MINNESOTA PUBLIC UTILITIES COMMISSION

Environmental Assessment Supplement to the Pipeline Routing Permit Application

MinnCan Project
Minnesota Pipe Line Company

January 5, 2006 (Revised)

PUC DOCKET NO. PL5/PPL-05-2003

ENVIRONMENTAL ASSESSMENT SUPPLEMENT TO THE PUC ROUTING PERMIT APPLICATION

MinnCan Project
Minnesota Pipe Line Company

TABLE OF CONTENTS

Environmental Assessment Supplement to the Pipeline Routing Permit Application

MinnCan Project

List of Tables

List of Figures

List of Appendices

1.0 INTRODUCTION

This Environmental Assessment Supplement was prepared in support of Minnesota Pipe Line Company's (MPL's) Application to the Minnesota Public Utilities Commission (PUC) for a Pipeline Routing Permit (Application). This document provides a description of the existing environment along the proposed pipeline route, an analysis of human and environmental impacts that may result from construction and operation of the pipeline, and an identification of protection and restoration measures to be implemented to avoid and minimize environmental impacts. It has been prepared in accordance with the PUC's Pipeline Routing rules (Chapter 4415) and expands on information provided in the following four sections of the Application:

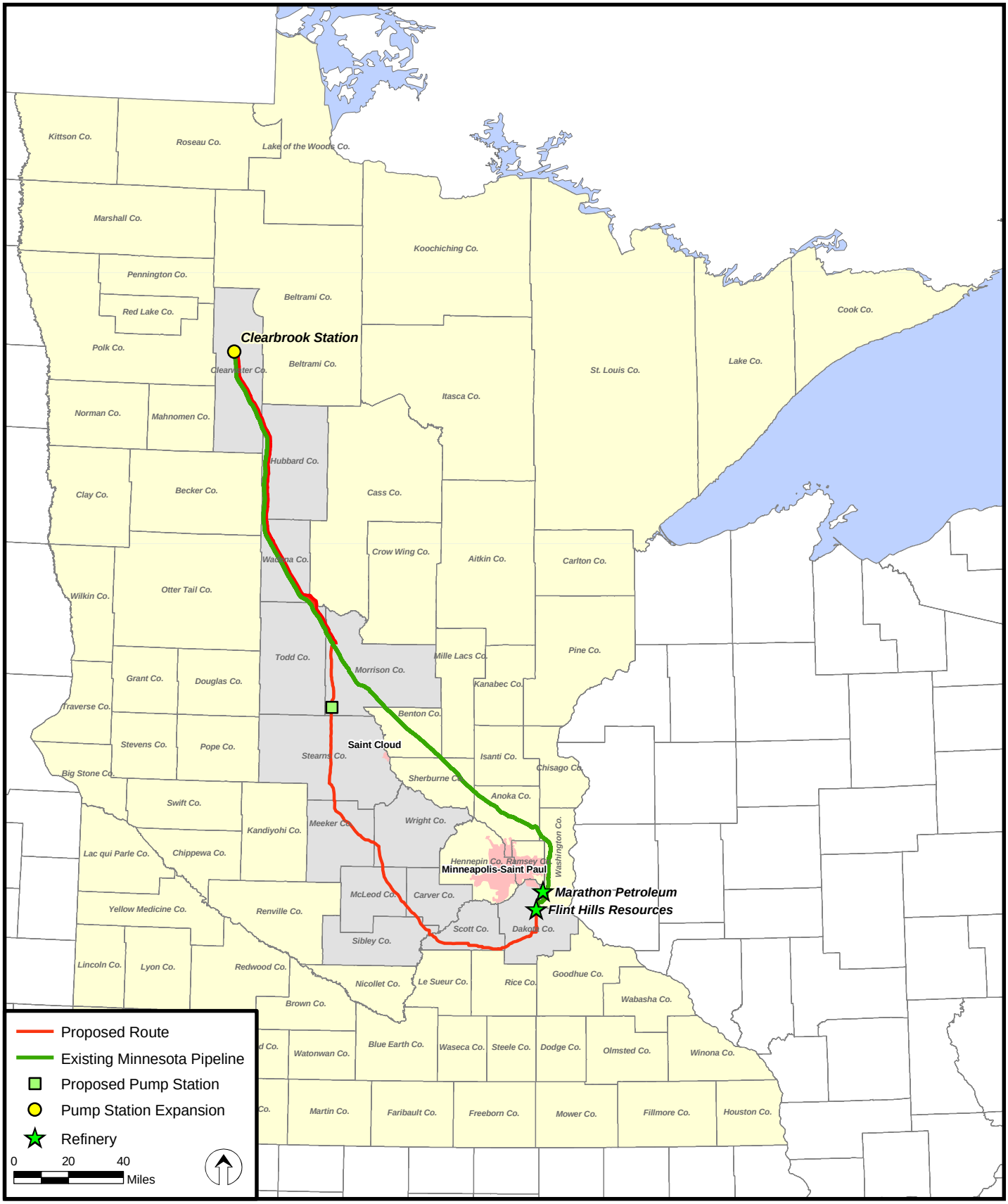
- 4415.0140 Location of Preferred Route and Description of Environment
- 4415.0145 Environmental Impact of Preferred Route
- 4415.0150 Right-of-Way Protection and Restoration Measures
- 4415.0170 Evidence of Consideration of Alternative Routes

1.1 PROJECT DESCRIPTION AND NEED

MPL is proposing to expand and increase the capacity of its existing crude oil pipeline system in Minnesota. This expansion, referred to as the MinnCan Project, will interconnect with existing MPL storage facilities in Clearbrook and at a delivery point south of the Twin Cities near Rosemount. The Rosemount terminus will provide a direct interconnection with the Flint Hills Resources refinery and a direct interconnection through existing pipeline facilities with the Marathon Petroleum Company St. Paul Park refinery (Figure 1). The pipeline expansion will provide additional supplies of Canadian crude oil to Minnesota; augment existing regional transportation systems; and provide a competitive and secure supply of crude oil to the Minnesota refineries. The additional crude oil supplies will enable the refineries to increase their processing capacities to meet regional demands for gasoline, diesel fuel, jet fuel, asphalt, and other petroleum products (*e.g.*, propane, petroleum coke).

The MinnCan Project will involve the construction and operation of the following:

- Approximately 295 miles of 24-inch diameter underground petroleum pipeline extending from MPL's Clearbrook Station in Clearbrook (Milepost (MP) 0) to the Flint Hills Resources refinery near Rosemount (MP 294.6);



MINNCAN PROJECT

Figure 1
Proposed Pipeline Route

DATE: 12/10/05
REVISED: 01/03/06
SCALE: 1:3,125,000
DRAWN BY:RSMcGREGOR

NATURAL RESOURCE GROUP, INC.

M:\Clients\J-L\KPL\Central_MN_ArcGIS\PUC_RA_Sup_F01_Proposed.mxd

- Two pump stations consisting of an originating station located inside of MPL's Clearbrook Station in Clearwater County and a mid-point pump station located in Morrison County near Upsala, Minnesota;
- Other aboveground facilities at the Clearbrook Station and at the Flint Hills Resources refinery, including pipeline and metering facilities and traps for launching and receiving pigs; and
- Mainline valves at major waterbody crossings and over the length of the pipeline route.

