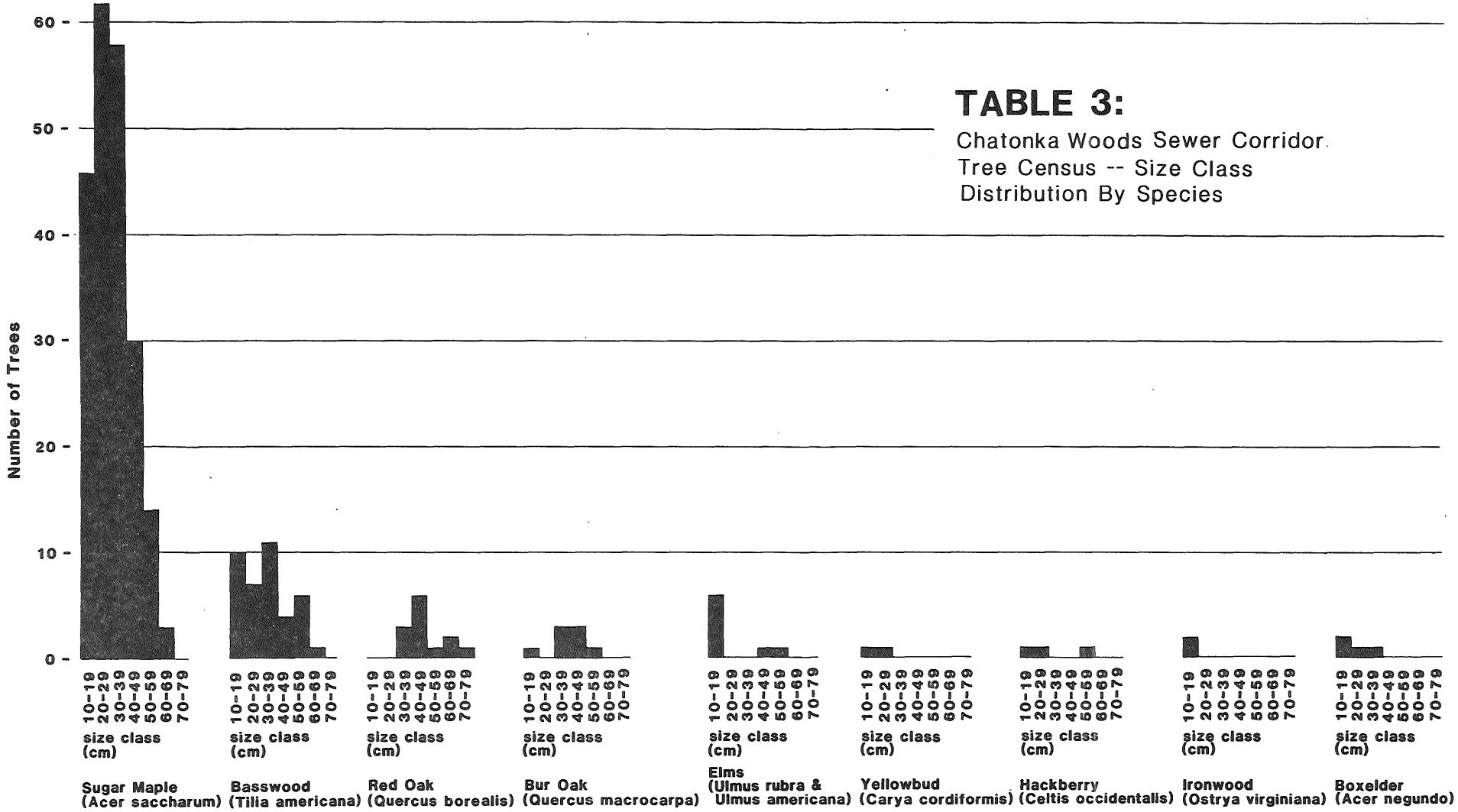
TABLE 1-B: Number of Trees by Species

Species	# Trees in Chatonka Woods Corridor - Proposed Alignment (Relative Density)	# Trees in Woodland #1 - Proposed Alignment (Relative Density)	# Trees in Woodland #2 - Alternate Alignment (Relative Density)
Sugar maple	214 (73)	21 (18)	20 (17)
Basswood	39 (13)	8 (7)	8 (7)
Red oak	13 (4)	49 (41)	48 (42)
White oak	-	-	12 (10)
Bur oak	9 (3)	-	-
Bigtooth aspen	-	23 (19)	2 (2)
Elms	8 (3)	3 (3)	4 (3.5)
Ironwood	2 (.5)	5 (4)	16 (14)
Yellowbud	2 (.5)	10 (8)	4 (3.5)
Hackberry	3 (1)	-	-
Box elder	4 (1)	-	-
Black cherry	-	1 (1)	1 (1)
Total # Trees	294	120	115

TABLE 2

CHATONKA WOODS SEWER CORRIDOR TREE CENSUS
RELATIVE DENSITY OF INDIVIDUAL SPECIES BY SIZE CLASS

	Relative Density (%) by Size Class (cm)						
	10-19	20-29	30-39	40-49	50-59	60-69	70-79
Ac sa	68	86	77	68	60	50	-
Ti am*	15	10	14	9	24	17	-
Qu bo	-	-	4	14	4	33	100
Qu ma	1	-	4	7	8	-	-
Ul sp	9	-	-	2	4	-	-
Ac ne	3	1	1	-	-	-	-
Ce oc	1	1	-	-	1	-	-
Ca co	1	1	-	-	-	-	-
Os vi	3	-	-	-	-	-	-
Totals	101	99	100	100	101	100	100


TABLE 3:
Chatonka Woods Sewer Corridor
Tree Census -- Size Class
Distribution By Species
Number of Trees
60
50
40
30
20
10
0
10-19
20-29
30-39
40-49
50-59
60-69
70-79
size class (cm)
Sugar Maple (Acer saccharum)
Basswood (Tilia americana)
Red Oak (Quercus borealis)
Bur Oak (Quercus macrocarpa)
Elms (Ulmus rubra & Ulmus americana)
Yellowbud (Carya cordiformis)
Hackberry (Celtis occidentalis)
Ironwood (Ostrya virginiana)
Boxelder (Acer negundo)

2.1.2 Characterization of Chatonka Woods

Chatonka Woods is a maple-dominated remnant with a heterogeneous array of subdominant canopy species. In addition to sugar maple, the characteristic trees include basswood, red oak, bur oak, red and American elm, and hackberry. The remnant is on rolling terrain with generally well-drained, loamy soils. In the eastern part of the woods, there is a swale that evidently is poorly drained at certain times of the year. Elms are particularly abundant in the vicinity of this low lying area.

Chatonka Woods is divided among several landowners and land use practices. The differing land use practices have produced a complex patchwork of plant assemblages. These assemblages can be divided into and mapped as four areas.

1) logged and grazed
2) logged
3) residential
4) American Tree Farm

The distribution of the four areas is shown in Figure 3. Each assemblage is discussed below.

2.1.2.1 Logged and Grazed

This area is at the western end of Chatonka Woods. It is managed as part of a single pasture unit. The area can be readily differentiated from the rest of Chatonka Woods on 8 inches to the mile black and white ASCS aerial photography.

The overstory is sporadic with less than 10% canopy coverage. The trees present are mostly small (less than 30 cm dbh) sugar maple. Aerial photograph imagery from the 1970's indicates that at the time the canopy, although broken, was far more extensive than it is today. The recent decrease in canopy coverage is the result of logging activities.

The understory reflects the area's history of grazing and selective cutting. The shrub and sapling layer is conspicuously absent. At present there is no ongoing forest regeneration. The herbaceous layer is dominated by cool-season, sod-forming grasses, particularly Poa pratensis. Among the commoner forbs are plantain (Plantago sp.) and fleabane (Erigeron sp.).

2.1.2.2 Logged

The logged area lies between the residential tracts and the grazed and logged tract just described (Figure 3). Overstory trees are widely scattered as the result of the logging that apparently took place in the early 1980's. In the extensive gaps between the overstory trees is a dense layer of young sugar maples, 3 to 7 feet high. The area is difficult to traverse because of the dense saplings and abundant logging slash and debris. It is anticipated that in time the area will succeed to an even-aged stand of sugar maple overtopped by the scattered trees that escaped logging.

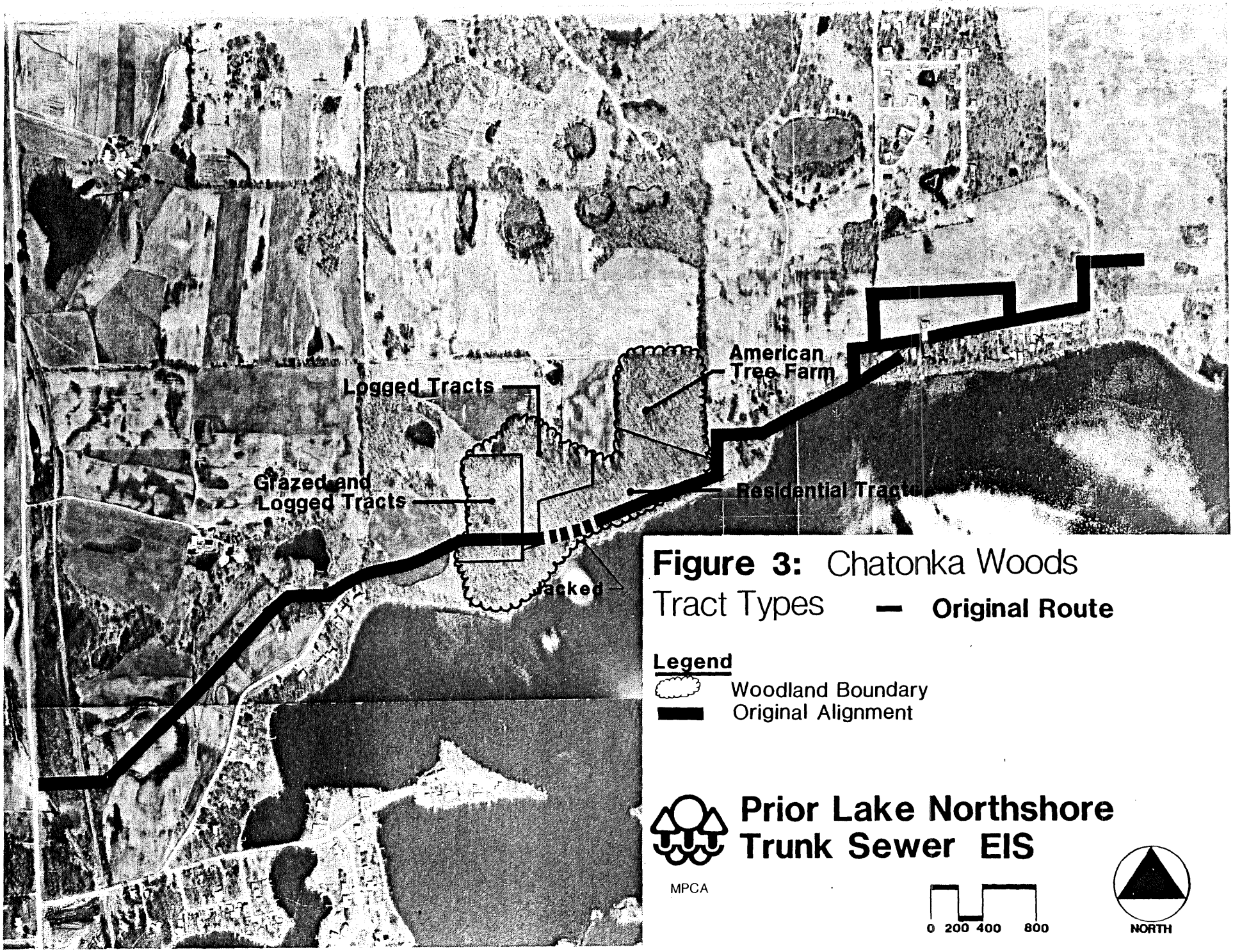


Figure 3: Chatonka Woods Tract Types — **Original Route**

Legend

Woodland Boundary

Original Alignment

Prior Lake Northshore Trunk Sewer EIS

MPCA

0 200 400 800

NORTH

2.1.2.3 Residential

This area forms the southern border of Chatonka Woods. It is composed of many small tracts. The individual tracts are narrow but deep and are aligned along the shore of Prior Lake like beads on a chain. Each tract has a lakeside residence at its southern end. A gravel road runs the length of this area.

The vegetation in this part of Chatonka Woods varies from tract to tract and reflects the predilliction of the individual tract owners. The net result is a mosaic of vegetation types ranging from manicured yardscapes to sugar maple dominated forest fragments with intact canopies but disturbed understories.

Beyond the actual construction of the cabins and houses, the indicators of human disturbance are many. Overstory trees have been selectively removed and in some instances replaced by ornamental plantings or lawns. Many of the remaining trees, particularly those near the residences or road are damaged at the base. The characteristic understory species of undisturbed maple-basswood forests, such as bloodroot (Sanguinaria canadensis), bellwort (Uvulaia grandiflora), Virginia waterleaf (Hydrophyllum virginianum), sweet cicely (Osmorhiza claytoni), and wood violet (Viola spp.), are either absent or few in number. And, localized disturbances at the ground and canopy levels have fostered the invasion of aggressive weedy species, most notably, prickly ash (Xanthoxylem americanum).

2.1.2.4 American Tree Farm

The tree farm is a 10 acre tract in the northeast corner of Chatonka Woods. The tract is on a slope that dips from the north toward the southeast. A shallow drainageway descends the slope. Approximate relief is 30 feet.

The tract has rich loamy soils and is well drained with the exception of the low lying area which separates the tree farm from the residential development on its south. A narrow blacktop drive is the only physical structure present.

The American Tree Farm is a mature second-growth stand dominated by sugar maple (Table 4). Allan Olson, a forester who visited the site in November 1984, estimates the stand to be less than 95 years old (personal communication, 1984). The tract's southern end is dominated by elms. Many of these are dying or have recently died. An inventory of the tract conducted in 1980 indicates that in 1980 one of every three trees larger than 10 inches (25.4 cm) dbh was an elm (Table 4). Today, the proportion of large elms in the population is much less.

The overstory structure varies from north to south. In the north the overstory is nearly continuous and little direct sunlight reaches the understory. Towards the south where the elms increase in abundance, the canopy progressively becomes more open, and large gaps dominate the forest structure. The gaps are the result of mortality from Dutch elm disease and a severe storm that passed through the area in the winter of 1979-1980.

The understory is mesophytic. Shrubs are widely scattered and include elderberry (Sambucus pubens), gooseberry (Ribes cynobasti), and pagoda dogwood (Cornus alternifolia). Wood nettle (Laportea canadensis) is the most abundant

TABLE 4

AMERICAN TREE FARM INVENTORY - 1980

Species	Relative Density By Size Class 5-9" DBH %	Relative Density By Size Class 10+" DBH %	Basal Area (sq. ft./acre) By Size Class 5-9" DBH %	Basal Area (sq. ft./acre) By Size Class 10+" DBH %	Volume by Size Class 5-9" DBH (cords/acre)	Volume by Size Class 10+" DBH (board feet/acre)
Acer saccharum (sugar maple)	62	65	16	50	3.6	2,990
Ulmus americana (American elm)	15	16	4	12	1.4	1,560
Ulmus rubra (Red elm)	8	16	2	12	.5	1,520
Tilia americana (Basswood)	15	3	4	2	.5	390

herbaceous species. Its population has reportedly increased where there are now openings in the canopy. Other, less common herbs include Virginia waterleaf (Hydrophyllum virginianum), sweet cicely (Osmorhiza claytonii), puttyroot (Aplectrum hyemale), carrion-flower (Smilax herbacea), wild geranium (Geranium maculatrum), bloodroot (Sanguinaria canadensis), wood violet (Viola spp.), and zigzag goldenrod (Solidago flexicaulis).

The tract has been enrolled in the American Tree Farm System (ATFS) since the 1950's. The ATFS is a program to insure proper and sustained management of the nation's privately-held forest resources. Enrollment in the program is on a volunteer basis. A single timber sale was conducted under the auspices of the program. The sale was in 1956 and its objectives were probably threefold: to harvest the marketable trees, to cull the unmarketable trees, and to ease overcrowding within the stand. The sale removed 16,700 board feet from the 10 acre tract (Table 5). Most of the harvested trees were sugar maple and elm. Some basswood and red oak were also removed. In view of how relatively little red oak remains today, it is believed most of the red oak was logged from the tract at this time. Current management activities are limited to the selective cutting of the standing dead trees.

Allan Olson conducted an AFTS inspection in 1984 (personal communication, 1984). Based on this inspection he plans to make the following recommendations to the landowners:

1) Selectively cut all harvestable elms within the next 2 to 4 years.

2) Conduct a general timber sale of the other mature trees within the next decade.

2.1.3 Significance of the Maple-Basswood Stand in Chatonka Woods

The Minnesota Natural Heritage Program evaluated the maple-basswood stand on the basis of its size, age, and condition (relative degree of degradation). In its memorandum to the Minnesota Pollution Control Agency (Appendix 2) the Program described the stand in these terms:

> The Prior Lake woods has been moderately to heavily disturbed by logging and likely by grazing. In addition, the loss of canopy elms to Dutch elm disease has significantly altered the structure of the woods. Elm was a major component of this forest, its removal has created large openings in the forest canopy throughout the site. The woods, notably in low areas, now displays less than 50% canopy cover. Young to mature sugar maple and lesser amounts of basswood now dominate the woods. The understory vegetation is patchy. Large portions are dominated by wood nettle (Laportea canadensis) with little or no tree reproduction. Other areas are dominated by dense sugar maple reproduction responding to gaps in the canopy created by dying canopy elms.

The Program went on to conclude that on a scale of A to D (Appendix 1) the stand merited a C ranking and was not "...of state- or county-wide natural area significance." To reach this conclusion, the Chatonka Woods was compared

TABLE 5

TREES SELECTIVELY CUT FROM 10-ACRE
AMERICAN TREE FARM TRACT IN 1956*

Species	Board Feet Removed Per Acre	Total (% of Total)
Acer saccharum (sugar maple)	742	7,420 (44)
Ulmus spp. (Red and American elm)	626	6,260 (37)
Tilia americana (Basswood)	102	1,020 (6)
Quercus borealis Red oak)	178	1,780 (11)
Quercus alba (White or possibly Bur oak)	8	80 (.5)
Populus deltoides (Cottonwood)	20	200 (1)
TOTAL	1,676	16,760 Board Feet

* Excerpt from American Tree Farm System files maintained by District Forester.

against 10 south-central Minnesota maple-basswood stands with statewide significance (B ranked or above). The Chatonka Woods stand was determined to be less significant than any one of these.

The rationale behind this decision is based upon a complex interaction of factors, the most important of which are the age and size of the stand and its history of disturbance as evidenced by its composition and structure.

Size is perhaps the overriding factor accounting for the Chatonka Woods maple-basswood stand's C ranking. The American Tree Farm and the undeveloped forest area immediately south of it total no more than 13 acres. The average size of a maple-basswood occurrence of statewide significance (Nerstrand Woods excluded), is 58 acres: the very smallest occurrence with statewide significance is 20 acres. The small size of Chatonka Woods' maple-basswood stand has effectively magnified the impact of disturbance on the site. While several of the state-significant sites have been disturbed--Wolsfeld Woods (an A ranked site) has a well documented history of selective logging and parts of Richter Woods (a B ranked site) are, at present, undergoing a radical transformation because of Dutch elm disease--the extent of this disturbance is proportionately much less. As a general rule of thumb, the smaller an occurrence is, the more pristine it must be to achieve statewide recognition.

It is unclear in the Heritage Inventory's memorandum to the Minnesota Pollution Control Agency why the project area's maple-basswood stand does not have any county natural area significance. It could be argued that since there are no sites of statewide significance (A or B ranked) in Scott County, a C ranked site such as the Chatonka Woods maple-basswood stand merits protection at the county level. This point requires further clarification by the Minnesota Natural Heritage Inventory staff.

2.2 Woodland #1

Woodland #1 is on the western edge of the project area (Figure 1). It is a long, rectangular forest remnant bordered on the west by County 21 and on the east by an abandoned railroad grade. The remnant is approximately 200 to 400 feet wide and .3 miles long.

2.2.1 Tree Census

A total of 120 trees were censused in the alignment corridor (Tables 1-A and 1-B). Forty-nine of these (41%) were red oak, 23 (19%) were big toothed aspen, and 21 (18%) were sugar maple. Six other species were also recorded during the census. These were basswood, yellowbud hickory, red and American elm, ironwood and black cherry. More than 90% of the trees censused had dbh's less than 30 cm. Only 3 trees, 2 red oak and 1 basswood, had dbh's greater than 40 cm.

2.2.2 Characterization of Woodland #1

Like much of the project area, the remnant is on rolling terrain. Local relief is 25 feet. There are two small depressions in the remnant. The larger of the two is about an acre in size and is situated to the south of the censused corridor. With the exception of the two depressions soils are well drained loams.

Woodland #1 is dominated by red oak. Many of the oaks are multiple trunked. Also quite common are big-toothed aspen and sugar maple (Table 1-B). The aspen are clustered in localized patches on the upper and middle slopes. In the census corridor, all but one aspen were in the 20-29 cm dbh size class (Table 6). The sugar maple largely grow on the sheltered lower slopes. The largest maple recorded in the census was 27.4 cm dbh.

The high proportion of small trees coupled with the multiple trunked growth form of the oaks indicates the remnant is an even-aged, second growth stand that probably arose after a fire or episode of logging. The growth rings of two trees were counted. From this the stand is estimated to be 35 to 60 years old.

The understory is relatively open, with only scattered shrubs. Shrubs growing in the vicinity of the censused corridor include pagoda dogwood and hazelnut (Corylus cornuta). The ground layer, assessed on the basis of its non-ephemeral herbs, is relatively diverse. Virginia waterleaf, white snakeroot (Sanicula gregaria), honewort (Cryptotaenia canadensis) and zigzag goldenrod are some of the commoner herbaceous species.

2.3 Woodland #2

Woodland #2 surrounds a small wetland pothole located in the center of the project area. Total acreage of the remnant and wetland is less than 10 acres. The remnant is bordered by a residential street on the north. This street separates Woodland #2 from another, larger woodland. The route of the alternative alignment was estimated to intersect the east margin of Woodland #2 at about the 930' contour line and, after ascending the base of a rise, traverse the south facing slope bordering the pothole wetland in the northeast of the remnant (Figure 4). Subsequent engineering studies resulted in a shift of this alternative alignment slightly northeastward.

2.3.1 Tree Census

A total of 115 trees were tallied in the census corridor. Forty-two percent of the 115 were red oak, 17% were sugar maple, 14% were ironwood and 10% were white oak. The remaining 17% were either basswood, big toothed aspen, black cherry, yellowbud hickory or elms (Tables 1-A and 1-B).

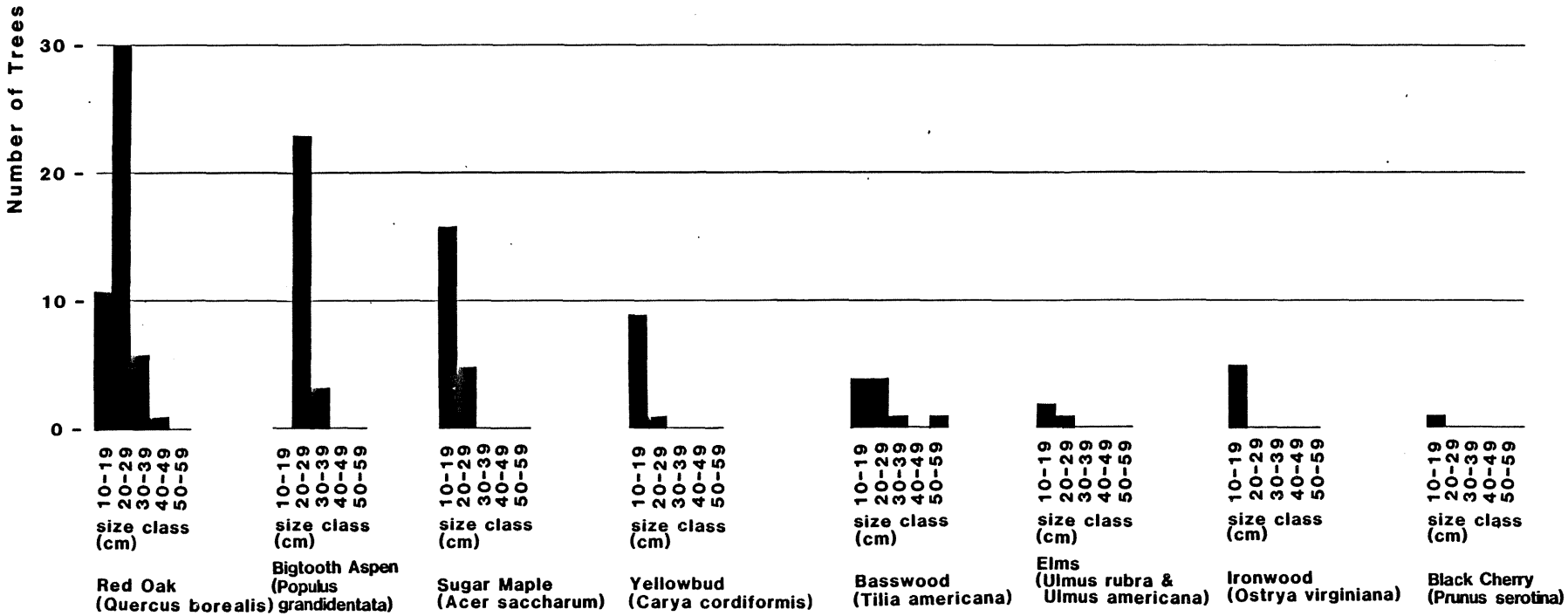
Forty-four percent of the trees had dbh's less than 20 cm. More than 60% were less than 30 cm dbh. Seventeen trees, including 7 red oaks and 4 white oaks, were over 40 cm dbh (Table 7). The larger diameter trees were scattered throughout the censused area.

2.3.2 Characterization of Woodland #2

Woodland #2 is on the hilly terrain immediately surrounding a small woodland pond. Soils are well drained on the slopes and poorly drained in the vicinity of the pond. The pond is ringed by herbaceous species tolerant of the fluctuating water levels. While the depth of the pond was not measured, it was gauged to be relatively shallow.

TABLE 6:

Woodland #1 Sewer Corridor
Tree Census -- Size Class
Distribution By Species



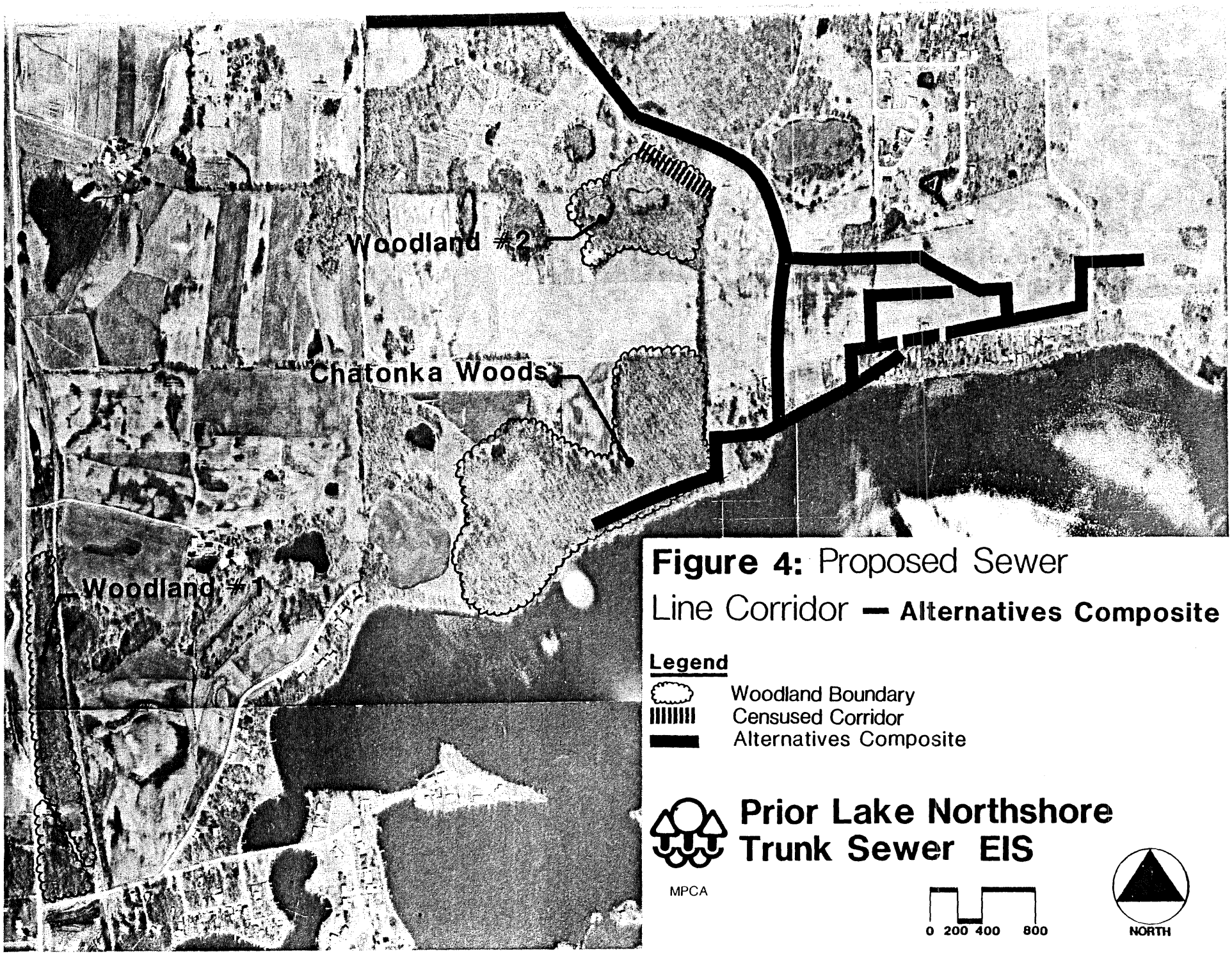


Figure 4: Proposed Sewer Line Corridor — **Alternatives Composite**

Legend

- Woodland Boundary
- Censused Corridor
- Alternatives Composite

Prior Lake Northshore Trunk Sewer EIS

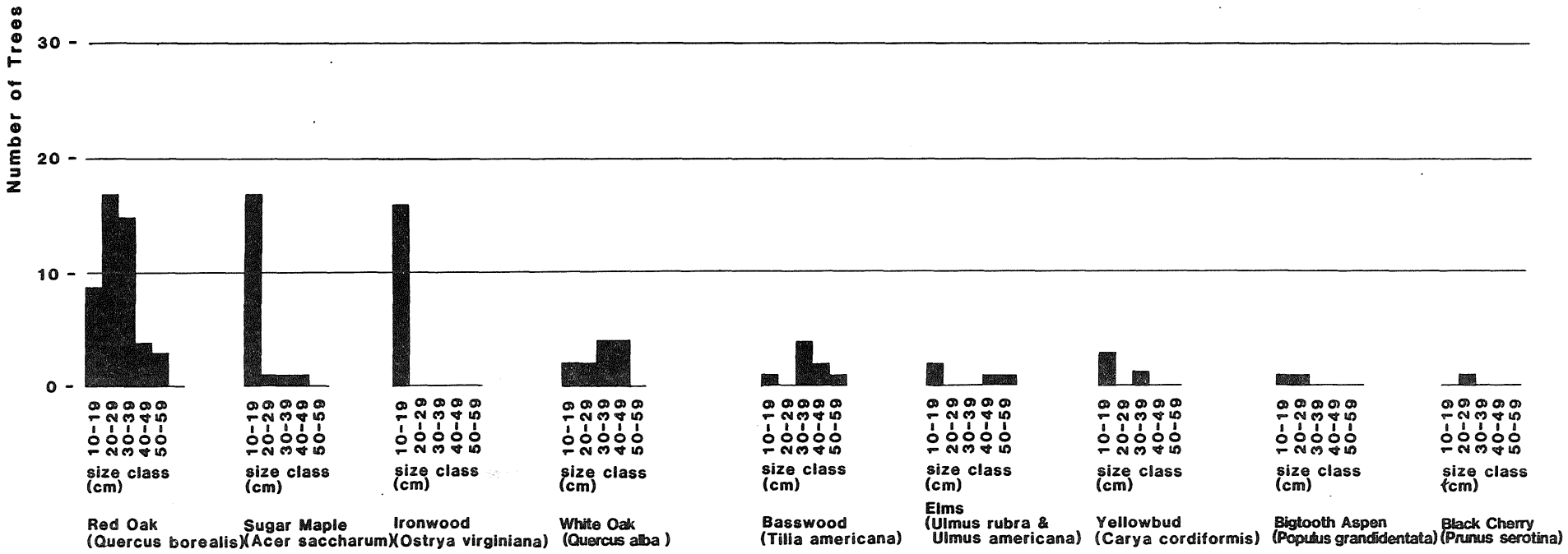
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NORTH

TABLE 7:

Woodland #2 Sewer Corridor
Tree Census -- Size Class
Distribution By Species



Until recently the low lying area to the east of the pond was dominated by elms. Most of the elms have now died from Dutch elm disease. Beneath the elms is a subcanopy of sugar maple. The remnant's slopes are dominated by red oak. Common associates of the red oak are white oak and ironwood. Oak reproduction is minimal and it is believed that over time and in the absence of disturbance, sugar maple will gradually assume a greater relative importance.

The understory is patchy. In the northeast corner of the woodland there is a garden plot. In some places, most armed shrubs, such as Xanthoxylem americanum, predominate. In other places, most notably the southern half of the woodland, the understory is relatively open and shows little signs of disturbance.

2.4 Rare Plant Inventory

Three species were identified as potentially occurring in the project area's forest remnants: Panax quinquefolius, Carex plataginea and Carex formosa.

Panax quinquefolius (ginseng) is a special concern species threatened by habitat degradation and commercial exploitation. Ginseng grows in deeply-shaded deciduous forests with relatively open understories. It prefers rich, mesic, loamy soils with a pH of 5.5 or higher. The species is unable to persist under grazing. Panax quinquefolius is an herbaceous perennial. Typically, a ginseng plant has a simple stem, about 3 dm high, with a whorl of three palmately divided leaves at its summit. The leaflets are long-stalked and usually 5 in number. After the first hard autumnal frost, ginseng leaves turn bright yellow. Shortly thereafter, they fall to the ground. The inventory was conducted when local ginseng populations were bearing bright yellow leaves (Keith Wendt, personal communication). Consequently, it is believed that the timing of the inventory was such that if ginseng were present in the project area it would have been readily visible.