Approximately 119 miles of the proposed pipeline, from Clearbrook (MP 0) to Cushing (MP 119.3), will be constructed mostly adjacent to existing pipelines within MPL's multiple line rights easements. The remaining about 176 miles of the proposed pipeline, from Cushing (MP 119.3) to the Flint Hills Resources refinery (MP 294.6), will be constructed along a "greenfield route" (a new route that does not parallel existing pipelines). The pipeline will cross portions of Clearwater, Hubbard, Wadena, Todd, Morrison, Stearns, Meeker, Wright, McLeod, Carver, Sibley, Scott, and Dakota Counties (see Table 1). Pipeline route maps are provided in the Application.

TABLE 1
Length of Pipeline in Each County Crossed by the Proposed Pipeline Route

County	Mileposts	Length (Miles)
Clearwater	0.0 – 31.3	31.3
Hubbard	31.3 – 64.5	33.2
Wadena	64.5 – 101.9	37.4
Todd	101.9 – 113.6	11.7
Morrison	113.6 – 146.1	32.5
Stearns	146.1 – 177.7	31.7
Meeker	177.7 – 200.7	23.0
Wright	200.7 – 210.6	9.9
McLeod	210.6 – 227.9	17.3
Carver	227.9 – 233.6	5.6
Sibley	233.6 – 242.5	8.9
Scott	242.5 – 272.4	30.0
Dakota	272.4 – 294.6	22.1
Total		294.6

1.2 LAND REQUIREMENTS

Construction Right-of-Way

Adjacent to MPL's existing pipelines, from MP 0 to 119.3, construction of the proposed pipeline generally will require a 100-foot-wide construction right-of-way to allow for temporary storage of topsoil and spoil and to accommodate safe operation of construction equipment. The spoil side (*i.e*., the topsoil and spoil stockpile area) typically will be 35 feet wide and located mostly within the existing maintained pipeline right-of-way. The working side *(i.*e., the equipment work area and travel lane) typically will be 65 feet wide and generally located outside the existing maintained pipeline right-of-way. Construction of the new pipeline will expand MPL's existing

maintained right-of-way from about 65 to 70 feet to about 100 feet in width. Figure 2 depicts the typical construction right-of-way in areas adjacent to the existing pipeline.

Along the new corridor from MP 119.3 to 294.6, construction of the pipeline generally also will require a 100-foot-wide corridor, consisting of a 40-foot-wide area on the spoil side and a 60-foot-wide area on the working side. After construction, a 50-foot-wide permanent right-of-way will be retained for operation and maintenance of the new pipeline. Figure 3 depicts the typical construction right-of-way in areas along the greenfield route.

Temporary Extra Workspaces

Additional temporary workspaces are anticipated to be needed at other locations where the project will cross features such as waterbodies, roads, railroads, sideslopes, and other special circumstances. These temporary extra workspaces are construction areas that are needed outside of the typical construction right-of-way to stage equipment and stockpile spoil material. Typical schematics showing the general locations and dimensions of the temporary extra workspaces are provided in Appendix A. Table 2 lists the typical dimensions of temporary extra workspaces that will be used for pipeline construction.

TABLE 2
Typical Dimensions of Temporary Extra Workspaces for the Proposed Pipeline

Feature	Dimensions On Each Side of Feature [a/]
Open-cut Road Crossings	100’ X 175’ and 50’ X 175’
Bored Road and Railroad Crossings	100’ X 175’ and 50’ X 175’
Foreign Pipeline and Utility Crossings	50’ X 100’ and 50’ X 100’
Pipeline Crossovers	~100’ X 100’
Waterbody Crossings >50' wide	100’ X 300’ and 50’ X 300’
Waterbody Crossings <50' wide	75’ X 200’ and 50’ X 200’
Horizontal Directionally Drilled Waterbody Crossings	50’ X 200’

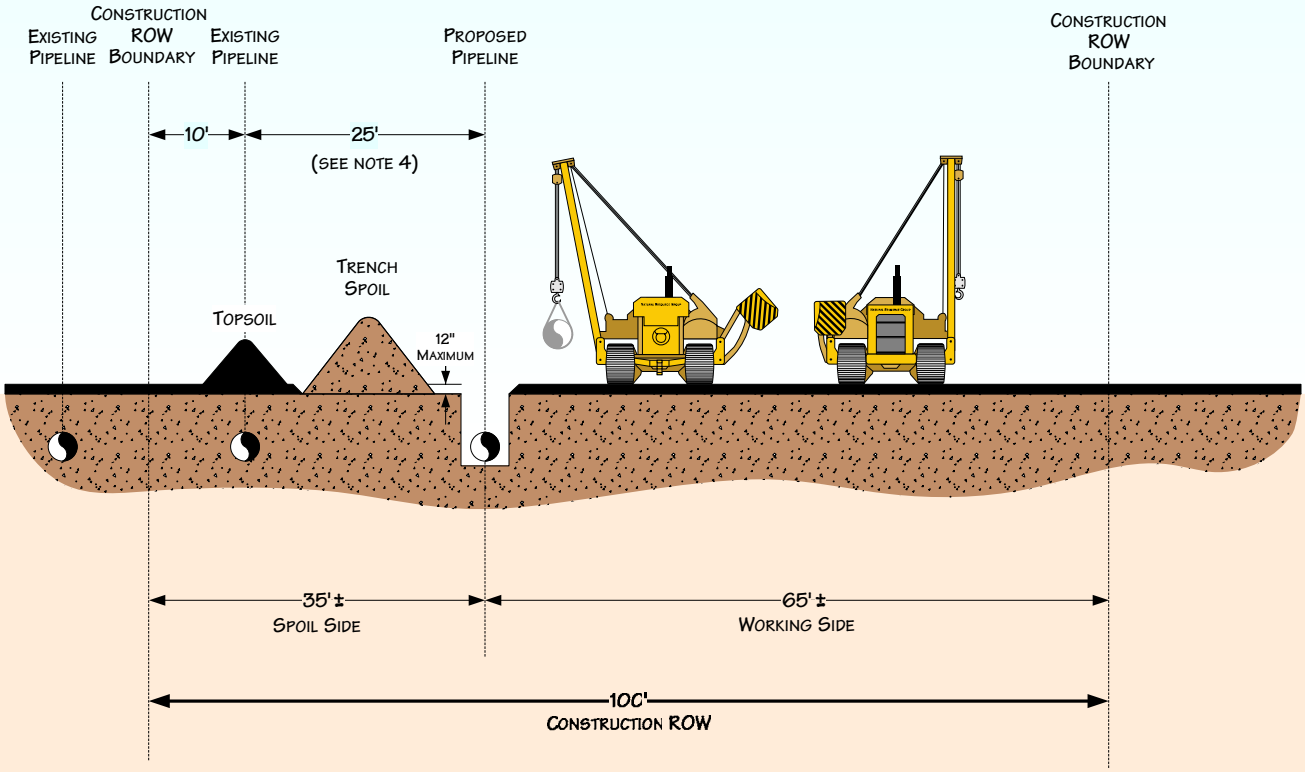
[a/] Areas are in addition to the 100-foot-wide construction right-of-way

Pipe/Material Storage Yards and Contractor Yards

During construction, MPL temporarily will use off right-of-way areas for pipe and materials storage. In addition, construction contractors will require off right-of-way areas to park equipment and stage construction activities. At this time, these pipe/material yards and contractor yards have not been identified.

Access Roads

Public roads typically will be used to gain access to the construction right-of-way. In areas where public roads are limited, existing privately owned roads may be used to provide access to the construction right-of-way. If neither public nor privately owned roads are available, MPL may need to construct new access roads. Use of private access roads and construction of any new access roads will require obtaining landowner permission prior to use. No private or new access roads have been identified at this time.



PROFILE

NOTES:

1. Construction right-of-way will typically not exceed 100' in width. Additional temporary workspace will be necessary at major road, railroad, waterbody crossings, sideslopes, and other special circumstances as required (See Additional Typical Crossing Sketches).
2. This drawing reflects "Trench plus Spoil Side" topsoil procedure, which will be used in active cropland and residential areas and other areas at landowner's request. In pasture land, topsoil will be stripped from the trench area.
3. Topsoil will be stockpiled separately from trench spoil as shown or in other configuration approved by the Environmental Inspector.
4. The offset from active pipeline, where applicable, will be 25' for most locations but may be increased or decreased depending on the site specific construction requirements (e.g., 35' in wetlands).
5. The depth of cover over the pipe will be similar to the adjacent pipelines (approximately 3').
6. No soil stripping or equipment will be allowed over existing pipelines.

For environmental review purposes only.

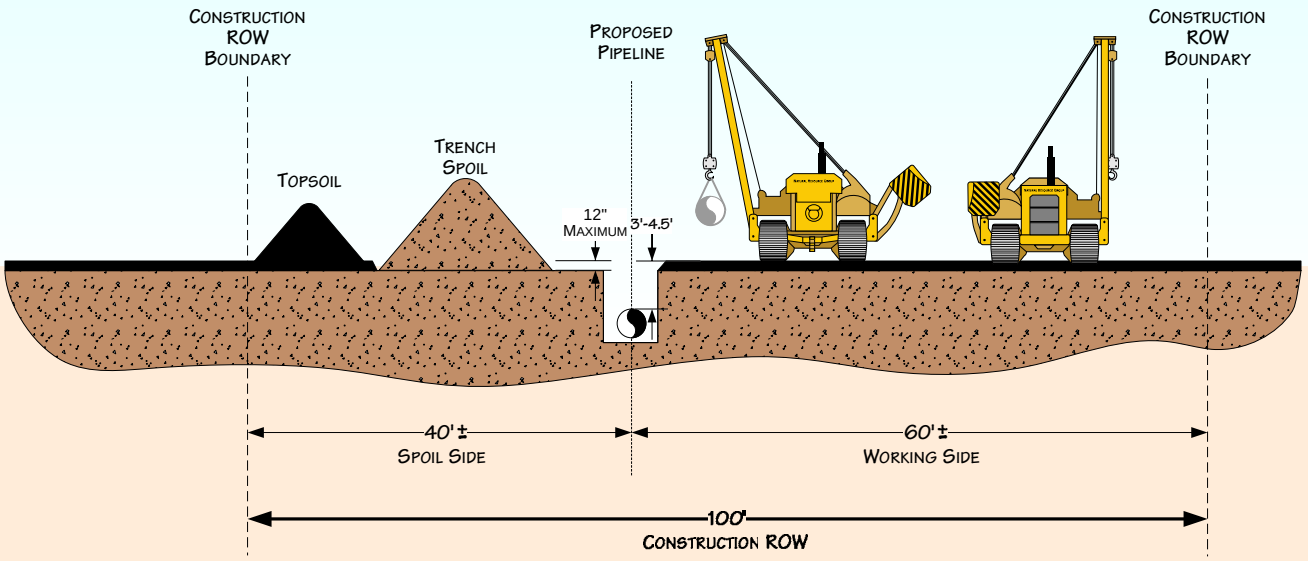
MINNCAN PROJECT

Figure 2
Typical Construction ROW
Adjacent to Existing Pipeline

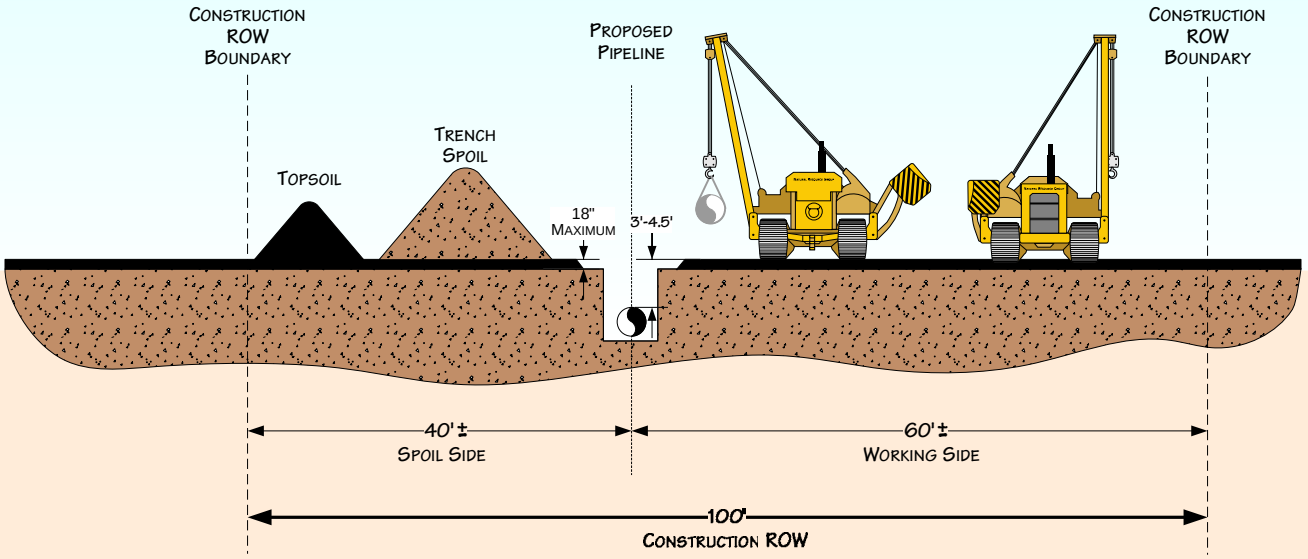
DATE:	11/2/2005
REVISED:	11/21/2005
SCALE:	NTS
DRAWN BY:	KJAnderson