Carex plataginea is a sedge that prefers densely shaded maple-basswood forests on steep north-to-east facing slopes or in deep moist ravines (Wheeler, 1981). Its official status has not been determined because it has not been found in Minnesota since before 1960. The only collection of Carex plataginea from the Twin Cities area was made in 1903. The species is distinguishable from all other Minnesota Carex by its very broad, evergreen, reddish-brown based leaves and reddish-brown, loosely spathe form, culm sheaths.

Carex formosa is a sedge last documented from the metropolitan region in 1937. Its present status in Minnesota is undetermined. In the state, the species is known only from dry or mesic deciduous woodlands. The sedge's pubescent leaves distinguish it from most other species of Minnesota Carex. A detailed description of its diagnostic characteristics is given in Table 8.

The corridors described in Section 1.4 were systematically searched for the above species. None of the three species or any other rare species were found.

TABLE 8: POTENTIAL RARE PLANT OCCURRENCES IN THE PROJECT AREA'S MESIC DECIDUOUS FOREST

Species	Description*	Status in Minnesota	Nearest Collection Site/ Date Last Collected	Habitat*
Panax quinquefolius (Ginseng)	Herbaceous perennial plant composed of a simple stem, about 3 dm high, bearing a whorl of 3 palmate leaves. Leaflets are long stalked, and usually 5 in number. Fruit bright red when ripe. Foliage turns bright yellow after the first hard autumn frost, and drops from the plant a few days thereafter.	Special Concern Threatened by habitat degradation and commercial exploitation.	Several collections made from Hennepin County in the late 1800's. At about the same time a single collection was made from Belle Plain in Scott County. Recent sightings in the metropolitan area have been limited to a few small populations in Hennepin County.	Rich, deeply shaded, maple-basswood forests, with a relatively open understory. Species is unable to persist under grazing.
Carex plataginea (a sedge)	Broad, (30-40 mm wide), evergreen basal leaves with dark reddish-brown bases. Culms surrounded by loose, spathiform sheaths that are also dark-reddened. This set of vegetative field characteristics will distinguish the species from all other species of Minnesota Carex.	Undetermined	The only collection from this area was made in Hennepin County in 1903.	Densely shaded maple-basswood forests on steep north-to-east facing slopes or in deep, moist ravines (Wheeler, 1981)
Carex formosa (a sedge)	Leaves membranaceous, pubescent at least on the underside; basal sheaths strongly reddened. Terminal and lateral spikes gynaecandrous; lateral spikes oblong cylindric; inflated perigynia few nerved and subtended by short acuminate scales. Although not diagnostic the reddish basal sheaths and pubescent leaves are good characteristics to look for in the field.	Undetermined	Three collections from Ramsey County. The last documented occurrence from the Twin Cities area dates back to 1937.	In Minnesota the species is known only from dry, deciduous woodlands.

* Description and habitat information compiled from Fernald (1950) and Wheeler (1981).

3.0 CONCLUSIONS

The survey supports the following conclusions:

1) The construction of the proposed alignment would result in the loss of approximately 415 trees. The greatest visible impact of this loss will be in the residential area of Chatonka Woods.

2) The construction of the alternate alignment along the censused corridor would have resulted in the loss of approximately 120 trees. Construction may also have resulted in an influx of sediments into the woodland pond in the center of Woodland #2.

3) Chatonka Woods, because of the development and land use practices that have taken place, is not an exemplary representative of a maple-basswood community. The Minnesota Natural Heritage Inventory examined the least disturbed part of Chatonka Woods (the American Tree Farm) in September, 1984 and concluded the area did not have statewide or county natural area significance. The conclusion that the area does not have statewide natural area significance was corrobated by this study. The conclusion that the American Tree Farm has no county-wide significance requires further clarification on the part of the Minnesota Natural Heritage Program.

4) Woodlands #1 and #2 are examples of a Mixed Oak Forest. The Mixed Oak Forest is a successional forest type. Both remnants are relatively small and show signs of degradation. Consequently, neither is considered to represent an exemplary occurrence of this forest type.

5) No rare plants were found during the systematic search of the construction corridor. Although the search was limited to a brief time span, based on collection records compiled by the Minnesota Natural Heritage Inventory, it is highly unlikely additional search efforts would result in the eventual discovery of any rare species.

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Wheeler, G.A.
1981 A Study of the Genus Carex in Minnesota. Ph.D. thesis. University of Minnesota, St. Paul. Department of Botany. 501 pages.

Personal Communications:
Allan Olson, District Forester and American Tree Farm System Liaison
Keith Wendt, Minnesota Natural Heritage Inventory.

APPENDIX 1

Source: Minnesota Natural Heritage Program
Minnesota Department of Natural Resources

SOUTHERN MAPLE-BASSWOOD FOREST
(BIG WOODS SECTION)
ELEMENT ABSTRACT

NATURAL COMMUNITY
ELEMENT NAME: Southern Maple-Basswood Forest (Big Woods Section)

PLANT COMMUNITY
COVER TYPES: Acer saccharum - Quercus borealis - Tilia americana - Ulmus americana (A3.A00)
Acer saccharum - Tilia americana - Quercus alba (A3.B00)

BASIS FOR CONCERN: Due to land clearing for agricultural cropland, selective logging, and grazing, old growth undisturbed stands of maple-basswood forest in the Big Woods section are quite rare.

DESCRIPTION
AND DISTRIBUTION: The southern maple-basswood forests of Minnesota are the westernmost expression of Braun's (1950) Maple-Basswood Forest region which extends from westcentral Minnesota into southern Wisconsin, and through small areas of northeast Iowa and northwest Illinois in the "Driftless Area". Strongly mesophytic species, sugar maple (Acer saccharum) and basswood (Tilia americana) are the dominate trees; Red oak (Quercus borealis) is the most common associate. The understory is characterized by species of southern affinity: bellwort (Uvularia grandiflora), bloodroot (Sanguinaria canadensis), blue cohosh (Caulophyllum thalictroides), ginseng (Panax quinquefolium), and white snakeroot (Eupatorium rugosum).

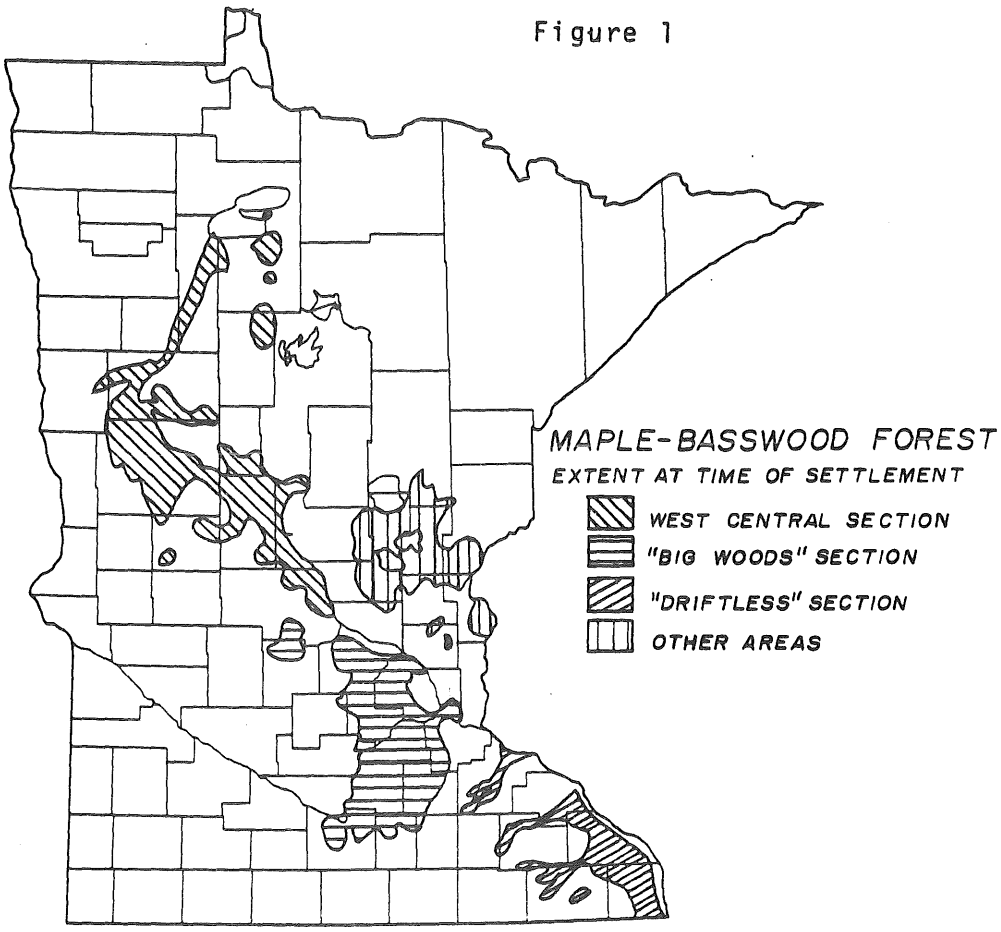
The Maple-Basswood Forest is similar to the northern part of Braun's (1950) Beech-Maple Forest which occurs in eastern Wisconsin and south Michigan. Here, west of the "beech border", American beech (Fagus grandiflora) replaces basswood as the principal co-dominant in the mesophytic forest. Rogers (1981) believes the differences in community characteristics (particularly understory composition) between the Beech-Maple and Maple-Basswood forests are not great enough to warrant subdivision into two distinct types. Curtis (1959) studied stands of beech-maple and maple-basswood forest in different regions of Wisconsin and found the stands floristically uniform enough to consider them as one forest type which he called the southern mesic forest.

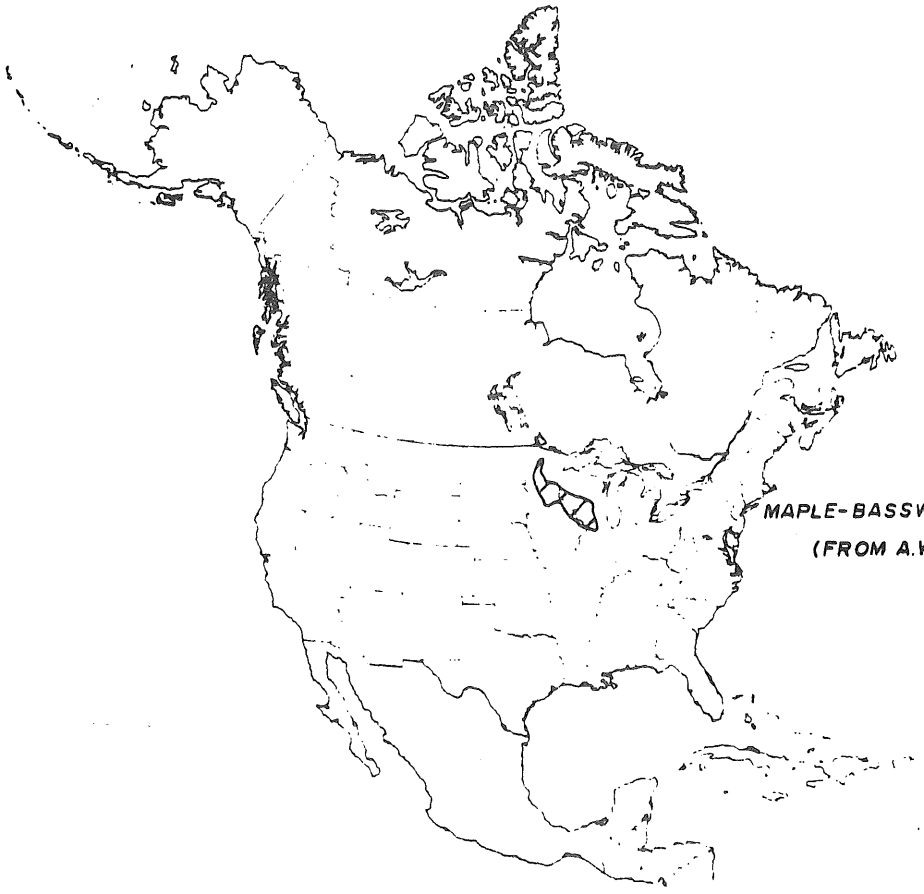
The southern maple-basswood forest in Minnesota is found in three major geographic sections of the state (Figure 1). The Big Woods Section was the largest contiguous expanse of maple-basswood forest on the presettlement landscape. Smaller areas of maple-basswood forest occurred in the Driftless Section found in southeastern Minnesota and in the West-central Section, an area extending north and west of the Big Woods in a narrow tongue between the prairie region and mixed conifer-hardwood region of Minnesota. These smaller areas of maple-basswood forest did not occur as contiguous forest, but rather as scattered islands in a matrix of other vegetation types.

THE BIG WOODS SECTION

The "Big Wood", as originally described by Daubenmire (1[illegible],

Figure 1


MAPLE-BASSWOOD FOREST
EXTENT AT TIME OF SETTLEMENT
WEST CENTRAL SECTION
"BIG WOODS" SECTION
"DRIFTLESS" SECTION
OTHER AREAS


MAPLE-BASSWOOD FOREST
(FROM A.W. KUCHLER)

was once the dominant vegetation type of southcentral Minnesota and the largest continuous area of maple-basswood forest on the presettlement landscape. The forest covered approximately 3,420 mi^2 of Minnesota, extending roughly from St. Cloud south to Mankato (Figure 2). The "Big Woods" forest was found on mesic loamy soils formed in Des Moines Lobe till. The Hayden soil characterized the well drained sites while the Dundas and Glencoe soil series typified the poorly drained sites.

The boundaries of the original forest were in large part controlled by the frequency of fire. The "Big Woods" flora was restricted to areas where natural firebreaks such as rivers, lakes, and rough topography prevented the spread of fire. The characteristic trees of the "Big Woods" were elms (Ulmus americana, Ulmus rubra), red oak (Quercus borealis), basswood (Tilia americana), ironwood (Ostrya virginiana) and sugar maple (Acer saccharam) with lesser amounts of ash (Fraxinus nigra, Fraxinus pensylvanica) and butternut (Carya cordiformis). Prior to white settlement, Elm was the most abundant tree throughout the Big Woods section, most frequently found on poorly drained soils. Sugar maple had the most restricted distribution of all the "Big Woods" tree domiants, preferring the well drained sites in areas well protected from fires. Based on paleoecological studies, the "Big Woods" flora is relatively young; it succeeded oak forest in the region only around 300 years ago (Grimm, 1981).

CURRENT STATUS: The original "Big Woods" forest has been virtually eliminated through land clearing for agricultural cropland. Today, remnant maple-basswood forest occurs in the Big Woods section only as small isolated tracts ranging in size from 5 acres to 200 acres. These tracts are separated by cultivated farmland and residential land. Many of these scattered woodland "islands" have been utilized in ways which has significantly altered the structure and composition of the original forest.

Many of the remaining stands of "Big Woods" forest are being used as pasture. Under heavy grazing pressure, an almost complete destruction of the understory occurs. The result is an even-age woodland containing large mature trees in the canopy but an almost total absence of trees in younger age classes. Forests which are subjected to light grazing pressure exhibit a shift in the composition of the original understory with certain native species increasing and other decreasing or eliminated. Light-moderate grazing generally increases the density of shrubs, especially prickley ash (Xanthoxylum americanum) blackberry (Rubus spp.) and current (Ribes spp.) Herbaceous plants such as sedges (Carex spp.), certain grasses, and forbs including hog peanut (Amphicarpa bracteata), Agrimonie (Agrimonia gryposepala), (Aster shortii), fleabane (Frigeron pulchellus), geranium (Geranium maculatum) and avens (Geum canadense) generally increase with grazing.

Other uses of the remaining "Big Woods" forest have been less destructive and have actually tended to maintain and often increase the dominance of the characteristic shade tolerant species - sugar maple, basswood, and ironwood. High-grading of the "Big Woods" by selective removal of less shade tolerant

species such as red and white oak, yellowbud hickory and walnut to be used for barrels, fence posts, and building materials has been a common practice since settlement of the area. This steady cutting practice, over a long period, has resulted in a change in forest composition toward greater dominance of sugar maple and basswood in the remaining forests. Since the less shade-tolerant oaks and hickories do not normally reproduce under their own shade, sugar maple can be expected to increase naturally in the Big Woods section, at least in the absence of natural catastrophes such as fire and large windstorms.

The production of maple syrup, another use of the "Big Woods" forest since white settlement, has resulted in the maintainance of relatively intact pieces of maple-basswood forest. Some of the finest examples of "Big Woods" that remain today, are those which have had a long history of maple sugar production.

Considerable change is occurring in the remaining "Big Woods" as a result of a more recent phenomena - dutch elm disease. This disease is eliminating elm as a major component ofthe "Big Woods"

REPRESENTATIVE SITES: Wolsfeld Woods SNA (Hennepin Co.)
Townsend's Woods (Rice Co.)
Richter Woods (LeSueur Co.)

NUMBER OF OCCURRENCES: Ten sites of natural area quality (Rank A or B), as of October 1993.

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Rogers, R.S. 1981. Mature mesophytic hardwood forest: community transitions, by layer, from east-central Minnesota to southeastern Michigan. Ecology 62(6):1634-1647.

PREPARED BY: Keith Wendt, Plant Ecologist, Natural Heritage Program 10/93

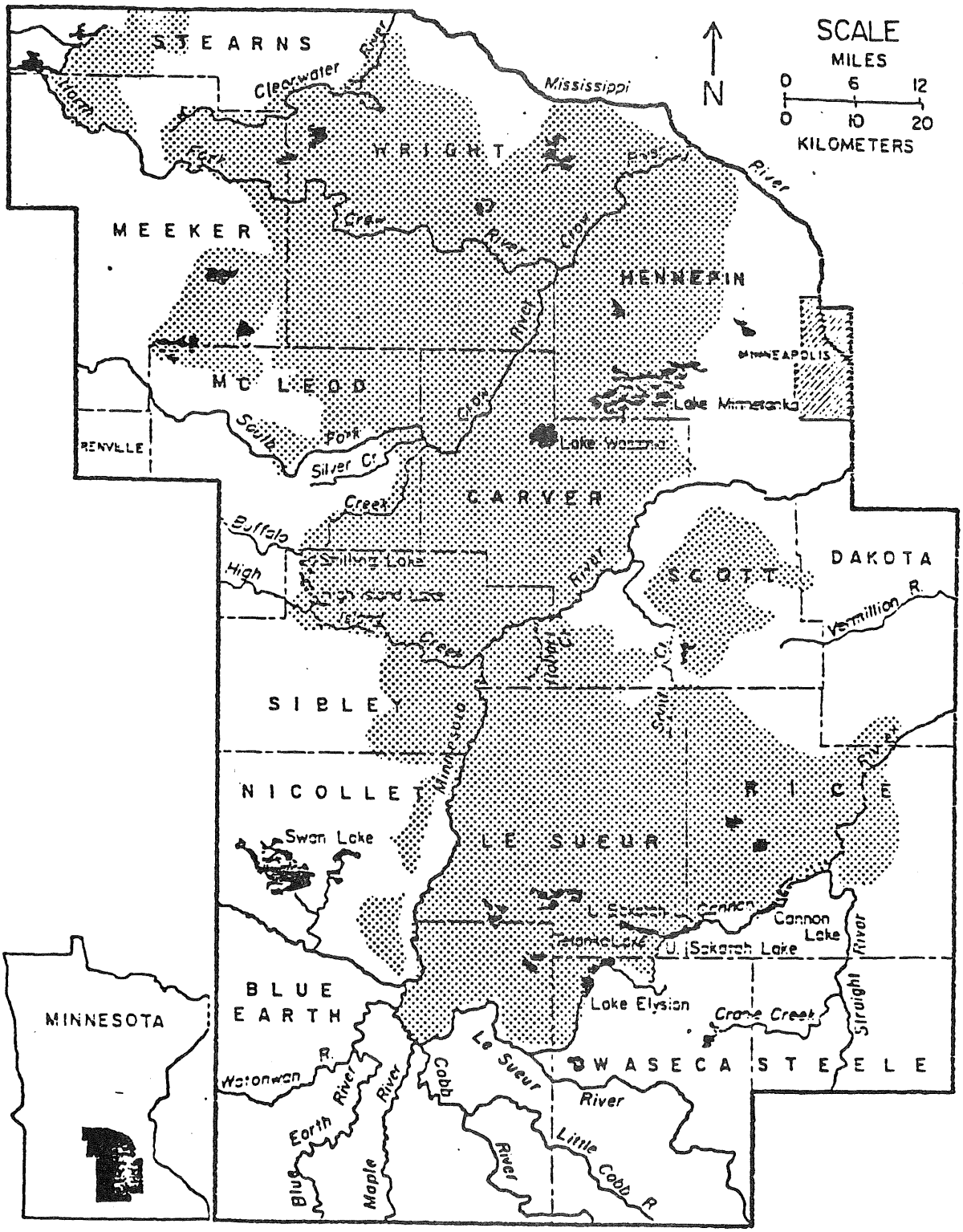


Figure 2

Southern maple-basswood forest in the Big Woods region
(extent on the presettlement landscape)

Adapted from Grimm, 1981

Appendix A

ELEMENT OCCURRENCE RANKING - MAPLE-BASSWOOD FOREST

GRADE A

Old growth (120 yr.+) forest tracts relatively undisturbed by man or recovered to an extent where community structure and composition is intact and reflects native presettlement conditions. Grade A forests display the following ecological features (1) closed overstory canopy of old growth mesophytic species, (2) presence of standing dead trees and numerous down trees, (3) heterogenous understory, patchy distribution of herbaceous layer, (4) uneven age stand, shade-tolerant mesophytic trees regularly distributed in all size classes, (5) abundance and richness of spring ephemerals and spring blooming herbs. Grade A forests may have been subjected to some light to moderate disturbance. Examples are tracts used in the past for sugar maple production or selective removal for oaks. These types of former land uses in a Grade A tract have done little damage; the major change has been an increase in the relative importance of the mesophytic species - sugar maple, basswood, ironwood.

GRADE B

Forest tracts due to slight to moderate man-induced disturbances or their small size are not considered of Grade A quality. These tracts have been recently lightly disturbed or moderately disturbed in the past, but have recovered much of their original composition and structure. Examples of Grade B forests are (1) old growth forests being selectively logged, (2) old growth forests with recent light grazing or moderate past grazing where the understory has recovered and is relatively intact, (3) old second-growth (90-120 yr.) forests with an intact ground layer, and good tree size class distribution, (4) virgin old growth forest of small size (<40 acres). Grade B forests have the propensity to return to Grade A condition with protection and removal of disturbance.

GRADE C

Mature second growth (50-90 yr.) forests or moderately disturbed communities where the original composition and structure has been altered and no longer reflects natural conditions. Grade C forests include old growth areas subjected to moderate or heavy grazing resulting in an increase in the density of armed shrubs especially Zanthoxylum americanum, Rubus spp. and Ribes spp., a shift in dominance of the ground layer species to those increasing with disturbance, and a decrease in tree reproduction. Ungrazed forests graded C are typically mid successional forests recovering after heavy logging. These tracts are characterized by an absence of larger tree size classes, presence of low branching and multiple-trunked trees, absence of dead falls, and relatively uniform understories, often characterized by a continuous cover of a few dominant species.

GRADE D

Degraded forest communities, where severe disturbances have profoundly altered the original structure and composition of the site. Grade D forests include young second growth stands (20-50 yr) following recent clear cutting, and heavily grazed forest tracts of any age where an almost complete destruction of the understory and herb layer has occurred. Such heavily grazed areas become open woodlots as the mature canopy trees die and there is a near total absence of trees in younger age classes to replace them. Characteristic herb species of severely grazed woods include Arctinum minus, Ambrosia artemisiifolia, Nepeta cataria, Solanum dulcamora, Taraxacum officinale.

ELEMENT CODE

NAME OF ELEMENT Maple-Basswood Forest
(Big Woods region)

ELEMENT OCCURRENCE LOG SHEET

Occurrence #	EO Rank	Quad Code	County	Location	Apprc Acres
048	B	Waterville V15A	Rice	Townsend's Woods NE SW 18, T109N, R22W	20
005	A	Excelsior S15a	Hennepin	Wolsfeld Woods* NESE 27, T118N, R23W	22
055	AB	Buffalo R14	Wright	Schmidt Lake Woods SE 25, T120N, R25W	84
005	AB	Anoka R16b	Hennepin	Taylors Woods* SWSE 16, T120N, R22W	60
006	AB	Anoka R16b	Hennepin	Diamond L. Woods* NE NE 29, T120N, R22W	120
005	A	Montgomery U15a	LeSueur	Richter County Park* W 1/2 SE8, T111N, R23W	70
	B	Montgomery U15a	LeSueur	Richter Woods - private NESE 8, T111N, R23W	50
053	B	Elysian V15b	LeSueur	Swains Woods N27, T109N, R24W	50
004	B	Nerstrand U17d	Rice	Nerstrand Woods* NE NW16, T110N, R19W	
	B	Gaylord T13	Sibley	End-of-the World Woods NW T112N, R26W	80
003	B	Mound S15b	Hennepin	Hardscrabble Pt. Woods* 26, T117N, R24W	28

APPENDIX 2

Source: Minnesota Natural Heritage Program
Minnesota Department of Natural Resources

Prior Lake EIS Data Request

Evaluation of Unique Biological Features by

Minnesota Natural Heritage Program

The Natural Heritage Program has reviewed its data-base and found no significant occurrences of rare plants, animals or natural communities within the Prior Lake project boundaries. In addition, an on-site survey was conducted on September 20, 1984, to assess the forested area on the site. The forest is a degraded example of the Southern Maple-Basswood Forest (Big Woods Section). Undisturbed examples of this natural community type are considered endangered in the state (see Appendix I). The Prior Lake site, however, is not an undisturbed or exemplary occurrence of Southern Maple-Basswood Forest and therefore is not considered a natural area of statewide or county significance.

The Prior Lake woods has been moderately to heavily disturbed by logging and likely by grazing. In addition, the loss of canopy elms to Dutch elm disease has significantly altered the structure of the woods. Elm was a major component of this forest, its removal has created large openings in the forest canopy throughout the site. The woods, notably in low areas, now displays less than 50% canopy cover. Young to mature sugar maple and lesser amounts of basswood now dominate the woods. The understory vegetation is patchy. Large portions are dominated by wood nettle (Laportea canadensis) with little or no tree reproduction. Other areas are dominated by dense sugar maple reproduction responding to gaps in the canopy created by dying canopy elms.

The Natural Area Rank of this site was determined to be -- Rank C (see Appendix I). The Natural Heritage Program, to date, has identified 10 occurrences of the Southern Maple-Basswood Forest type that have a Natural Area Rank of B or higher. These occurrences are considered of statewide significance.

Although the Prior Lake site is not considered of statewide or county natural area significance, it does retain a large degree of native vegetation and is of value for educational use and as an environmental corridor.

Ginseng (Panax quinquefolium), a plant of state special concern, may potentially occur in this habitat type. The species was not found on the September 1984 survey, it is normally conspicuous at this time of year.

SF-00006-03

STATE OF MINNESOTA

DEPARTMENT Natural Resources - Wildlife

Office Memorandum

TO: Alexis Duxbury
N.D. Parks and Recreation
1424 W. Century Ave., Suite 202
Bismarck, ND 58502

DATE: January 4, 1985

FROM: Keith Wendt (KW)
Minnesota Natural Heritage Program

PHONE: 612 297-2367

SUBJECT: Prior Lake

I am responding to your call last week asking me to clarify the Natural Heritage Programs system of ranking natural community types. Occurrences of southern maple-basswood forests are ranked according to their degree of naturalness (i.e., how close they resemble presettlement conditions). Exemplary occurrences ranked B or higher are considered natural areas of statewide significance. The Prior Lake site was given a rank of C due to its small size and degraded nature. Occurrences ranked C are common in the Scott County area and do not merit preservation as scientific and natural areas. Again, we have assessed the Prior Lake site only on the basis of its natural area significance; we found it not of statewide or even county significance.

KW:rcm

APPENDIX 3

Forest Management Plan Revision

For:

J. B. Andren
4019 Linden Hills Boulevard
Minneapolis, MN 55410
926-9255
Lot 3, 26-115-23W Scott Co.

By:

Tom Romaine
DNR - District Forester
Courthouse Annex
Waconia, MN 55387
442-2317

Northern Hardwoods Map Symbol: $\frac{MV"}{MIII}$, Acreage: 10

This woodlot overlies Hayden loam soil types. Topography is gently rolling and drainage is south to nearly Prior Lake. Access is very good due to the township road on the west and the driveway through the north end. This woodlot has never been grazed and was selectively harvested during the middle 1950s.

Overstory tree species include American and slippery elm, sugar maple and basswood. Understory tree species are the same. A veritable carpet of sugar maple reproduction covers the woodlot floor. A species composition, volume, and basal area per acre table and a gross volume table follow the text of this plan.

Woodland condition is generally very good, although Dutch elm disease (DED) may cause the loss of the elms in this stand.

Forest management needs here are protection, timberstand improvement (TSI), and wildlife habitat enhancement.

Recommendations:

1. Continue to protect from fire and grazing.

2. Before they are lost to DED plan to mark and harvest your elms. The same sort of assistance used during the 1950s harvest is available.

3. Non-merchantable elms, large cull trees, and very poorly formed pole sized trees may be marketable as firewood. Various methods of marketing firewood are open to you.

4. Where their retention will not cause or increase an insect, disease, or safety hazard retain at least two standing dead trees per acre for wildlife den trees.

5. Pile slash from harvest and TSI operations near edges for additional wildlife cover.

Northern Hardwoods

Species Composition, Volume and Basal Area per Acre Table

	Species Composition		Volume		Basal Area	
Diameter	5"-9"	10"+	5"-9"	10"+	5"-9"	10"+
Species						
American elm	15%	16%	1.4 cd	1560 BF	4	12
Slippery elm	8%	16%	.5 cd	520 BF	2	12
Sugar maple	62%	65%	3.6 cd	2990 BF	16	50
Basswood	15%	3%	.5 cd	390 BF	4	2
Total	100%	100%	6.0 cd	5460 BF	26	76

Gross Volume Table

Diameter	5"-9"	10"+
Species		
American elm	14 cd	15600 BF
Slippery elm	5 cd	5200 BF
Sugar maple	36 cd	29900 BF
Basswood	5 cd	3900 BF
Total	60 cd	54600 BF

No. A-23
5/71

COVER TYPE MAP

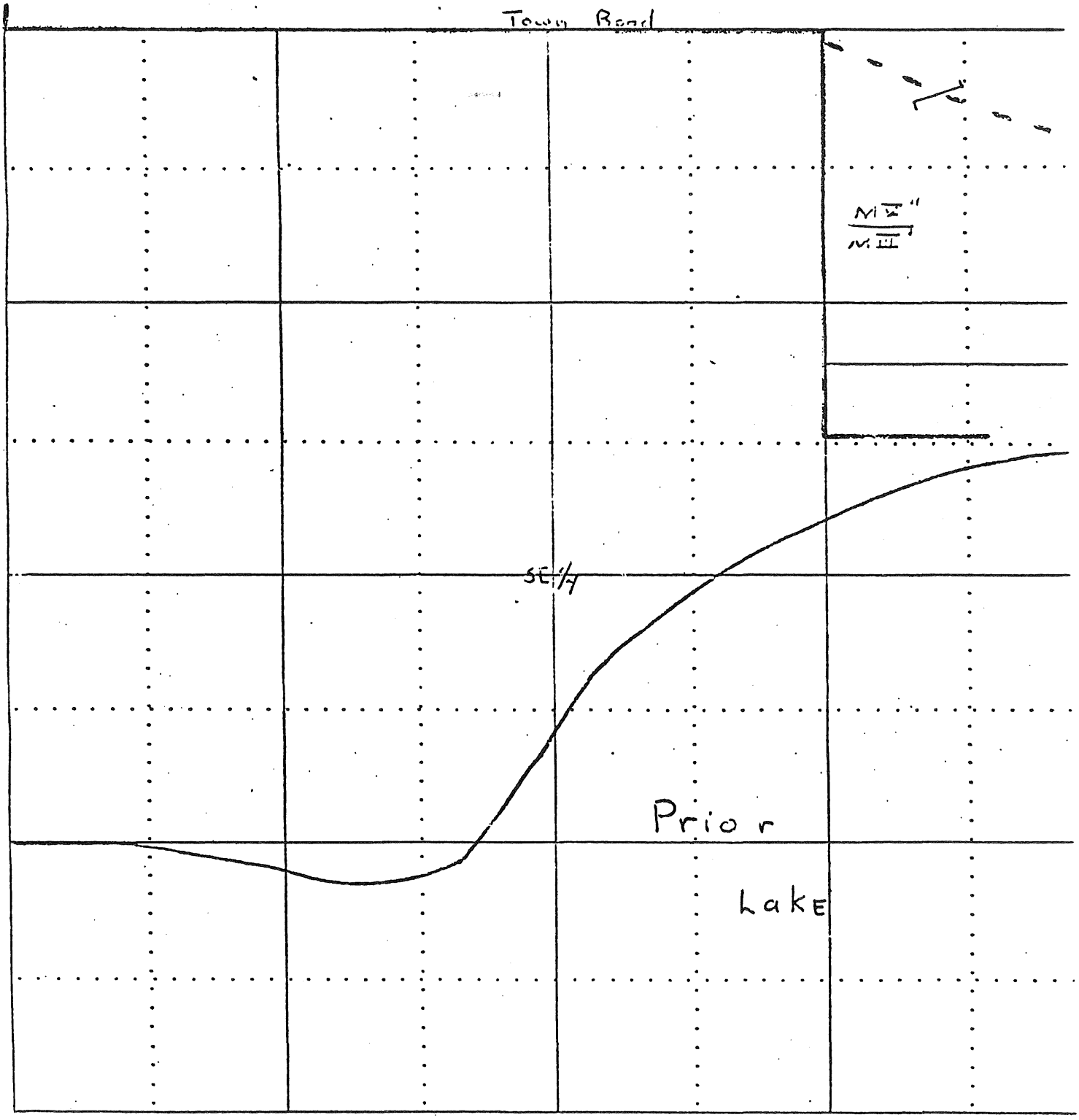
MINNESOTA
DEPARTMENT OF NATURAL RESOUR

WORK UNIT Andren
DATE 2-28-80
MAPPER Bonine

N
16" = 1 mile

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

SEC. 26 TWP. 115 R 23
MAGNETIC DECL. _____



APPENDIX 4

Notes on the value of Chatonka Woods as wildlife habitat.

NOTES ON THE VALUE OF CHATONKA WOODS AS WILDLIFE HABITAT

A systematic assessment of the suitability of the project area's forest remnants as wildlife habitat is outside the scope of this study. However, one casual observation made in the course of the study deserves mention.

As noted in Section 2.1.2.4, Dutch elm disease and storm damage has greatly affected the forest character of the American Tree Farm. Most of the elms on the tract and that part of the low swale just outside the tract are dead or dying. About 5 acres of the woods is now dominated by large, towering snags. To estimate the density of snags, a randomly placed 20 x 20 meter plot was marked off. All snags within this plot were counted and measured. This crude analysis indicated that there are more than 10 snags/acre greater than 25 cm dbh in the area.