K:\524\2004-558\50\ROW_DRAWINGS.VSD

MP 119 to Approximate Midpoint of Pipeline Route



Approximate Midpoint to End of Pipeline Route



PROFILE

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY NOT EXCEED 100' IN WIDTH, CONSISTING OF 50' OF PERMANENT RIGHT-OF-WAY AND UP TO 50' OF TEMPORARY CONSTRUCTION RIGHT-OF-WAY. ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT MAJOR ROAD, RAILROADS, WATERBODY CROSSINGS, SIDESLOPES AND OTHER SPECIAL CIRCUMSTANCES AS REQUIRED (SEE ADDITIONAL TYPICAL CROSSING SKETCHES).
2. THE TOP DRAWING REFLECTS "TRENCH PLUS SPOIL SIDE" TOPSOIL STRIPPING PROCEDURE WITH A MAXIMUM TOPSOIL STRIPPING DEPTH OF 12", WHICH WILL BE USED IN ACTIVE CROPLAND AND OTHER AREAS AT LANDOWNER'S REQUEST FROM ABOUT MP 119 TO THE APPROXIMATE MIDPOINT OF THE PIPELINE ROUTE. ALONG THIS PORTION OF THE ROUTE, TOPSOIL WILL BE STRIPPED TO MAXIMUM DEPTH OF 12" FROM THE "TRENCH ONLY" IN PASTURE LAND.
3. THE BOTTOM DRAWING REFLECTS "TRENCH ONLY" TOPSOIL STRIPPING PROCEDURE WITH A MAXIMUM TOPSOIL STRIPPING DEPTH OF 18", WHICH WILL BE USED IN ACTIVE CROPLAND, PASTURE LAND, AND OTHER AREAS AT LANDOWNER'S REQUEST FROM THE APPROXIMATE MIDPOINT TO THE END OF THE PIPELINE ROUTE.
4. TOPSOIL WILL BE STOCKPILED SEPARATELY FROM TRENCH SPOIL AS SHOWN OR IN OTHER CONFIGURATION APPROVED BY THE ENVIRONMENTAL INSPECTOR.
5. DEPTH OF COVER IS ASSUMED TO BE 4.5' IN AGRICULTURAL LAND AND 3' IN NON-AGRICULTURAL LAND.

For environmental review purposes only.

MINNCAN PROJECT

Figure 3
Typical Construction ROW
Areas Along Greenfield Route

DATE:	7/21/2004
REVISED:	1/26/2006
SCALE:	NTS
DRAWN BY:	KJA3361

K:\524\ROW\FIGURE 2A_W2.VSD

Aboveground Facilities

Associated aboveground facilities for the MinnCan Project will include two pump stations and aboveground facilities at the Clearbrook Station and the Flint Hills Resources refinery. The originating pump station will be located inside of MPL's Clearbrook Station in Clearwater County. The mid-point pump station will be located in Morrison County near Upsala, Minnesota.

Major equipment and facilities at each pump station site will consist of:

- Three to four single or two stage centrifugal pumps, each driven by 2,000 to 3,500 horsepower electric motors;
- A building to house the electrical switchgear and controls for the station;
- High voltage and low voltage transformers for power to the station;
- Manifold piping, valves, and sump;
- Satellite dish for communications; and
- Perimeter fence and camera for security.

Other than electrical power, the stations will not require additional utilities. The mid-point facility will not be manned and access gates will be locked for security. The operations at both facilities will be under 24 hours-per-day, 7-days-per week surveillance from MPL's Pipeline Control Center in Wichita, Kansas.

In addition to these two pump stations, new aboveground facilities also will be needed at the Clearbrook Station and at the Flint Hills Resources refinery. Facilities other than the pump station planned for the Clearbrook Station include:

- Piping facilities and centrifugal pumps to tie into existing storage tanks;
- Metering facilities;
- Communications and electric equipment to support these facilities; and
- A trap for launching pigs.

Facilities planned for the Flint Hills Resources refinery include:

- Custody transfer metering system and sampling system;
- Building to house metering and sampling system; and
- A trap for receiving pigs.

The location of the mid-point station preliminarily has been identified between MPs 140 and 146. The actual location of this station will be determined based on the ability to secure sufficient property for the site within an area determined by hydraulic modeling of the pipeline. Criteria for selecting an appropriate site include availability of electrical power, access to public

roads, and distance from adjacent residences. The facilities at pump stations typically cover approximately 1 to 2 acres.

Because the proposed facilities at the Clearbrook Station and Flint Hills Resources refinery will be sited within the existing properties of these facilities, no additional land will be acquired for the proposed facilities. The actual locations within the existing facilities will be determined during the detailed design and engineering phase of the project.

The project also will include the placement of mainline valves along the pipeline and on either side of the major river crossings (*i.e*., crossings greater than 100 feet across measured from high water mark to high water mark). A fenced area at each valve will be provided for security purposes. The valves and fenced areas will be located within the permanent right-of-way and may include an access road from the nearest public roadway.

1.3 TYPICAL CONSTRUCTION SEQUENCE

This section provides a general overview of the typical construction sequence for a pipeline. The associated aboveground facilities will be constructed concurrently with the pipeline toward the end of the construction period. Because the aboveground facilities, except the mid-point pump station, will be constructed within the construction right-of-way or existing facilities, the construction activities related to these facilities primarily will be limited to previously disturbed or developed areas.

Figure 4 shows the typical steps of cross-country pipeline construction. Standard pipeline construction proceeds in the manner of an outdoor assembly line composed of specific activities that make up the linear construction sequence. These operations collectively include survey and staking of the right-of-way, clearing and grading, topsoil stripping, pipe stringing and bending, welding and coating, trenching, lowering-in and backfilling, hydrostatic testing, cleanup, and restoration and revegetation.

Survey and Staking

Before construction, MPL crews will survey and stake the centerline and exterior boundaries of the construction right-of-way. The exterior boundary stakes will mark the limit of approved disturbance areas, which will be maintained throughout the construction period. The Gopher State One Call system will be contacted to identify and mark the locations of underground utilities. During this period, equipment involved in pipeline construction will be moved onto the right-of-way using existing roads for access wherever practicable.

Clearing and Grading

MPL will clear the 100-foot-wide construction right-of-way and temporary extra workspaces of shrubs and trees. In the absence of other agency regulations or the preferences of private landowners, trees will be stockpiled to the side or removed from the right-of-way before any soil disturbance activities to prevent soil mixing with cut timber. Landowners will be given the option to take custody of the timber which is cut down.

Following clearing, grading of the ground surface may be done to provide a relatively smooth working surface and a safe working area. Typically, a 10-foot-wide buffer will be left relatively undisturbed at waterbody crossings until immediately before the pipeline is installed across the waterbody.

1. Survey and Staking
2. Clearing
3. Front-End Grading
4. ROW Topsoil Stripping
5. Restaking Centerline of Trench
6. Stringing Pipe
7. Field Bending Pipe
8. Line-Up, Initial Weld
9. Fill & Cap, Final Weld
10. As-Built Footage
11. X-Ray Inspection, Weld Repair
12. Coating Field Welds
13a. Trenching (wheel ditcher)
13b. Trenching (backhoe)
13c. Trenching (rock)
14. Inspection & Repair of Coating
15. Lowering Pipe into Trench
16. As-Built Survey
17. Pad, Backfill, Rough Grade
18. Hydrostatic Testing, Final Tie-in
19. Replace Topsoil, Final Clean-Up, Full Restoration