Snags are important to many birds and mammals. In the course of this study no animals were observed utilizing the snags but evidence of their utilization was seen. Several trees had woodpecker holes in them, including one tree with the long rectangular hole of a pileated woodpecker.

Whether the stand will maintain this density of snags is a matter of question. According to Allan Olson, he will be recommending to the owners that they remove most of the elms from the tract before they become unmarketable. The American Tree Farm System recognizes the vital role snags play in the maintenance of optimal forest wildlife habitat. Mr. Olson said he usually recommends that landowners leave at least a few standing dead snags/acre for wildlife.

It is up to the individual landowner as to whether or not he/she chooses to follow the advice given by the American Tree Farm System Liaison.

APPENDIX C

Potential Wildlife Species List

Table C-1 BIRD SPECIES - PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT
Brushland and Woodland Habitats
Potential Summer, Winter, or Permanent Residents

Common Name	Habitat Type	Habitat Type	Habitat Type	Habitat Type
Mallard	BR BRU	BR YDU		
Black Duck	BR BRU	BR YDU		WD PHH
Wood Duck			WD BWD	WD PHH
Turkey Vulture			WD BWD	
Sharp-shinned Hawk			WD BWD	WD PHH
Cooper's Hawk			WD BWD	
Red-tailed Hawk			WD BWD	WD PHH
Bobwhite	BR BRU	BR YDU		WD PHH
Gray Partridge	BR BRU			
Ring-necked Pheasant	BR BRU	BR YDU		
American Woodcock				WD PHH
Common Snipe	BR BRU	BR YDU		
Mourning Dove	BR BRU	BR YDU		
Yellow-billed Cuckoo	BR BRU	BR YDU		
Black-billed Cuckoo			WD BWD	WD PHH
Barn Owl	BR BRU	BR YDU	WD BWD	WD PHH
Screech Owl		BR YDU	WD BWD	WD PHH
Great Horned Owl			WD BWD	WD PHH
Barred Owl			WD BWD	WD PHH
Saw-whet Owl			WD BWD	WD PHH
Snowy Owl	BR BRU			
Whip-poor-will	BR BRU	BR YDU		WD PHH
Chimney Swift			WD BWD	
Ruby-throated Hummingbird			WD BWD	WD PHH
Common Flicker			WD BWD	WD PHH
Pileated Woodpecker			WD BWD	WD PHH
Red-bellied Woodpecker			WD BWD	WD PHH
Red-headed Woodpecker	BR BRU	BR YDU		
Yellow-bellied Sapsucker			WD BWD	WD PHH
Hairy Woodpecker			WD BWD	WD PHH
Great Crested Flycatcher			WD BWD	WD PHH
Eastern Phoebe			WD BWD	WD PHH
Downy Woodpecker	BR BRU	BR YDU		
Eastern Kingbird	BR BRU	BR YDU		
Willow Flycatcher	BR BRU	BR YDU		
Eastern Wood Peewee	BR BRU	BR YDU	WD BWD	WD PHH
Blue Jay	BR BRU	BR YDU	WD BWD	WD PHH
Common Crow	BR BRU	BR YDU	WD BWD	WD PHH
Black-capped Chickadee	BR BRU	BR YDU	WD BWD	WD PHH
White-breasted Nuthatch		BR YDU	WD BWD	WD PHH
Brown Creeper			WD BWD	WD PHH
House Wren		BR YDU		

BR BRU = Open Brush; BR YDU = Young Deciduous Upland; WD BWD = Big Woods;
WD PHH = Mature Deciduous Upland

Table C-1 (Continued) BIRD SPECIES - PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT
Brushland and Woodland Habitats
Potential Summer, Winter, or Permanent Residents

Common Name	Habitat Type	Habitat Type	Habitat Type	Habitat Type
Gray Catbird	BR BRU	BR YDU	WD BWD	WD PHH
Brown Thrasher	BR BRU	BR YDU		
Wood Thrush			WD BWD	WD PHH
Veery			WD BWD	WD PHH
Blue-gray Gnatcatcher		BR YDU	WD BWD	WD PHH
Cedar Waxwing				WD PHH
Red-eyed Vireo		BR YDU	WD BWD	WD PHH
Yellow Warbler		BR YDU		
Cerulean Warbler			WD BWD	WD PHH
Chestnut-sided Warbler	BR BRU	BR YDU		WD PHH
Ovenbird			WD BWD	WD PHH
Common Yellowthroat	BR BRU	BR YDU		
American Redstart	BR BRU	BR YDU		WD PHH
Scarlet Tanager			WD BWD	WD PHH
Cardinal	BR BRU	BR YDU		WD PHH
Rose-breasted Grosbeak				WD PHH
Indigo Bunting	BR BRU	BR YDU		
Purple Finch	BR BRU			
Rufous-sided Towhee	BR BRU	BR YDU		
Clay-colored Sparrow	BR BRU	BR YDU		
Field Sparrow	BR BRU	BR YDU		
Song Sparrow	BR BRU	BR YDU		

BR BRU = Open Brush; BR YDU = Young Deciduous Upland; WD BWD = Big Woods;
WD PHH = Mature Deciduous Upland

Table C-2 MAMMAL SPECIES - PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT
Brushland and Woodland Habitats
Potential Permanent Residents

Common Name	Habitat Type	Habitat Type	Habitat Type	Habitat Type
Cinerous Shrew			WD BWD	WD PHH
Short-tailed Shrew	BR BRU	BR YDU	WD BWD	WD PHH
Eastern Cottontail Rabbit	BR BRU	BR YDU		
Woodchuck	BR BRU	BR YDU		WD PHH
Eastern Chipmunk			WD BWD	WD PHH
Red Squirrel			WD BWD	WD PHH
Eastern Gray Squirrel		BR YDU	WD BWD	
Southern Flying Squirrel			WD BWD	WD PHH
White-footed Mouse	BR BRU	BR YDU	WD BWD	WD PHH
Boreal Redback Vole			WD BWD	WD PHH
Meadow Jumping Mouse	BR BRU	BR YDU		
Raccoon	BR BRU	BR YDU	WD BWD	WD PHH
Short-tailed Weasel	BR BRU	BR YDU	WD BWD	WD PHH
Long-tailed Weasel	BR BRU	BR YDU	WD BWD	WD PHH
Least Weasel	BR BRU	BR YDU		
Mink	BR BRU	BR YDU	WD BWD	WD PHH
Spotted Skunk	BR BRU	BR YDU		
Striped Skunk	BR BRU	BR YDU		WD PHH
Red Fox	BR BRU	BR YDU		WD PHH
Gray Fox	BR BRU	BR YDU	WD BWD	WD PHH
Coyote	BR BRU	BR YDU		WD PHH
White-tailed Deer	BR BRU	BR YDU	WD BWD	WD PHH

BR BRU = Open Brush; BR YDU = Young Deciduous Upland; WD BWD = Big Woods;
WD PHH = Mature Deciduous Upland

Table C-3

REPTILE AND AMPHIBIAN SPECIES - PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT
Brushland and Woodland Habitats
Potential Permanent Residents

Common Name	Habitat Type	Habitat Type	Habitat Type	Habitat Type
Brown Snake			WD BWD	
Common Garter Snake			WD BWD	WD PHH
Milk Snake			WD BWD	
Spring Peeper	BR BRU	BR YDU		WD PHH
Striped Chorus Frog	BR BRU	BR YDU	WD BWD	WD PHH
Wood Frog			WD BWD	WD PHH
American Toad	BR BRU	BR YDU	WD BWD	WD PHH

BR BRU = Open Brush; BR YDU = Young Deciduous Upland; WD BWD = Big Woods;
WD PHH = Mature Deciduous Upland

Table C-4

BIRD SPECIES - PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT
Agricultural Land and Wetland Habitat Types
Potential Summer, Winter, or Permanent Residents

Common Name	Habitat Type	Habitat Type	Habitat Type	Habitat Type	Habitat Type	Habitat Type
Great Blue Heron						WE MSH
Green Heron					WE PLM	WE MSH
American Bittern	GR FLD				WE PLM	WE MSH
Canada Goose	GR FLD	SA AGM		SA AGF	WE PLM	WE MSH
Mallard	GR FLD	SA AGM			WE PLM	WE MSH
Black Duck	GR FLD	SA AGM			WE PLM	WE MSH
Green-winged Teal					WE PLM	WE MSH
Blue-winged Teal	GR FLD				WE PLM	WE MSH
Ring-necked Duck					WE PLM	WE MSH
Wood Duck						WE MSH
Marsh Hawk	GR FLD				WE PLM	WE MSH
Bobwhite	GR FLD	SA AGM	SA OPT			
Gray Patridge	GR FLD			SA AGF		
Ring-necked Pheasant	GR FLD	SA AGM		SA AGF	WE PLM	WE MSH
Virginia Rail						WE MSH
Killdeer			SA OPT	SA AGF		WE MSH
Spotted Sandpiper	GR FLD	SA AGM		SA AGF		WE MSH
Upland Sandpiper	GR FLD	SA AGM	SA OPT			
American Woodcock	GR FLD		SA OPT			WE MSH
Common Snipe					WE PLM	WE MSH
Wilson's Phalarope					WE PLM	WE MSH
Black Tern					WE PLM	WE MSH
Common Tern	GR FLD					WE MSH
Rock Dove				SA AGF		WE MSH
Barn Owl			SA OPT	SA AGF		
Screech Owl				SA AGF		
Snowy Owl	GR FLD		SA OPT	SA AGF		
Common Nighthawk	GR FLD			SA AGF		
Belted Kingfisher						WE MSH
Eastern Kingbird						WE MSH
Horned Lark	GR FLD	SA AGM	SA OPT	SA AGF		
Tree Swallow	GR FLD			SA AGF		WE MSH
Barn Swallow		SA AGM	SA OPT	SA AGF		
Purple Martin		SA AGM	SA OPT			WE MSH
Short-billed Marsh Wren		SA AGM			WE PLM	
Gray Catbird						WE MSH
Eastern Bluebird	GR FLD					
Yellow Warbler						WE MSH
Common Yellowthroat						WE MSH
House Sparrow				SA AGF		
Bobolink	GR FLD	SA AGM	SA OPT	SA AGF	WE PLM	
Eastern Meadowlark	GR FLD	SA AGM	SA OPT	SA AGF	WE PLM	
Western Meadowlark	GR FLD	SA AGM	SA OPT	SA AGF	WE PLM	
Yellow-headed Blackbird						WE MSH
Red-winged Blackbird	GR FLD	SA AGM	SA OPT	SA AGF	WE PLM	WE MSH
Brewer's Blackbird	GR FLD	SA AGM	SA OPT	SA AGF		WE MSH
Common Grackle						WE MSH
Dickcissel	GR FLD	SA AGM				
American Goldfinch	GR FLD					
Savannah Sparrow	GR FLD	SA AGM	SA OPT	SA AGF		
Grasshopper Sparrow		SA AGM	SA OPT	SA AGF		
Vesper Sparrow	GR FLD	SA AGM	SA OPT	SA AGF		WE MSH
Lark Sparrow	GR FLD		SA OPT			
Clay-colored Sparrow	GR FLD		SA OPT			
Field Sparrow	GR FLD	SA AGM	SA OPT			
Swamp Sparrow		SA AGM			WE PLM	WE MSH
Lapland Longspur	GR FLD	SA AGM	SA OPT	SA AGF	WE PLM	
Snow Bunting	GR FLD	SA AGM	SA OPT	SA AGF		

GR FLD = Old Field; SA AGM = Agricultural Meadow; SA OPT = Open Pasture; SA AGF = Agricultural Field; WE PLM = Non-persistent Emergent Wetland; WE MSH = Persistent Emergent Wetland;

Table C-5 MAMMAL SPECIES - PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT
Agricultural Land and Wetland Habitat Types
Potential Permanent Residents

Common Name	Habitat Type	Habitat Type	Habitat Type	Habitat Type	Habitat Type	Habitat Type
Eastern Mole	GR FLD	SA AGM	SA OPT	SA AGF		
Cinerous Shrew						WE MSH
Short-tailed Shrew	GR FLD	SA AGM		SA AGF		
White-tailed Jackrabbit	GR FLD	SA AGM	SA OPT	SA AGF		
Eastern Cottontail Rabbit		SA AGM		SA AGF	WE PLM	WE MSH
Woodchuck		SA AGM	SA OPT	SA AGF		
Thirteen-lined Ground Squirrel	GR FLD	SA AGM	SA OPT	SA AGF		
Red Squirrel						WE MSH
Fox Squirrel				SA AGF		
Plains Pocket Gopher	GR FLD	SA AGM	SA OPT	SA AGF		
Western Harvest Mouse	GR FLD	SA AGM	SA OPT	SA AGF		
Prairie Deer Mouse	GR FLD	SA AGM	SA OPT	SA AGF		
Meadow Mole	GR FLD	SA AGM	SA OPT	SA AGF	WE PLM	WE MSH
Muskrat						WE MSH
Norway Rat		SA AGM		SA AGF		
House Mouse		SA AGM		SA AGF		
Meadow Jumping Mouse		SA AGM				WE MSH
Raccoon						WE MSH
Short-tailed Weasel						WE MSH
Long-tailed Weasel	GR FLD	SA AGM	SA OPT	SA AGF	WE PLM	WE MSH
Least Weasel	GR FLD	SA AGM			WE PLM	
Mink						WE MSH
Spotted Skunk	GR FLD	SA AGM		SA AGF		
Striped Skunk	GR FLD	SA AGM	SA OPT	SA AGF	WE PLM	WE MSH
Badger	GR FLD		SA OPT			
Red Fox	GR FLD	SA AGM	SA OPT	SA AGF	WE PLM	WE MSH
Gray Fox	GR FLD				WE PLM	WE MSH
Coyote	GR FLD					
White-tailed Deer	GR FLD	SA AGM		SA AGF	WE PLM	WE MSH

GR FLD = Old Field; SA AGM = Agricultural Meadow; SA OPT = Open Pasture; SA AGF = Agricultural Field; WE PLM = Non-persistent Emergent Wetland; WE MSH = Persistent Emergent Wetland;

Table C-6 REPTILE AND AMPHIBIAN SPECIES - PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT
Agricultural Land and Wetland Habitat Types
Potential Permanent Residents

Common Name	Habitat Type	Habitat Type	Habitat Type	Habitat Type	Habitat Type	Habitat Type
Snapping Turtle						WE MSH
Painted Turtle						WE MSH
Spiny Softshell						WE MSH
Brown Snake						WE MSH
Northern Water Snake						WE MSH
Common Garter Snake					WE PLM	WE MSH
Gopher Snake	GR FLD					
Milk Snake				SA AGF		
Tiger Salamander					WE PLM	WE MSH
Spring Peeper						WE MSH
Striped Chorus Frog	GR FLD	SA AGM			WE PLM	WE MSH
Northern Leopard Frog	GR FLD	SA AGM	SA OPT	SA AGF		WE MSH
Green Frog					WE PLM	WE MSH
American Toad	GR FLD	SA AGM	SA OPT	SA AGF	WE PLM	WE MSH

GR FLD = Old Field; SA AGM = Agricultural Meadow; SA OPT = Open Pasture; SA AGF = Agricultural Field; WE PLM = Non-persistent Emergent Wetland; WE MSH = Persistent Emergent Wetland;

Table C-7 BIRD SPECIES - PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT
Fully Developed Urban Wildlife Habitat
Potential Summer, Winter and Permanent Residents

Common Name	Habitat Type	Habitat Type
Canada Goose	SP URB	
Mallard	SP URB	
Black Duck	SP URB	WD PHH
Wood Duck		WD PHH
Ring-necked Pheasant	SP URB	
Killdeer	SP URB	
Rock Dove	SP URB	
Mourning Dove	SP URB	
Black-billed Cuckoo		WD PHH
Barn Owl	SP URB	WD PHH
Screech Owl	SP URB	WD PHH
Saw-whet Owl	SP URB	WD PHH
Common Nighthawk	SP URB	
Chimney Swift	SP URB	
Ruby-throated Hummingbird	SP URB	WD PHH
Common Flicker	SP URB	WD PHH
Pileated Woodpecker		WD PHH
Red-bellied Woodpecker	SP URB	WD PHH
Red-headed Woodpecker	SP URB	
Yellow-billed Sapsucker	SP URB	WD PHH
Hairy Woodpecker	SP URB	WD PHH
Great Crested Flycatcher	SP URB	WD PHH
Eastern Phoebe	SP URB	WD PHH
Downy Woodpecker	SP URB	WD PHH
Eastern Kingbird	SP URB	
Least Flycatcher	SP URB	
Eastern Wood Peewee	SP URB	WD PHH
Horned Lark	SP URB	
Barn Swallow	SP URB	
Purple Martin	SP URB	
Blue Jay	SP URB	WD PHH
White-breasted Nuthatch	SP URB	WD PHH
Brown Creeper		WD PHH
House Wren	SP URB	
Carolina Wren	SP URB	WD PHH
Gray Catbird	SP URB	WD PHH
Brown Thrasher	SP URB	
American Robin	SP URB	
Wood Thrush	SP URB	WD PHH
Veery		WD PHH
Eastern Bluebird	SP URB	
Bohemian Waxwing		WD PHH

SP URB = Urban; WD PHH = Mature Deciduous Woodland;

Table C-7 BIRD SPECIES - PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT
(Continued) Fully Developed Urban Wildlife Habitat
Potential Summer, Winter and Permanent Residents

Common Name	Habitat Type	Habitat Type
Cedar Waxwing	SP URB	
Starling	SP URB	
Warbling Vireo	SP URB	
American Redstart	SP URB	WD PHH
House Sparrow	SP URB	
Orchard Oriole	SP URB	
Northern Oriole	SP URB	
Brewer's Blackbird	SP URB	
Common Grackle	SP URB	
Brown-headed Cowbird	SP URB	
Scarlet Tanager		WD PHH
Cardinal	SP URB	WD PHH
Rose-breasted Grosbeak	SP URB	WD PHH
Evening Grosbeak	SP URB	
American Goldfinch	SP URB	
Rufous-sided Towhee	SP URB	
Lark Sparrow	SP URB	
Chipping Sparrow	SP URB	
Song Sparrow	SP URB	
Tufted Titmouse	SP URB	WD PHH

SP URB = Urban; WD PHH = Mature Deciduous Woodland;

Table C-8 MAMMAL SPECIES - PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT
Fully Developed Urban Wildlife Habitat
Potential Permanent Residents

Common Name	Habitat Type	Habitat Type
Cinerous Shrew		WD PHH
Short-tailed Shrew	SP URB	WD PHH
Little Brown Bat	SP URB	
Eastern Cottontail Rabbit	SP URB	
Woodchuck	SP URB	WD PHH
Eastern Chipmunk		WD PHH
Red Squirrel		WD PHH
Norway Rat	SP URB	
House Mouse	SP URB	
Raccoon		WD PHH
Striped Skunk		WD PHH
Red Fox		WD PHH
White-tailed Deer		WD PHH

SP URB = Urban; WD PHH = Mature Deciduous Woodland;

Table C-9 REPTILE AND AMPHIBIANS - PRIOR LAKE NORTH SHORE TRUNK SEWER PROJECT
Fully Developed Urban Wildlife Habitat
Potential Permanent Residents

Common Name	Habitat Type	Habitat Type
Brown Snake	SP URB	
Common Garter Snake	SP URB	WD PHH
Spring Peeper		WD PHH
Striped Chorus Frog		WD PHH
American Toad	SP URB	WD PHH

SP URB = Urban; WD PHH = Mature Deciduous Woodland;

APPENDIX D

Cost Estimates

APPENDIX D

COST ESTIMATE

NORTHERN PRIOR LAKE
SANITARY SEWER
ORIGINAL ROUTE

8" Sanitary Sewer

0 - 8' Depth, PVC	269	L.F. @ $15.00/L.F.	$ 4,035.00
8 - 10' Depth, PVC	132	L.F. @ $16.00/L.F.	$ 2,112.00
10 - 12' Depth, PVC	474	L.F. @ $17.00/L.F.	$ 8,058.00
12 - 14' Depth, PVC	172	L.F. @ $18.00/L.F.	$ 3,096.00
14 - 16' Depth, PVC	387	L.F. @ $19.00/L.F.	$ 7,353.00
16 - 18' Depth, PVC	122	L.F. @ $20.00/L.F.	$ 2,440.00
18 - 20' Depth, PVC	126	L.F. @ $21.00/L.F.	$ 2,646.00
20 - 22' Depth, PVC	90	L.F. @ $22.00/L.F.	$ 1,980.00
22 - 24' Depth, PVC	26	L.F. @ $23.00/L.F.	$ 598.00
	1,798'	PVC	$ 32,318.00

15" Sanitary Sewer - RCP - Class V

0 - 8' Depth	1,196	L.F. @ $22.00/L.F.	$ 26,312.00
8 - 10' Depth	668	L.F. @ $23.00/L.F.	$ 15,364.00
10 - 12' Depth	370	L.F. @ $25.00/L.F.	$ 9,250.00
12 - 14' Depth	410	L.F. @ $27.00/L.F.	$ 11,070.00
14 - 16' Depth	702	L.F. @ $29.00/L.F.	$ 20,358.00
16 - 18' Depth	714	L.F. @ $32.00/L.F.	$ 22,848.00
18 - 20' Depth	573	L.F. @ $38.00/L.F.	$ 21,774.00
20 - 22' Depth	495	L.F. @ $42.00/L.F.	$ 20,790.00
22 - 24' Depth	675	L.F. @ $45.00/L.F.	$ 30,375.00
24 - 26' Depth	721	L.F. @ $48.00/L.F.	$ 34,608.00
26 - 28' Depth	563	L.F. @ $50.00/L.F.	$ 28,150.00
28 - 30' Depth	423	L.F. @ $53.00/L.F.	$ 22,419.00
30 - 32' Depth	212	L.F. @ $55.00/L.F.	$ 11,660.00
32 - 34' Depth	162	L.F. @ $60.00/L.F.	$ 9,720.00
34 - 36' Depth	156	L.F. @ $71.00/L.F.	$ 11,076.00
36 - 38' Depth	243	L.F. @ $83.00/L.F.	$ 20,169.00
38 - 40' Depth	340	L.F. @ $94.00/L.F.	$ 31,960.00
40 - 42' Depth	245	L.F. @ $106.00/L.F.	$ 25,970.00
42 - 44' Depth	246	L.F. @ $117.00/L.F.	$ 28,782.00
44 - 46' Depth	299	L.F. @ $130.00/L.F.	$ 38,870.00
46 - 48' Depth	37	L.F. @ $142.00/L.F.	$ 5,254.00
48 - 50' Depth	83	L.F. @ $153.00/L.F.	$ 12,699.00
50 - 52' Depth	125	L.F. @ $165.00/L.F.	$ 20,625.00
52 - 54' Depth	46	L.F. @ $175.00/L.F.	$ 8,050.00
54 - 56' Depth	42	L.F. @ $187.00/L.F.	$ 7,854.00
56 - 58' Depth	62	L.F. @ $200.00/L.F.	$ 12,400.00
	9,808'		$ 508,407.00
			32,318.00
			$ 540,725.00

Connect to Exist. MH	1	Each @ $	Lump Sum	$ 3,000.00
Manholes	45	Each @	$1,000.00/Each	$ 45,000.00
Manhole - extra depth	562	L.F. @ $	80.00/L.F.	$ 44,960.00
Drop Section	10	Each @	$2,000.00/Each	$ 20,000.00
Excess Drop Section	90	L.F. @ $	60.00/L.F.	$ 5,400.00
15" x 4" Saddles	61	Each @ $	85.00/Each	$ 5,185.00
8" x 4" PVC Wyes	28	Each @ $	50.00/Each	$ 1,400.00
4" EHS Pipe	3,805	L.F. @ $	10.00/L.F.	$ 38,050.00
Jacking	350	L.F. @ $	350.00/L.F.	$ 122,500.00
15" RCP Install Inside" Casing	350	L.F. @ $	50.00/L.F.	$ 17,500.00
Clear & Grub	5.46	Acre @	$3,000.00/AC	$ 16,380.00
Clear & Grub (Trees)	414	Each @ $	350.00/Each	$ 144,900.00
TOTAL GRAVITY SEWER COST*				$1,005,000.00

Restoration

Common Borrow	6,811	C.Y. @ $	2.50/C.Y.	$ 17,027.00
Class 5 Gravel	1,350	Ton @ $	7.00/Ton	$ 9,450.00
Black Dirt & Sod	13,000	S.Y. @ $	2.00/S.Y.	$ 26,000.00
Seed, Topsoil & Mulch	10.3	Acre @	$3,000.00/AC	$ 30,900.00
Erosion Control			Lump Sum	$ 10,000.00
TOTAL RESTORATION COST*				$ 93,377.00

Mobilization	40,000.00
Gravity Sewer	$1,005,000.00
Restoration	$ 93,377.00
Dewatering	$ 75,000.00
Contingencies (10%)	$ 121,337.70
Total Construction Costs	$1,334,714.70
Technical Services (15%)	$ 200,207.20
TOTAL COST*	$1,534,921.90

*NOTE: These prices are for sanitary sewer work, restoration of surface disturbances and restoration of gravel roads only; estimates do not include easements, utility removals, driveway pavement, tree replacement, or street improvements. Cost estimates for street improvements, water main and storm sewer are provided in separate tables.

Original Route

COST ESTIMATE

NORTHERN PRIOR LAKE
SANITARY SEWER
ALTERNATIVE 1

8" Sanitary Sewer

0 - 8' Depth, PVC	130	L.F. @ $15.00/L.F.	$ 1,950.00
8 - 10' Depth, PVC	60	L.F. @ $16.00/L.F.	$ 960.00
10 - 12' Depth, PVC	170	L.F. @ $17.00/L.F.	$ 2,890.00
12 - 14' Depth, PVC	128	L.F. @ $18.00/L.F.	$ 2,304.00
14 - 16' Depth, PVC	440	L.F. @ $19.00/L.F.	$ 8,360.00
16 - 18' Depth, PVC	262	L.F. @ $20.00/L.F.	$ 5,240.00
18 - 20' Depth, PVC	230	L.F. @ $21.00/L.F.	$ 4,830.00
20 - 22' Depth, PVC	390	L.F. @ $22.00/L.F.	$ 8,580.00
22 - 24' Depth, PVC	382	L.F. @ $23.00/L.F.	$ 8,786.00
24 - 26' Depth, PVC	267	L.F. @ $24.00/L.F.	$ 6,408.00
26 - 28' Depth, PVC	345	L.F. @ $25.00/L.F.	$ 8,625.00
28 - 30' Depth, PVC	239	L.F. @ $26.00/L.F.	$ 6,214.00
30 - 32' Depth, PVC	20	L.F. @ $27.00/L.F.	$ 540.00
32 - 34' Depth, PVC	19	L.F. @ $28.00/L.F.	$ 532.00
	3,082'		$ 66,219.00

15" Sanitary Sewer - RCP - Class V

0 - 8' Depth	835	L.F. @ $22.00/L.F.	$ 18,370.00
8 - 10' Depth	880	L.F. @ $23.00/L.F.	$ 20,240.00
10 - 12' Depth	1,055	L.F. @ $25.00/L.F.	$ 26,375.00
12 - 14' Depth	1,620	L.F. @ $27.00/L.F.	$ 43,740.00
14 - 16' Depth	1,325	L.F. @ $29.00/L.F.	$ 38,425.00
16 - 18' Depth	411	L.F. @ $32.00/L.F.	$ 13,152.00
18 - 20' Depth	260	L.F. @ $38.00/L.F.	$ 9,880.00
20 - 22' Depth	345	L.F. @ $42.00/L.F.	$ 14,490.00
22 - 24' Depth	155	L.F. @ $45.00/L.F.	$ 6,975.00
24 - 26' Depth	85	L.F. @ $48.00/L.F.	$ 4,080.00
26 - 28' Depth	245	L.F. @ $50.00/L.F.	$ 12,250.00
28 - 30' Depth	40	L.F. @ $53.00/L.F.	$ 2,120.00
30 - 32' Depth	355	L.F. @ $55.00/L.F.	$ 19,525.00
32 - 34' Depth	160	L.F. @ $60.00/L.F.	$ 9,600.00
	7,771'		$ 239,222.00
			$ 66,219.00
			$ 305,441.00

Jacking (County Road 42)			Lump Sum	$ 5,000.00
Manholes	34	Each @	$1,000.00/Each	$ 34,000.00
Manhole - extra depth	288	L.F. @	$ 80.00/L.F.	$ 23,040.00
Drop Section	2	Each @	$2,000.00/Each	$ 4,000.00
Sewer Services (4")	2,305	L.F. @	$ 10.00/L.F.	$ 23,050.00
8" wyes - 8" x 4" PVC	43	Each @	$ 50.00/Each	$ 2,150.00
15" saddles	22	Each @	$ 85.00/Each	$ 1,870.00
Clear and Grub	4.35	Acre @	$3,000.00/AC	$ 13,050.00
Clear and Grub (Trees)	320	Each @	$ 350.00/Each	$112,500.00
TOTAL GRAVITY SEWER COST*				$524,101.00
Lift Station No. 1 (Large)			Lump Sum	$ 70,000.00
Lift Station No. 2 (Small)			Lump Sum	$ 35,000.00
6" Forcemain	60	L.F. @	$ 10.00/L.F.	$ 600.00
4" Forcemain	450	L.F. @	$ 8.00/L.F.	$ 3,600.00
Fittings				
Duplex grinder pump	2	Each @	$8,000.00/Each	$ 16,000.00
Single grinder pump	2	Each @	$1,500.00/Each	$ 3,000.00
1-1/2" Forcemain	200	L.F. @	$ 6.00/L.F.	$ 1,200.00
TOTAL LIFT STATION & FORCEMAIN COST				$129,400.00
Restoration				
Class 5 Gravel	1,000	Ton @	$ 7.00/Ton	$ 7,000.00
Black Dirt & Sod	1,600	S.Y. @	$ 2.00/S.Y.	$ 3,200.00
Seed, Topsoil & Mulch	3	Acre @	$3,000.00/AC	$ 9,000.00
Erosion Control			Lump Sum	$ 4,000.00
TOTAL RESTORATION COST*				$ 23,200.00
Mobilization				$ 40,000.00
Gravity Sewer				$524,101.00
Lift Stations & Forecemain				$129,400.00
Restoration				$ 23,200.00
Dewatering				$ 50,000.00
TOTAL				$766,701.00
Contingencies (10%)				$ 76,670.00
Total Construction Costs				$843,371.00
Technical Services (15%)				$126,506.00
TOTAL COST*				$969,877.00

*NOTE: See Note - Original Route Cost Estimate

COST ESTIMATE

NORTHERN PRIOR LAKE
SANITARY SEWER
ALTERNATIVE 2

8" Sanitary Sewer

0 - 8' Depth, PVC	669 L.F. @ $15.00/L.F.	$	10,035.00
8 - 10' Depth, PVC	277 L.F. @ $16.00/L.F.	$	4,432.00
10 - 12' Depth, PVC	421 L.F. @ $17.00/L.F.	$	7,157.00
12 - 14' Depth, PVC	672 L.F. @ $18.00/L.F.	$	12,096.00
14 - 16' Depth, PVC	416 L.F. @ $19.00/L.F.	$	7,904.00
16 - 18' Depth, PVC	377 L.F. @ $20.00/L.F.	$	7,540.00
18 - 20' Depth, PVC	298 L.F. @ $21.00/L.F.	$	6,258.00
20 - 22' Depth, PVC	189 L.F. @ $22.00/L.F.	$	4,158.00
22 - 24' Depth, PVC	94 L.F. @ $23.00/L.F.	$	2,162.00
24 - 26' Depth, PVC	230 L.F. @ $24.00/L.F.	$	
26 - 28' Depth, PVC	10 L.F. @ $25.00/L.F.	$	
	3,653'	$	61,742.00

15" Sanitary Sewer - RCP - Class V

0 - 8' Depth	365 L.F. @ $22.00/L.F.	$	8,030.00
8 - 10' Depth	656 L.F. @ $23.00/L.F.	$	15,088.00
10 - 12' Depth	818 L.F. @ $25.00/L.F.	$	20,450.00
12 - 14' Depth	1,463 L.F. @ $27.00/L.F.	$	39,501.00
14 - 16' Depth	1,767 L.F. @ $29.00/L.F.	$	51,243.00
16 - 18' Depth	1,069 L.F. @ $32.00/L.F.	$	34,208.00
18 - 20' Depth	560 L.F. @ $38.00/L.F.	$	21,280.00
20 - 22' Depth	680 L.F. @ $42.00/L.F.	$	28,560.00
22 - 24' Depth	508 L.F. @ $45.00/L.F.	$	22,860.00
24 - 26' Depth	472 L.F. @ $48.00/L.F.	$	22,656.00
26 - 28' Depth	287 L.F. @ $50.00/L.F.	$	14,350.00
28 - 30' Depth	349 L.F. @ $53.00/L.F.	$	18,497.00
30 - 32' Depth	265 L.F. @ $55.00/L.F.	$	14,575.00
32 - 34' Depth	91 L.F. @ $60.00/L.F.	$	5,460.00
	9,350'	$	316,758.00
		$	61,742.00
		$	378,500.00

Jacking (County Road 42)		Lump Sum	$ 5,000.00
Manholes	44	Each @ $1,000.00/Each	$ 44,000.00
Manhole - extra depth	328.5	L.F. @ $ 80.00/L.F.	$ 26,280.00
Sewer Services (4")	3,306	L.F. @ $ 10.00/L.F.	$ 33,060.00
8" wyes - 8 x 4 PVC	52	Each @ $ 50.00/Each	$ 2,600.00
15" saddles	37	Each @ $ 85.00/Each	$ 3,145.00
Clear and Grub	5.15	Acre @ $3,000.00/AC	$ 15,450.00
Clear and Grub (Trees)	400	Each @ $ 350.00/Each	$ 140,000.00
TOTAL GRAVITY SEWER COST*			$ 648,035.00
Lift Station No. 1		Lump Sum	$ 135,000.00
Lift Station No. 2		Lump Sum	$ 35,000.00
6" Forcemain	600	L.F. @ $ 10.00/L.F.	$ 6,000.00
4" Forcemain	450	L.F. @ $ 8.00/L.F.	$ 3,600.00
Fittings			
Duplex grinder pump	2	Each @ $8,000.00/Each	$ 16,000.00
Single grinder pump	2	Each @ $6,000.00/Each	$ 12,000.00
1-1/2" Forcemain	400	L.F. @ $ 6.00/L.F.	$ 2,400.00
TOTAL LIFT STATION & FORCEMAIN COST			$ 210,000.00
Restoration			
Class 5 Gravel	3,200	Ton @ $ 7.00/Ton	$ 22,400.00
Black Dirt & Sod	5,500	S.Y. @ $ 2.00/S.Y.	$ 11,000.00
Seed, Topsoil & Mulch	7	Acre @ $3,000.00/AC	$ 21,000.00
Erosion Control		Lump Sum	$ 4,000.00
TOTAL RESTORATION COST*			$ 58,400.00
Mobilization			$ 40,000.00
Gravity Sewer			$ 648,035.00
Lift Stations & Forecemain			$ 210,000.00
Restoration			$ 58,400.00
Dewatering			$ 75,000.00
TOTAL			1,031,435.00
Contingencies (10%)			$ 103,144.00
Total Construction Costs			$1,134,579.00
Technical Services (15%)			$ 170,187.00
TOTAL COST*			$1,304,766.00