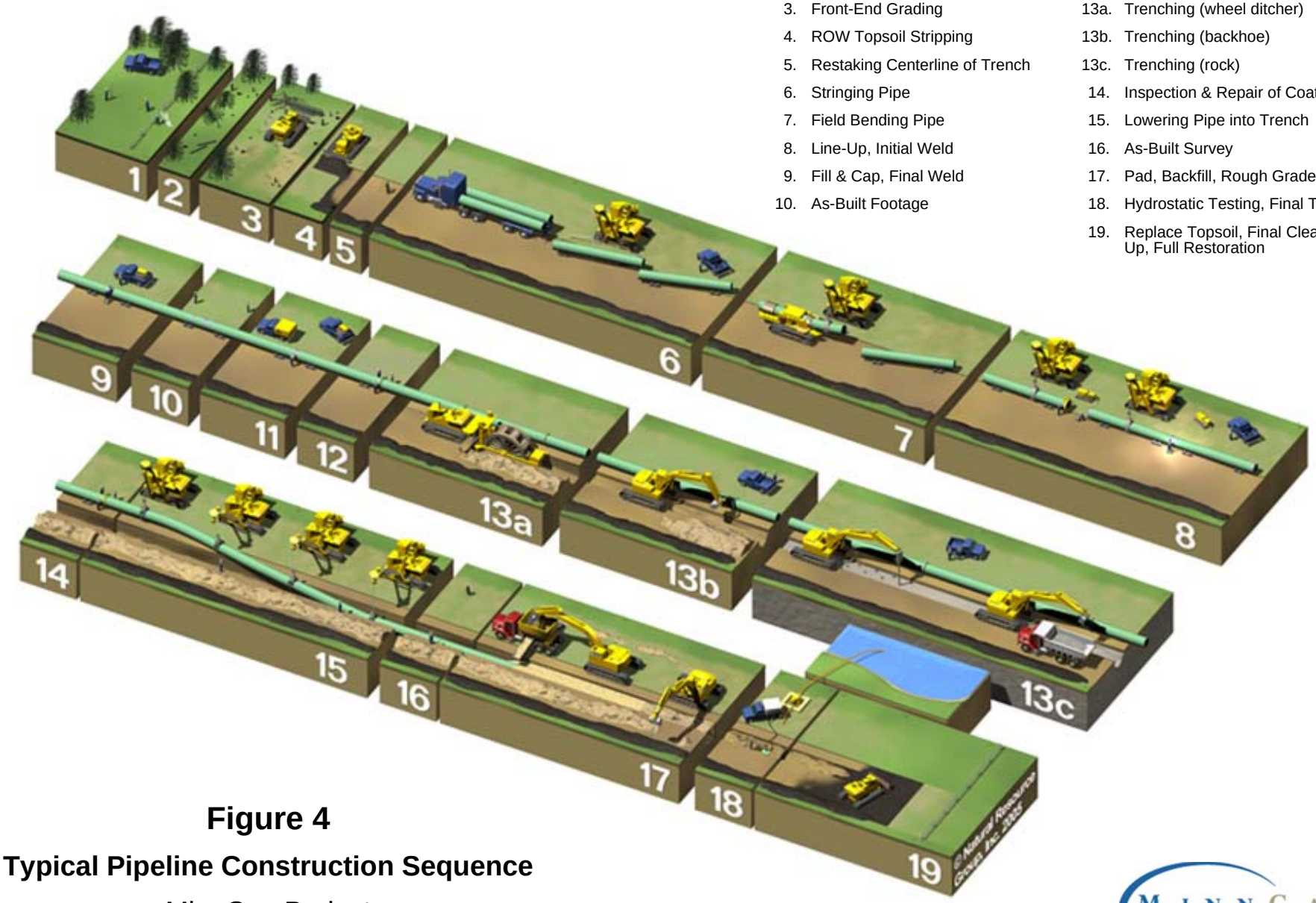


Figure 4

Typical Pipeline Construction Sequence

MinnCan Project

K:\67A\TYPICALS\PERSPECTIVES\MINNCANSTAGES.VSD

Following clearing and grading, temporary bridges will be installed at waterbodies along the pipeline route to provide temporary access for equipment traveling along the construction right-of-way. In addition, temporary erosion control measures will be installed in accordance with MPL's Upland Erosion Control, Revegetation, and Maintenance Plan (Erosion Control Plan; see Appendix B)

Topsoil Stripping

Topsoil will be stripped and segregated in agricultural areas along the pipeline route in accordance with MPL's Agricultural Impact Mitigation Plan (AIMP). In unsaturated wetlands, a maximum of 12 inches of surficial soils will also be stripped from the trench area.

Stringing and Bending

Before excavating the pipeline trench, individual joints of pipe will be strung along the construction right-of-way and arranged to be accessible to construction personnel. This operation typically requires specially designed stringing trucks to deliver pipe from the pipe yard to the right-of-way. Small portable cranes and/or side-boom tractors are used to unload the stringing trucks and place the pipe along the right-of-way. A mechanical pipe-bending machine will bend individual joints of pipe to the desired angle to accommodate changes in the natural ground contour or pipeline alignment. In certain areas, prefabricated fittings will be used where field bending is not practicable.

Welding and Coating

After stringing and bending are complete, pipe sections will be aligned, welded together, and placed on temporary supports along the edge of the trench. MPL will inspect the welds, both visually and radiographically. The pipe is typically delivered with a factory coating of fusion-bonded epoxy or similar material to prevent corrosion. MPL will apply coating at welded joints and will electronically inspect the pipeline coating before the pipe is lowered in the trench

Trenching

Backhoes and/or ditching machines will be used to excavate a trench approximately 5 to 6.5 feet deep. The trench walls will generally be kept vertical to the extent practicable and the trench typically will be 3 feet wide. In unstable and saturated soils, the trench could be wider.

Where trench dewatering is needed, water will be discharged directly to the ground if there is adequate vegetation along the right-of-way to filter the water effectively. Where vegetation is sparse or absent, or in environmentally sensitive areas (*e.g.*, adjacent to streams or wetlands), straw bale dewatering structures or suitable filtering alternatives will be used to minimize siltation in adjacent waterbodies.

Lowering-in and Backfilling

After welding and coating are completed and the trench is excavated, the pipe will be lowered into the trench by side-boom tractors. Bladed equipment or a specially designed backfilling machine will be used to backfill the trench to the approximate ground surface elevation. Construction debris, including wooden supports, welding rods, containers, brush, trees, or refuse of any kind, will not be permitted in the backfill. If an excessive amount of rocks are present in the backfill, the pipeline will be protected with rock shield or similar protective coating and/or backfilled with clean padding prior to backfilling with the rocky material.

Hydrostatic Testing

After backfilling, MPL will hydrostatically test the pipeline in accordance with the regulations of the Office of Pipeline Safety (OPS) within the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) to ensure that the system is capable of operating at the design pressure. The testing process will involve filling a segment of the pipeline with water and maintaining a prescribed pressure for a specified amount of time.

The length of individual test segments will be determined by topography and water availability. Water withdrawals used to fill and test the pipeline will be consistent with state regulations and MPL's Wetland and Waterbody Construction and Mitigation Procedures (WWCMP; see Appendix D). MPL will obtain hydrostatic test water from major waterbodies crossed by the pipeline and/or municipal sources along the route. The test water will be discharged through energy dissipation devices to the ground surface or to a nearby waterbody. These discharges will be done in accordance with MPL's WWCMP and permits issued by state agencies.

Cleanup

After the backfilling is complete, MPL will regrade and restore work areas as nearly as practicable to the original contour of the land. Topsoil will be spread over areas from which it was originally removed. Permanent soil stabilization efforts primarily will consist of revegetation of the right-of-way. Fences removed to install the pipeline will be reconstructed across the right-of-way.

Disposal of timber, slash, and rock will be done in accordance with the desires of the landowner and consistent with local regulations and MPL's Erosion Control Plan (Appendix B). In the absence of other agency regulations or the preferences of private landowners, timber will be stockpiled along the edge of the right-of-way. Slash will be stockpiled on the edge of the right-of-way, chipped and spread across the right-of-way in upland areas, hauled offsite, or burned onsite in accordance with local regulations. Excess rock will be stockpiled onsite if requested by the landowner, or disposed of in an alternative, landowner-approved upland area or permitted landfill.

Restoration and Revegetation

Following installation and final cleanup of the pipeline, original grade and contours will be restored to the extent practicable and permanent erosion controls will be installed. Disturbed soils will be revegetated in accordance with MPL's Erosion Control Plan (Appendix B), other permit requirements, and site-specific landowner requests. Disturbed areas will be restored in accordance with landowner agreements.

1.4 ENVIRONMENTAL RESTORATION AND MITIGATION

MPL developed standardized erosion control and restoration measures to minimize potentially adverse environmental effects resulting from pipeline right-of-way preparation and construction activities, or from pipeline operation and maintenance; these measures are described in MPL's Erosion Control Plan (Appendix B) and WWCMP (Appendix D). MPL also developed standardized restoration measures to minimize or prevent impacts to agricultural lands; these measures are described in MPL's AIMP (Appendix C).

MPL will comply with applicable federal, state, and local rules and regulations and take appropriate precautions to protect against pollution of the environment. MPL will retain third-party Environmental Inspectors to verify that environmental protection measures, permit conditions, and other specifications are implemented appropriately by the contractor during project construction. Additionally, MPL will continue to take appropriate precautions to prevent pollution after construction is complete during operation and maintenance of the pipeline.

2.0 ROUTE SELECTION AND ALTERNATIVES ANALYSIS

MPL is proposing to construct 294.6 miles of 24-inch diameter underground crude oil pipeline from its existing Clearbrook Station near Clearbrook (MP 0) to the Flint Hills Resources refinery near Rosemount (MP 294.6). From MP 0 to 119.3, the new pipeline will parallel MPL's existing pipelines, except for a 7–mile reroute around the City of Staples; the remainder, from MP 119.3 to 294.6, will be built within a new corridor that trends west and south of the Twin Cities. In developing this route, referred to in this section as the preferred route, MPL studied a variety of alternatives for routing the proposed pipeline facilities. These alternatives consist of system alternatives, route alternatives, and route variations. MPL evaluated and compared several factors, including ability to meet project objectives, technical and economic feasibility, and potential environmental impacts for each alternative. The following sections describe MPL's process for selecting the preferred route and provide an analysis of the alternatives.

2.1 PROJECT OBJECTIVES

Over the next decade Canadian petroleum producers will expand significantly the production of oil sand reserves in Alberta and Saskatchewan. The MinnCan Project will expand the abilities of MPL to bring this Canadian crude oil into the Minnesota market and provide the region with greater capability and flexibility to meet the expanding local demand for gasoline, diesel fuel, jet fuel, asphalt, and other petroleum products. Because MPL's existing system into the Twin Cities area is at maximum capacity, it cannot accommodate the additional volumes of oil from Canada. The MinnCan Project will provide additional volumes of Canadian crude oil to the refineries in Minnesota, which will help meet a growing demand for fuels in the region. The new pipeline will supply the refineries with 60,000 to 165,000 barrels per day (bpd) of crude oil. These project objectives were used in the evaluation of system and route alternatives to determine whether the alternatives may be viable options for transporting the crude oil.

2.2 SYSTEM ALTERNATIVES

System alternatives are options to the proposed action that would make use of other existing or proposed pipeline or transportation systems to meet the stated objectives of the project. MPL evaluated three system alternatives:

- Expanding MPL's pipeline system by completing loops along the existing route;
- Trucking crude oil supplies from Clearbrook to the Minnesota refineries; and
- Utilizing existing or proposed pipeline facilities to supply crude oil to the Minnesota refineries.

2.2.1 Expanding Existing MPL Facilities

The existing MPL system consists of two 257-mile-long 16-inch-diameter pipelines from Clearbrook to the Twin Cities and a third 16-inch-diameter pipeline comprised of eight discrete segments called loops. The loops are parallel to the other two pipelines for a total of about 166 miles. MPL evaluated the feasibility of completing or connecting the eight loops as an alternative to the MinnCan Project. Several factors, however, combined to eliminate this option as a viable or reasonable alternative. First and foremost, the alternative would increase the throughput capacity of the existing pipeline by only 40,000 bpd; therefore, it would not achieve MPL's goal of 60,000 to 165,000 bpd. Second, construction along MPL's existing route in

Anoka, Washington, and Dakota Counties would not be practical both economically and technologically due to residential and commercial encroachment on the existing pipelines. Construction of this alternative would be in close proximity to numerous residences, would be disruptive to the residents' daily activities, and likely would result in significant public opposition to the project. This could result in delays in the permitting schedule, and extend the expected in-service date. Third, the cost of the alternative would range from $80 million to $120 million for the additional capacity. This equates to $2,000 to $3,000 of capital investment per barrel/day versus $1,800 of capital investment per barrel/day for the MinnCan Project. And finally, power consumption (*i.e.*, electrical power to operate pump stations) would be several times higher for the additional volume on a per barrel basis than the MinnCan Project.

2.2.2 Trucking

As an alternative to the MinnCan Project, MPL potentially could transport additional crude oil supplies from its existing Clearbrook Station to the Minnesota refineries southeast of the Twin Cities by truck. This alternative, however, is characterized by higher public safety and environmental risk, unreasonable logistical feasibility, and higher incremental cost. Accident data consistently demonstrate that pipelines are the safest form of transportation for bulk liquids, including crude oil. The safety risk is magnified significantly by the logistics created by increased truck traffic on Minnesota highways. A typical truck transport carries approximately 150 barrels (bbls) of heavy crude oil. Truck frequency for 100,000 bpd on a per annum basis would require 28 trucks per hour, 24 hours per day, 7 days per week. Each truck would make a 600-mile, 12-hour roundtrip journey from Clearbrook to the Twin Cities refineries and back. The trucks primarily would utilize Highway 10 in northern Minnesota and Interstate 694/494 around the Twin Cities; these highways already are among the most heavily congested roadways in the state. Collectively, the alternative would add 147,168,000 miles per year of additional truck traffic to Minnesota highways, and the trucks would consume approximately 29,433,600 gallons of fuel per year. Finally, the estimated trucking cost of $4.00/bbl (or approximately $146,000,000 per year) is greater than existing alternatives, which is the primary reason trucking currently is not used to supply crude oil to the Twin Cities refineries. The safety and environmental risks, logistical requirements, and high cost eliminate the trucking option as a viable alternative.