*NOTE: See Note, Original Route Cost Estimate

COST ESTIMATE

NORTHERN PRIOR LAKE
SANITARY SEWER
ALTERNATIVE 3

8" Sanitary Sewer

0 - 8' Depth, PVC	669 L.F. @	$15.00/L.F.	$ 10,035.00
8 - 10' Depth, PVC	277 L.F. @	$16.00/L.F.	$ 4,432.00
10 - 12' Depth, PVC	421 L.F. @	$17.00/L.F.	$ 7,157.00
12 - 14' Depth, PVC	672 L.F. @	$18.00/L.F.	$ 12,096.00
14 - 16' Depth, PVC	416 L.F. @	$19.00/L.F.	$ 7,904.00
16 - 18' Depth, PVC	377 L.F. @	$20.00/L.F.	$ 7,540.00
18 - 20' Depth, PVC	298 L.F. @	$21.00/L.F.	$ 6,258.00
20 - 22' Depth, PVC	189 L.F. @	$22.00/L.F.	$ 4,158.00
22 - 24' Depth, PVC	94 L.F. @	$23.00/L.F.	$ 2,162.00
	3,413'		$ 61,742.00

15" Sanitary Sewer - RCP - Class V

0 - 8' Depth	285 L.F. @	$22.00/L.F.	$ 6,270.00
8 - 10' Depth	70 L.F. @	$23.00/L.F.	$ 1,610.00
10 - 12' Depth	568 L.F. @	$25.00/L.F.	$ 14,200,00
12 - 14' Depth	1,081 L.F. @	$27.00/L.F.	$ 29,187.00
14 - 16' Depth	980 L.F. @	$29.00/L.F.	$ 28,420.00
16 - 18' Depth	341 L.F. @	$32.00/L.F.	$ 10,912.00
18 - 20' Depth	205 L.F. @	$38.00/L.F.	$ 7,790.00
20 - 22' Depth	350 L.F. @	$42.00/L.F.	$ 14,700.00
22 - 24' Depth	1,047 L.F. @	$45.00/L.F.	$ 47,115.00
24 - 26' Depth	515 L.F. @	$48.00/L.F.	$ 24,720.00
26 - 28' Depth	321 L.F. @	$50.00/L.F.	$ 16,050.00
28 - 30' Depth	241 L.F. @	$53.00/L.F.	$ 12,773.00
30 - 32' Depth	155 L.F. @	$55.00/L.F.	$ 8,525.00
32 - 34' Depth	115 L.F. @	$60.00/L.F.	$ 6,900.00
34 - 36' Depth	84 L.F. @	$67.00/L.F.	$ 5,628.00
36 - 38' Depth	130 L.F. @	$74.00/L.F.	$ 9,620.00
38 - 40' Depth	341 L.F. @	$82.00/L.F.	$ 27,962.00
40 - 42' Depth	358 L.F. @	$90.00/L.F.	$ 32,220.00
42 - 44' Depth	285 L.F. @	$98.00/L.F.	$ 27,930.00
44 - 46' Depth	426 L.F. @	$107.00/L.F.	$ 45,582.00
46 - 48' Depth	419 L.F. @	$116.00/L.F.	$ 48,604.00
48 - 50' Depth	175 L.F. @	$125.00/L.F.	$ 21,875.00
50 - 52' Depth	495 L.F. @	$135.00/L.F.	$ 66,825.00
52 - 54' Depth	75 L.F. @	$145.00/L.F.	$ 10,875.00
54 - 56' Depth	50 L.F. @	$155.00/L.F.	$ 7,750.00
56 - 58' Depth	50 L.F. @	$165.00/L.F.	$ 8,250.00
58 - 60' Depth	50 L.F. @	$175.00/L.F.	$ 8,750.00
60 - 62' Depth	545 L.F. @	$185.00/L.F.	$ 100,825.00
	9,757'		$ 651,868.00
			$ 61,742.00
			$ 713,610.00

Jacking (County Road 42)		Lump Sum	$ 5,000.00
Manholes	41 Each @	$1,000.00/Each	$ 41,000.00
Manhole - extra depth	419.5 L.F. @	$ 80.00/L.F.	$ 33,560.00
Drop Section	2 Each @	$2,000.00/Each	$ 4,000.00
Sewer Services (4")	3,475 L.F. @	$ 10.00/L.F.	$ 34,750.00
8" wyes - 8 x 4 PVC	52 Each @	$ 50.00/Each	$ 2,600.00
15" saddles	37 Each @	$ 85.00/Each	$ 3,145.00
Clear and Grub	6.2 Acre @	$3,000.00/AC	$ 18,600.00
Clear and Grub (Trees)	450 Each @	$ 350.00/Each	$ 157,500.00
TOTAL GRAVITY SEWER COST*			$1,013,765.00
Small Lift Station		Lump Sum	$ 15,000.00
TOTAL LIFT STATION INCLUDING FORCEMAIN COST			$ 15,000.00

Restoration

Class 5 Gravel	4,000 Ton @	$ 7.00/Ton	$ 28,000.00
Black Dirt & Sod	5,500 S.Y. @	$ 2.00/S.Y.	$ 11,000.00
Seed, Topsoil & Mulch	8 Acre @	$3,000.00/AC	$ 24,000.00
Erosion Control		Lump Sum	$ 4,000.00
TOTAL RESTORATION COST*			$ 67,000.00

Mobilization	$ 40,000.00
Gravity Sewer	$1,013,765.00
Lift Stations & Forecemain	$ 15,000.00
Restoration	$ 67,000.00
Dewatering	$ 75,000.00
Contingencies (10%)	$ 121,077.00
Total Construction Costs	$1,331,842.00
Technical Services (15%)	$ 199,776.00
TOTAL COST*	$1,531,618.00

*NOTE: See Note, Original Route Cost Estimate.

Alternative 3

COST ESTIMATE

NORTHERN PRIOR LAKE
SANITARY SEWER
FUTURE TRUNK LINE TO THE NORTHWEST
(ROUTE COMPLEMENTARY TO ORIGINAL ROUTE ALIGNMENT)

15" Sanitary Sewer - RCP - Class V					
0 - 8' Depth	80	L.F.	@ $22.00/L.F.	$	1,760.00
8 - 10' Depth	435	L.F.	@ $23.00/L.F.	$	10,005.00
10 - 12' Depth	615	L.F.	@ $25.00/L.F.	$	15,375.00
12 - 14' Depth	1,160	L.F.	@ $27.00/L.F.	$	31,320.00
14 - 16' Depth	1,315	L.F.	@ $29.00/L.F.	$	38,135.00
16 - 18' Depth	720	L.F.	@ $32.00/L.F.	$	23,040.00
18 - 20' Depth	395	L.F.	@ $38.00/L.F.	$	15,010.00
20 - 22' Depth	385	L.F.	@ $42.00/L.F.	$	16,170.00
22 - 24' Depth	15	L.F.	@ $45.00/L.F.	$	675.00
	5,120	L.F.			
					151,490.00
Jacking (County Road 42)			Lump Sum	$	5,000.00
Manholes	14	Each	@ $1,000.00/Each	$	14,000.00
Manhole - extra depth	78	L.F.	@ $ 80.00/L.F.	$	6,240.00
Drop Section	0	Each	@ $ /Each	$	0.00
Sewer Services (4")					
12' or less	300	L.F.	@ $ 8.00/L.F.	$	2,400.00
15" wyes	10	Each	@ $ 125.00/Each	$	1,250.00
Clear and Grub	4.35	Acre	@ $3,000.00/AC	$	13,050.00
Clear and Grub (Trees)	320	Each	@ $ 350.00/Each	$	112,000.00
TOTAL GRAVITY SEWER COST*				$	305,430.00
Restoration					
Class 5 Gravel	500	Ton	@ $ 7.00/Ton	$	3,500.00
Black Dirt & Sod	800	S.Y.	@ $ 2.00/S.Y.	$	1,600.00
Seed, Topsoil & Mulch	2	Acre	@ $3,000.00/AC	$	6,000.00
Erosion Control			Lump Sum	$	2,000.00
TOTAL RESTORATION COST*				$	13,100.00

Gravity Sewer	$	305,430.00
Restoration	$	13,100.00
Dewatering	$	25,000.00
Contingencies (10%)	$	34,353.00
Total Construction Costs	$	377,883.00
Technical Services (15%)	$	56,682.00
TOTAL COST*	$	434,565.00

*NOTE: See Note, Original Route Cost Estimate.

Future Trunk Line to the Northwest

COST ESTIMATE

NORTHERN PRIOR LAKE
SANITARY SEWER
FUTURE TRUNK LINE TO THE WEST
(ROUTE COMPLIMENTARY TO ALTERNATIVES 1, 2, AND 3)

8" Sanitary Sewer

0 - 8' Depth, DIP	114 L.F. @ $21.00/L.F.	$	2,394.00
8 - 10' Depth, DIP	65 L.F. @ $22.00/L.F.	$	1,430.00
10 - 12' Depth, DIP	58 L.F. @ $23.00/L.F.	$	1,334.00
12 - 14' Depth, DIP	64 L.F. @ $24.00/L.F.	$	1,536.00
14 - 16' Depth, PVC	24 L.F. @ $26.00/L.F.	$	624.00
16 - 18' Depth, PVC	3 L.F. @ $28.00/L.F.	$	84.00
18 - 20' Depth, PVC	2 L.F. @ $30.00/L.F.	$	60.00
20 - 22' Depth, PVC	3 L.F. @ $33.00/L.F.	$	99.00
22 - 24' Depth, PVC	10 L.F. @ $35.00/L.F.	$	350.00
	343'		
		$	7,911.00

15" Sanitary Sewer - RCP - Class V

0 - 8' Depth	527 L.F. @ $22.00/L.F.	$	11,594.00
8 - 10' Depth	591 L.F. @ $23.00/L.F.	$	13,593.00
10 - 12' Depth	291 L.F. @ $25.00/L.F.	$	7,275.00
12 - 14' Depth	187 L.F. @ $27.00/L.F.	$	5,049.00
14 - 16' Depth	370 L.F. @ $29.00/L.F.	$	10,730.00
16 - 18' Depth	398 L.F. @ $32.00/L.F.	$	12,736.00
18 - 20' Depth	413 L.F. @ $38.00/L.F.	$	15,694.00
20 - 22' Depth	293 L.F. @ $42.00/L.F.	$	12,306.00
22 - 24' Depth	251 L.F. @ $45.00/L.F.	$	11,295.00
24 - 26' Depth	175 L.F. @ $48.00/L.F.	$	8,400.00
26 - 28' Depth	132 L.F. @ $50.00/L.F.	$	6,600.00
28 - 30' Depth	63 L.F. @ $53.00/L.F.	$	3,339.00
30 - 32' Depth	67 L.F. @ $55.00/L.F.	$	3,685.00
32 - 34' Depth	49 L.F. @ $60.00/L.F.	$	2,940.00
34 - 36' Depth	48 L.F. @ $67.00/L.F.	$	3,216.00
36 - 38' Depth	67 L.F. @ $74.00/L.F.	$	4,958.00
38 - 40' Depth	157 L.F. @ $82.00/L.F.	$	12,874.00
40 - 42' Depth	55 L.F. @ $90.00/L.F.	$	4,950.00
42 - 44' Depth	30 L.F. @ $98.00/L.F.	$	2,940.00
44 - 46' Depth	35 L.F. @ $107.00/L.F.	$	3,745.00
46 - 48' Depth	37 L.F. @ $116.00/L.F.	$	4,292.00
48 - 50' Depth	83 L.F. @ $125.00/L.F.	$	10,375.00
50 - 52' Depth	125 L.F. @ $135.00/L.F.	$	16,875.00
52 - 54' Depth	46 L.F. @ $145.00/L.F.	$	6,670.00
54 - 56' Depth	42 L.F. @ $155.00/L.F.	$	6,510.00
56 - 58' Depth	62 L.F. @ $165.00/L.F.	$	10,230.00
	4,594 L.F.	$	212,871.00
		$	7,911.00
		$	220,782.00

Connect to Exist. MH	1 Each @ $	Lump Sum	$ 3,000.00
Manholes	19 Each @	$1,000.00/Each	$ 19,000.00
Manhole - Extra Depth	205 L.F. @ $	80.00/L.F.	$ 16,400.00
Clear & Grub	1.19 Acre @	$3,000.00/AC	$ 3,750.00
Clear & Grub (Trees)	160 Each @ $	350.00/Each	$ 56,000.00
TOTAL GRAVITY SEWER COST*			$ 318,932.00

Restoration

Common Borrow	1,000 C.Y. @ $	2.50/C.Y.	$ 2,500.00
Class 5 Gravel	100 Ton @ $	7.00/Ton	$ 700.00
Black Dirt & Sod	5,000 S.Y. @ $	2.00/S.Y.	$ 10,000.00
Seed, Topsoil & Mulch	5 Acre @	$3,000.00/AC	$ 15,000.00
Erosion Control		Lump Sum	$ 3,000.00
TOTAL RESTORATION COST*			$ 31,200.00

Gravity Sewer	$ 318,932.00
Restoration	$ 31,200.00
Dewatering	$ 50,000.00
Contingencies (10%)	$ 40,013.00
Total Construction Costs	$ 440,145.00
Technical Services (15%)	$ 66,022.00
TOTAL COST*	$ 506,167.00

*NOTE: See Note, Original Route Cost Estimate

Future Trunk Line to the West

WATERMAIN COST ESTIMATE

Item	Unit	Quantity	Price	Total
Clear and Grub	Acre	1.0	$3,000.00	$ 3,000.00
Clear and Grub (Tree)	Each	135	$ 350.00	$ 47,250.00
6" D.I.P. Cl. 52	L.F.	560	$ 16.50	$ 9,240.00
8" D.I.P. Cl. 52	L.F.	400	$ 18.50	$ 7,400.00
12" D.I.P. Cl. 50	L.F.	5,850	$ 26.00	$152,100.00
Air Release MH	Each	4	$1,500.00	$ 6,000.00
Hydrant G.V. and Box	Each	12	$1,100.00	$ 13,200.00
6" Fittings	Lbs.	210	$ 1.10	$ 231.00
8" Fittings	Lbs.	390	$ 1.10	$ 429.00
12" Fittings	Lbs.	11,000	$ 1.10	$ 12,100.00
12" Butterfly Valve & Box	Each	5	$ 800.00	$ 4,000.00
1" Curb Stop and Box	Each	89	$ 200.00	$ 17,800.00
1" Copper Service	L.F.	1,286	$ 7.00	$ 9,002.00
1" Corp. Cock	Each	82	$ 21.00	$ 1,722.00
TOTAL WATERMAIN COST				$283,474.00
CONTINENCIES (10%)				28,347.00
TOTAL CONSTRUCTION COST				$311,821.00
TECHNICAL SERVICES (15%)				46,773.00
TOTAL COST				$358,594.00

PRIOR LAKE STORM SEWER COST ESTIMATE

Item	Beach St. (System 1) Quantity	Shore Tr. West (System 2) Quantity	Shore Tr. East (System 3) Quantity	Unit	Price	Beach St. Total	Shore Tr. West Total	Shore Tr. East Total	Total
12" RCP 0-8' Depth	120	15	57	L.F.	$ 18.50	$2,220.00	$ 277.50	$ 1,054.50	$ 3,552.00
15" RCP 0-8' Depth	457	122	173	L.F.	$ 20.50	$9,368.50	$ 2,501.00	$ 3,546.50	$15,416.00
15" RCP 8'-10' Depth	180	34	90	L.F.	$ 23.00	$4,140.00	$ 782.00	$ 2,070.00	$ 6,992.00
15" RCP 10'-12' Depth	-	30	45	L.F.	$ 25.25	-	$ 757.50	$ 1,136.25	$ 1,893.75
15" RCP 12'-14' Depth	-	27	-	L.F.	$ 27.50	-	$ 742.50	-	$ 742.50
15" RCP 14'-16' Depth	-	31	-	L.F.	$ 29.75	-	$ 922.25	-	$ 922.25
18" RCP 0-8' Depth	75	130	-	L.F.	$ 23.00	$1,725.00	$ 2,990.00	-	$ 4,715.00
18" RCP 8'-10' Depth	-	51	-	L.F.	$ 25.25	-	$ 1,287.75	-	$ 1,287.75
18" RCP 10'-12' Depth	-	66	-	L.F.	$ 27.50	-	$ 1,815.00	-	$ 1,815.00
18" RCP 12'-14' Depth	-	20	-	L.F.	$ 29.75	-	$ 595.00	-	$ 595.00
21" RCP 0-8' Depth	-	116	-	L.F.	$ 25.00	-	$ 2,900.00	-	$ 2,900.00
21" RCP 8'-10' Depth	-	9	-	L.F.	$ 27.25	-	$ 245.25	-	$ 245.25
24" RCP 0'-8' Depth	170	-	-	L.F.	$ 28.50	$4,845.00	-	-	$ 4,845.00
24" RCP 8'-10' Depth	17	-	-	L.F.	$ 30.75	$ 522.75	-	-	$ 522.75
24" RCP 10'-12' Depth	17	-	-	L.F.	$ 33.00	$ 561.00	-	-	$ 561.00
24" RCP 12'-14' Depth	42	-	-	L.F.	$ 35.25	$1,480.50	-	-	$ 1,480.50
18" RC Apron	1	-	-	Each	$400.00	$ 400.00	-	-	$ 400.00
24" RC Apron	1	-	-	Each	$600.00	$ 600.00	-	-	$ 600.00
12" RC Apron	2	-	-	Each	$350.00	$ 700.00	-	-	$ 700.00

PRIOR LAKE STORM SEWER COST ESTIMATE (cont.)