2.2.3 Existing or Proposed Pipeline Facilities

MPL evaluated the feasibility of using existing or proposed pipeline systems as alternatives, and concluded that these systems would not achieve project objectives. Only one existing pipeline system, in addition to the MPL system, supplies crude oil to the Twin Cities refineries. Koch Pipeline Company (KPL) operates a pipeline, the Wood River Pipeline, which delivers Gulf Coast crude oil from a hub in the St. Louis area to the refineries in Minnesota. This system currently provides the additional capacity needs of the refineries beyond what is supplied by the MPL system. Several market conditions, however, make continuing this option less attractive to the refiners than the MinnCan Project. The cost for crude oil and its transportation is more expensive using the KPL system. Additionally, supplies are not as reliable due to a combination of unpredictable weather conditions in the Gulf Coast region and declining available capacity in the existing systems that supply KPL. In contrast, the MinnCan Project will provide the Minnesota refiners with a more reliable and cost-effective source of crude oil. Finally, because the current capacity on the KPL pipeline will not meet the supply needs of the Minnesota refiners, this pipeline system would need to be expanded by adding more pump stations and hundreds of miles of new pipe in Missouri, Iowa, and Minnesota. The expanded system would result in environmental impacts in these states.

MPL also evaluated two proposed pipelines as alternatives to the MinnCan Project. Enbridge Energy Company (Enbridge) and TransCanada both have announced plans to expand capacity to transport Canadian crude oil to the St. Louis area. Minnesota refiners have determined that these projects are less advantageous than the MinnCan Project because they would not meet the refiners' immediate crude oil needs, would not provide a direct connection to the area refineries, and would be more expensive. Additionally, crude oil supplied by the Enbridge or TransCanada projects would need to be shipped to the Twin Cities from the St. Louis area via the existing KPL system. As noted above, this pipeline system would need to be expanded to meet the supply needs of the Twin Cities refiners. The Enbridge and TransCanada proposals also are less advantageous to the State of Minnesota for the above described reasons and because the projects would not create in-state construction jobs or tax revenues. Finally, because the projects are in the planning stages, there are uncertainties whether the projects eventually will be permitted and constructed.

2.3 ROUTE ALTERNATIVES

MPL identified and evaluated several options for routing its project. These studies were designed to define a preferred route that achieves project objectives, is technologically and economically feasible to construct, and minimizes impacts on landowners and the environment. The following sections provide a general discussion of the route selection process, an analysis of the various route alternatives evaluated for the project, and a detailed comparison of major route alternatives.

2.3.1 Initial Route Selection Process

Early in the planning stages for its project, MPL conducted a preliminary analysis of potential routing options for the MinnCan Project. This initial analysis assumed that the new pipeline would be constructed between MPL's terminal facilities in Clearbrook County and an interconnection with KPL's Wood River pipeline system in either southern Dakota or Rice County (as opposed to an interconnect at the Flint Hills Resources refinery). The original interconnect on the KPL pipeline was selected to provide the option for reversing the flow on the Wood River pipeline and transporting crude oil south to St. Louis area refiners. MPL has since decided not to pursue this option as part of the MinnCan Project.

During the initial route studies, MPL determined that the new pipeline should parallel its existing system through Clearbrook, Hubbard, Wadena, Todd, and Morrison or Benton Counties, and then follow a new corridor to the south and west of the Twin Cities metropolitan area (metro area) to the KPL interconnect. Although the existing MPL system continues to the southeast, passing east of the metro area, MPL rejected following the entirety of this corridor for two reasons. First, MPL concluded that residential and commercial encroachment on its existing pipelines in Anoka, Dakota, and Washington Counties would preclude additional expansion of this corridor. Second, because MPL identified its southern terminus as the KPL interconnect in southern Dakota or Rice Counties, a new corridor west of the metro area potentially would provide a more direct route for the new pipeline. For these reasons, MPL's initial analysis of routing options focused on greenfield routes trending west and south of the metro area.

The first step in the route selection process consisted of collecting publicly available environmental data to identify routing constraints. The sources of data consisted primarily of Geographic Information Systems (GIS) digital information layers, including U.S. Geological Survey (USGS) topographic maps; USGS land use database; U.S. Department of Agriculture (USDA) Farm Services Agency 2003 and 2005 color aerial photography; National Wetlands

Inventory (NWI) maps; Minnesota Department of Natural Resources (MDNR) county biological survey maps; MDNR Natural Heritage Information System database; Minnesota Department of Transportation (MDOT) highway maps; USDA state soil geographic (STATSCO and SSURGO) databases; and other natural feature databases obtained from the "data deli" on the MDNR website. MPL also consulted with the MDNR to identify other environmental routing constraints that may not be included in these publicly available data.

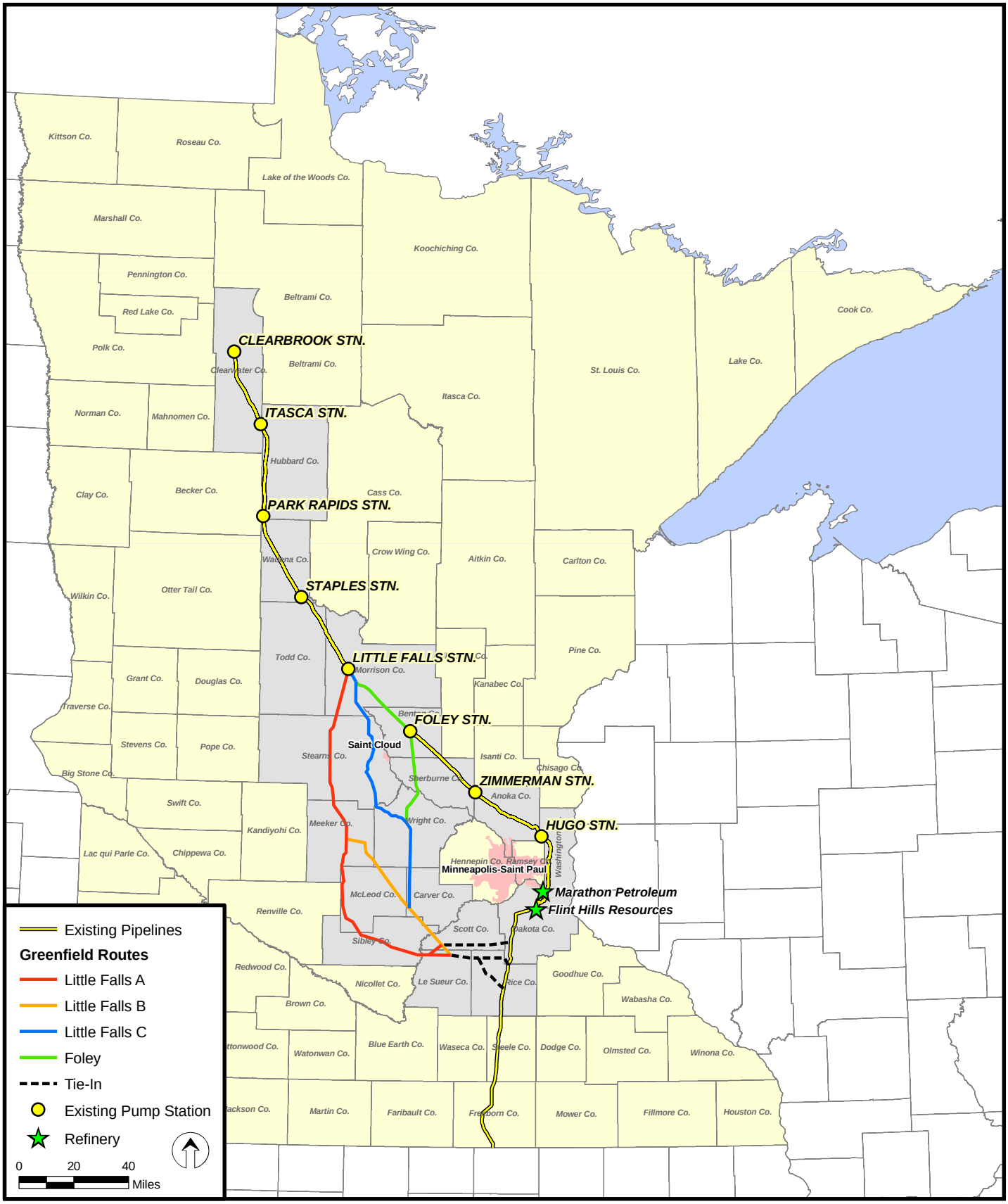
The next step involved mapping selected layers of the collected GIS data on 1:100,000 scale USGS topographic maps to identify the locations of environmental constraints within the study area. Existing major utility corridors also were identified for potential use in co-location. After constraint mapping was completed, four primary corridors were identified. Within each, MPL defined a potential route on the basis of topography and avoidance of sensitive resources such as residential areas, federal and state-managed lands, designated recreational and wildlife management areas, and areas supporting significant, sensitive, or critical habitat. MPL also identified three possible interconnections with KPL's Wood River Pipeline in southern Dakota and Rice Counties. The four routes (referred to as the Little Falls A, Little Falls B, Little Falls C, and Foley Routes) and the three interconnections with the Wood River Pipeline are shown on Figure 5.