Item	Beach St. (System 1) Quantity	Shore Tr. West (System 2) Quantity	Shore Tr. East (System 3) Quantity	Unit	Price	Beach St. Total	Shore Tr. West Total	Shore Tr. East Total	Total
Standard MH	4	2	2	Each	$900.00	$ 3,600.00	$ 1,800.00	$ 1,800.00	$ 7,200.00
Catchbasin Type A	-	-	1	Each	$600.00	-	-	$ 600.00	$ 600.00
Catchbasin Type B	5	3	1	Each	$750.00	$ 3,750.00	$ 2,250.00	$ 750.00	$ 6,750.00
Catchbasin MH	1	4	1	Each	$900.00	$ 900.00	$ 3,600.00	$ 900.00	$ 5,400.00
Extra Depth MH (Includes sumps in Environmental MH's)	-	9.4	3.5	L.F.	$ 80.00	-	$ 752.00	$ 280.00	$ 1,032.00
Conc. Flume Outlet	1	1	1	L.S.	$800.00	$ 800.00	$ 800.00	$ 800.00	$ 2,400.00
18" RCP 7°-30° Bend	-	4	-	Each	$350.00	-	$ 1,400.00	-	$ 1,400.00
21" RCP 7°-30° Bend	-	6	-	Each	$400.00	-	$ 2,400.00	-	$ 2,400.00
.90 Ac./Ft. Pond on Beach Street	322	-	-	C.Y.	$ 3.50	$ 1,127.00	-	-	$ 1,127.00
						$36,739.75	$28,817.75	$12,937.25	$78,494.75
Contingencies (10%)						$ 3,673.97	$ 2,881.77	$ 1,293.72	$ 7,849.47
TOTAL CONSTRUCTION						$40,413.72	$31,699.52	$14,230.97	$86,344.22
Technical Services (15%)						$ 6,062.06	$ 4,754.93	$ 2,134.65	$12,951.63
TOTAL COST						$46,475.78	$36,454.45	$16,365.62	$99,295.85

Shore Trail West (System 2)
Recommended Changes

Using 15" RCP, no bends and 2 less CBMH's and 1 less catchbasin would yield a savings: $99,295.85
- 8,995.73

Total Cost With System 2 Changes $90,300.12

ASPHALT STREETS WITH CURB AND GUTTERS CONSTRUCTION COST ESTIMATES

Item	Unit	Quantities			Unit Price	Costs			Total
		Beach St.	Shore Tr. West	Shore Tr. East		Beach St. Total	Shore Tr. West	Shore Tr. East	
Subgrade Preparation	Rd. Sta.	11.80	12.85	8.32	$ 55.00	$ 649.00	$ 707.00	$ 458.00	$ 1,813.00
Agg. Base (Cl. 5)	Ton	1,288	1,138	890	$ 10.00	$12,880.00	$11,380.00	$ 8,900.00	$ 33,160.00
Bit. Mat'l. For Mix 2331	Ton	28	24	19	$190.00	$ 5,320.00	$ 4,560.00	$ 3,610.00	$ 13,490.00
Bit. Mat'l. Base Course 2331	Ton	619	537	425	$ 12.00	$ 7,428.00	$ 6,444.00	$ 5,100.00	$ 18,972.00
Bit. Mat'l. For Mix 2341	Ton	19	16	13	$190.00	$ 3,610.00	$ 3,040.00	$ 2,470.00	$ 9,120.00
Bit. Mat'l. Wear Course 2341	Ton	309	268	213	$ 12.00	$ 3,708.00	$ 3,216.00	$ 2,556.00	$ 9,480.00
Bit. Mat'l. Tack Coat 2357	Gal.	180	156	123	$ 1.00	$ 180.00	$ 156.00	$ 123.00	$ 459.00
Design "D" 412 C & G	L.F.	2,393.3	2,511.4	1,763.8	$ 4.50	$10,770.00	$11,301.00	$ 7,937.00	$ 30,008.00
STREET COSTS						$44,545.00	$40,805.00	$31,154.00	$116,503.00
Contingencies (10%)						$ 4,455.00	$ 4,080.00	$ 3,115.00	$ 11,650.00
TOTAL CONSTRUCTION						$49,000.00	$44,884.00	$34,269.00	$128,153.00
Technical Services (15%)						$ 7,350.00	$ 6,733.00	$ 5,140.00	$ 19,223.00
TOTAL COSTS						$53,350.00	$51,617.00	$39,409.00	$147,376.00

APPENDIX E

Technical References and Sources of Information

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5. City Watershed management maps.
6. M.W.C.C. Interceptor as-built plans.
7. E.A.W.
8. E.A.W. findings of fact.
9. Amendment to feasibility study.
10. E.P.A. documents.
11. Prior Lake comprehensive plan.
12. Sample assessment rates in City.
13. Water system deficiencies report.
14. Water contamination study.
15. Population forecast from Met Council for City of Prior Lake.
16. Construction plans for each alternate.
17. Construction cost estimate for each alternate.
18. City water system study.
19. Base alignment construction plan - latest version.
20. Original project feasibility study.
21. City assessment policies.
22. All lake studies conducted on Prior Lake by MPCA.
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27. County 1/2 - Section Maps of Project Area.

28. City Topo Maps of Project Area.

29. City Utilities Maps of Areas (Sanitary Sewer, Storm Sewer, Water).

30. City Street Maps.

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APPENDIX F

Green Acres Statute
MN STAT Sec. 273.111

Minnesota Statutes, Section 273.111, as amended.

Subdivision 1. This act may be cited as the "Minnesota Agricultural Property Tax Law."

Subd. 2. The present general system of ad valorem property taxation in the state of Minnesota does not provide an equitable basis for the taxation of certain agricultural real property and has resulted in inadequate taxes on some lands and excessive taxes on others. Therefore, it is hereby declared to be the public policy of this state that the public interest would best be served by equalizing tax burdens upon agricultural property within this state through appropriate taxing measures.

Subd. 3. Real estate consisting of ten acres or more shall be entitled to valuation and tax deferment under this section only if it is actively and exclusively devoted to agricultural use as defined in subdivision 6, and either (1) is the homestead or thereafter become the homestead of a surviving spouse, child, or sibling of the said owner, or is a real estate which is farmed with the real estate which contains the homestead property, or (2) has been in possession of the applicant, his spouse, parent, or sibling, or any combination thereof, for a period of at least seven years prior to application for benefits under the provisions of Laws 1969, Chapter 1039, or (3) is the homestead of a shareholder in a family farm corporation, notwithstanding the fact that legal title to the real estate may be held in the name of the family farm corporation. "Family farm corporation" for the purpose of this subdivision means a corporation founded for the purpose of farming and owning agricultural land, in which all of the stockholders are members of a family related to each other within the third degree of kindred according to the rules of civil law.

Subd. 4. The value of any real estate described in subdivision 3 shall upon timely application by the owner, in the manner provided in subdivision 8, be determined solely with reference to its appropriate agricultural classification and value notwithstanding sections 272.03, subdivision 8, and 273.11. In determining such value for ad valorem tax purposes the assessor shall not consider any added values resulting from nonagricultural factors.

Subd. 5. The assessor shall, however, make a separate determination of the market value of such real estate. The tax based upon the appropriate mill rate applicable to such property in the taxing district shall be recorded on the property assessment records.

Subd. 6. Real property shall be considered to be agricultural use provided that annually: (1) at least 33⅓ percent of the total family income of the owner is derived therefrom, or the total production income including rental from the property is $300.00 plus $10.00 per tillable acre; and (2) it is devoted to the production for sale of livestock, dairy animals, dairy products, poultry and poultry products, fur bearing animals, horticultural and nursery stock which is under sections 18.44 to 18.61, fruit of all kinds, vegetables, forage, grains, bees and apiary products by the owner, slough, wasteland, and woodland contiguous to or surrounded by land described in subdivision 3 shall be considered to be in agricultural use if under the same ownership and management.

Subd. 7. Repealed.

Subd. 8 Application for deferment of taxes and assessment under this section shall be filed in the year 1969 by July 1 and thereafter by May 1 of the year prior to the year in which said taxes become payable. Any application filed hereunder and granted shall continue in effect for subsequent years until the property no longer qualifies. Such application shall be filed with the assessor of he taxing district in which the real property is located on such form as may be prescribed by the commissioner of taxation. The assessor may require proof by affidavit or otherwise that the property qualifies under subdivisions 3 and 6 above.

Subd. 8a. Notwithstanding the provisions contained in this subdivision, applications for agricultural tax assessment and deferment with respect to the assessment of January 2, 1968, may be made prior to July 1, 1969, and payment of any taxes otherwise due on May 31, 1969, shall be deferred without penalty until 30 days after notice or rejection of application or after notice of taxes as determined under the new assessment made in accordance with subdivision 4. Any reduction in taxes resulting from the application of this section shall be processed in accordance with section 270.07. Notwithstanding the time limits contained in section 278.01 and section 271.06, subdivision 1, as the case may be, an appeal may be taken to the district court or the tax court within 30 days of any order denying applications filed as provided in this subdivision for reduction in the January 2, 1968 valuations or assessments or of any valuations or assessments made after the effective date of this act.

Subd. 9. When real property which is being, or has been valued and assessed under this section is sold or no longer qualifies under subdivisions 3 and 7, the portion sold shall be subject to additional taxes, in the amount equal to the difference between the taxes determined in accordance with subdivision 4, and the amount determined under subdivision 5, provided, however, that the amount determined under subdivision 5 shall not be greater than it would have been had the actual bona fide sale price of the real property at an arms length transaction been used in lieu of the market value determined under subdivision 5. such additional taxes shall be extended against the property on the tax list for the current year, provided, however, that no interest or penalties shall be levied on such additional taxes if timely paid, and provided further, that such additional taxes shall only be levied with respect to the last three years that the said property has been valued and assessed under his section.

Subd. 10. The tax imposed by this section shall be a lien upon the property assessed to the same extent and for the same duration as other taxes imposed upon property within this state. The tax shall be annually extended by the county auditor and if and when payable shall be collected and distributed in the manner provided by law and for the collection and distribution of other property taxes.

Subd. 11. The payment of special local assessments levied after the date of Extra Session Laws 1967, Chapter 60, for improvements made to any real property described in subdivision 3 together with the interest thereon shall, on timely application as provided in subdivision 8, be deferred as long as such property meets the conditions contained in subdivision 3 and 7. When such property is sold or no longer qualifies under subdivision 3 and 7, all deferred special assessments plus interest shall be payable within 90 days. Penalty shall not be levied on any such special assessments if timely paid. If not paid within such 90 days, the county auditor shall include such deferred special assessments plus a 10 percent penalty on the tax list for the current year.

Subd. 12. This section shall be broadly construed to acheive its purpose. The invalidty of any provision shall be deemed not to affect the validity of other provisions.

Subd. 13. This section shall apply to assessments for tax purposes made in 1968 and thereafter.

Subd. 14. This section shall apply to special local assessments levied after July 1, 1967 and payable in the years thereafter, but shall not apply to any special assessments levied at any time by a county or district court under the provisions of chapter 116A.

APPENDIX G

List of Preparers

The following people were primarily responsible for preparing and reviewing the Draft Environmental Impact Statement.

Minnesota Pollution Control Agency	Title
Eric Kilberg	Planner Senior Project Manager
Deborah R. Pile	Director, Office of Planning and Review

Bennett-Ringrose-Wolsfeld-Jarvis-Gardner, Inc.

Name Education Professional Discipline	Experience	Project Responsibilities
Franklin J. Svoboda B.S. Wildlife Management	18 years, environmental research and analysis wildlife planning and management	EIS project manager, analysis of vegetation and wildlife impacts
Tedd W. Mattke, P.E. M.S.C.E., B.S.C.E. P. E. Minnesota Civil Engineering	7 years, engineering design for roads, sewer and water systems, water quality analysis	Construction impacts of alternatives, construction techniques, water quality, land use plans, zoning.
Terry L. Herman, P.E. B.S.C.E. P.E. Minnesota Civil Engineering	14 years, engineering design and project management for sewer and water systems and utilities	Economic impacts, construction impacts
David Showalter, AIA,APA M.C.R. Master of Architecture Bachelor of Architeture	11 years, site planning, urban design	Land use plans, zoning
Alexis Duxbury B.S. Botany	9 years, floral inventories, plant taxonomy, rare plant surveys	Woodland quality evaluation, rare plant search

APPENDIX H

Minnesota Historical Society Corrspondence

MINNESOTA HISTORICAL SOCIETY
FOUNDED IN 1849
690 Cedar Street, St. Paul, Minnesota 55101 • (612) 296-6126

9 March 1984

Mr. Eric J. Kilberg
Minnesota Pollution Control Agency
1935 West County Road B2
Roseville, Minnesota 55113-2785

Dear Mr. Kilberg:

RE: Prior Lake, Minnesota, North Shore Trunk Sewer (NSTS) Environmental Assessment Worksheet, Scott Co., MN

MHS Referral File Number: S-641
(PLEASE REFER TO THIS NUMBER IN ALL FUTURE CORRESPONDENCE)

Thank you for the opportunity to review and comment on the above project. It has been reviewed pursuant to responsibilities given the State Historic Preservation Officer by the National Historic Preservation Act of 1966 and the Procedures of the National Advisory Council on Historic Preservation (36CFR800).

A careful review of our files has turned up no information about archaeological resources in the area. We are also not aware of any archaeological surveys having been conducted in the area. On the basis of several systematic surveys conducted in central Minnesota, it appears that archaeological sites are found with the greatest density on the shores of lakes, usually within 1000 feet of the shoreline. In the case of the project at hand, the probability that an archaeological site exists somewhere in the planning area approaches 100 percent. Whether the projected construction will affect any archaeological sites is more difficult to assess, but it seems likely. Consequently we would recommend archaeological surveys in the area of projected construction.

Such a survey would determine the existence of any sites, their eligibility to the National Register, and the specific effects on them from the proposed activity. I have enclosed for your reference a list of archaeological consultants who have indicated an interest in performing such surveys. The archaeologist hired will need a map of the project area and an explanation of the kind of development proposed. Upon the completion of the survey and before work on the project begins, a copy of the survey results should be submitted to this office for final review.

I should add, however, that if you are aware of any extensive alterations to the project area and feel that the need for a survey should be reevaluated, you should not hesitate to contact Ted Lofstrom, Environmental Assessment Officer, State Historic Preservation Office, Fort Snelling History Center, Fort Snelling, St. Paul, Minnesota 55111; phone 612-726-1171 with that information.

Thank you for your participation in this important effort to preserve Minnesota's cultural resources.

Sincerely,

Russell W. Fridley
State Historic Preservation Officer

Encl.

MINNESOTA HISTORICAL SOCIETY
FOUNDED IN 1849
690 Cedar Street, St. Paul, Minnesota 55101 • (612) 296-6126

May 22, 1984

Mr. Larry J. Anderson
City of Prior Lake
4629 Dakota Street S.E.
P.O. Box 359
Prior Lake, Minnesota 55372

Dear Mr. Anderson:

RE: Archaeological Report
North and South Shore Sewer and
Water Project
Prior Lake, MN

MHS Referral File Number: S-641

Thank you for sending us the preliminary report of the findings of the archaeological survey for the above-referenced project. It is possible on the basis of this report and discussions with the consulting archaeologist to conclude that this project will not affect one confirmed archaeological site and one suspected mound group which were identified by the survey.

Consequently, we do not believe that construction of this project will affect any significant historical or archaeological resources.

Thank you for your continued close attention to historic values in your planning process.

Sincerely,

for Russell W. Fridley
State Historic Preservation Officer

cc: Eric Kilberg
Minnesota Pollution Control Agency
1935 West Co. Rd. B2
Roseville, MN 55113-2785

MINNESOTA HISTORICAL SOCIETY
FOUNDED IN 1849
690 Cedar Street, St. Paul, Minnesota 55101 • (612) 296-6126

13 September 1984

Mr. Eric J. Kilberg
Project Manager
Office of Planning & Review
Minnesota Pollution Control Agency
1935 West County Road B2
Roseville, Minnesota 55113-2785

Dear Mr. Kilberg:

RE: Prior Lake North Shore Trunk Sewer
Environmental Impact Statement
Prior Lake, MN

MHS Referral File Number: S-641

We have received and reviewed the two additional alternate routes proposed for the Prior Lake North Shore Trunk Sewer project. With the exception of those areas which each shares with the original proposal, neither route impacts areas of known or suspected archaeological sites or historic structures. Consequently both alternate routes would have no effect on properties listed on or eligible for listing on the National Register of Historic Places.

If you have any questions, please feel free to contact Ted Lofstrom, Environmental Assessment Officer, Fort Snelling History Center, St. Paul, MN 55111.

Thank you for your continued close attention to historic values in your planning process.

Sincerely,

Russell W. Fridley
State Historic Preservation Officer

RWF/fr