MPL conducted a quantitative analysis of potential environmental impacts associated with constructing each route. Some of the factors examined in this analysis were: length of the route, public lands, unique biological lands, NWI-mapped wetlands, forest and agricultural land, residential and commercial areas, and waterbody and highway crossings. This analysis identified no significant differences in the potential environmental impacts associated with each route.

MPL subsequently conducted a field review to evaluate and compare each route. The field review was conducted using a helicopter to fly over each route, followed by on-the-ground reconnaissance via public roads. The purpose of the field review was to confirm the information obtained during the preliminary analyses and to identify and evaluate issues not possible to determine through a desktop review. These primarily consisted of constructability issues (*e.g.*, impassable terrain, existing utility corridors, stream, river, and large wetland crossings), and review of actual versus desktop conditions (*e.g.*, new house construction, landfill sites).

Based on the field review and the existing information collected on each route, MPL narrowed the field of alternatives to two routes: the Little Falls B and Foley Routes (Figure 6). The Little Falls A Route was eliminated because it was significantly longer and did not provide any clear environmental advantages over the selected routes. The Little Falls C Route was eliminated primarily due to existing and future residential and commercial development constraints west of St. Cloud as well as waterbody and unique biological area constraints further south of the St. Cloud area.

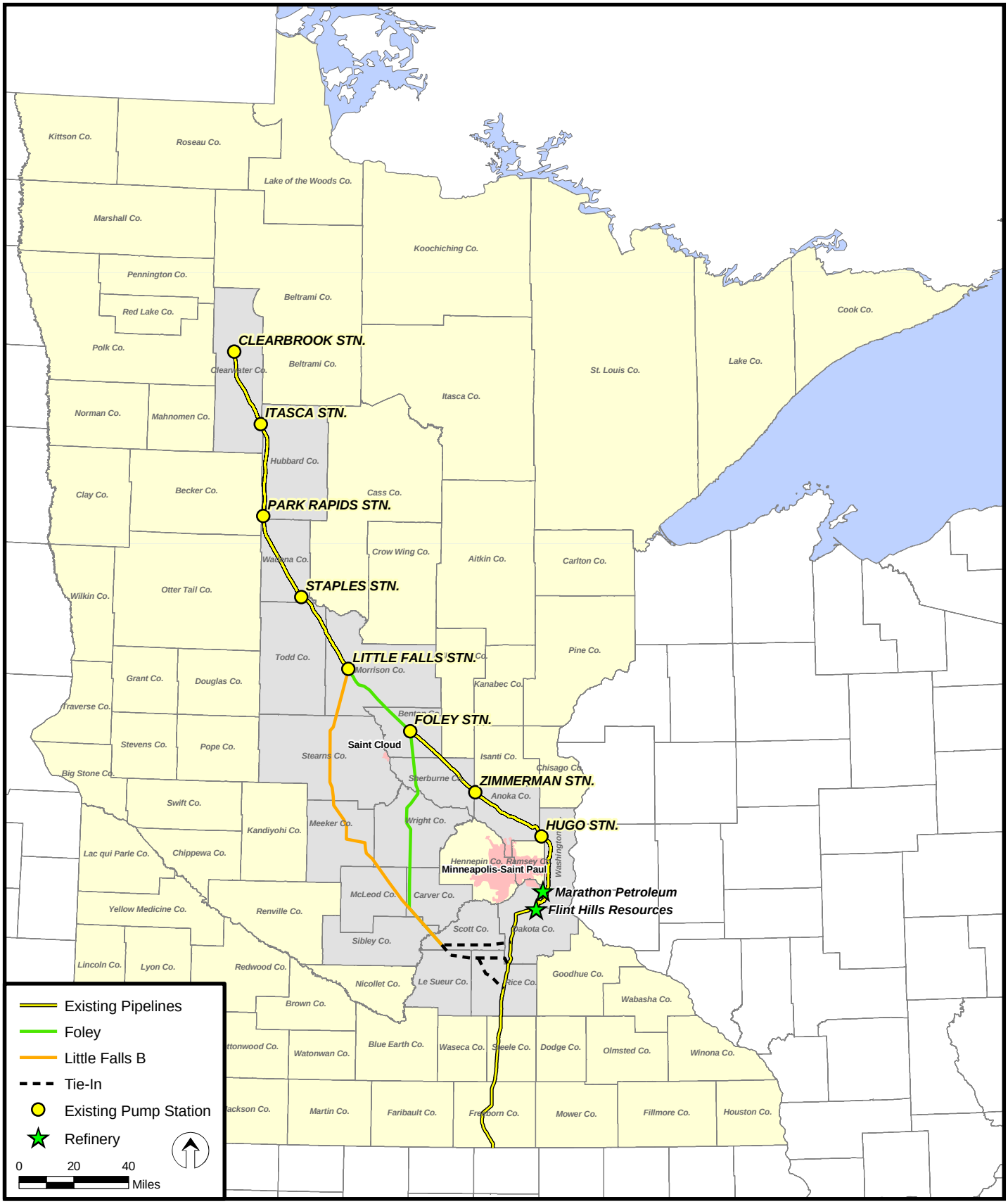
MPL further refined the Little Falls B and Foley Routes to avoid wetlands and forest lands to the extent practicable and to avoid residences and farmsteads. Few differences in cumulative environmental impacts were identified between the refined routes. The major difference was that the Foley Route followed MPL's existing pipelines for an additional 45 miles and thus utilized less greenfield right-of-way than the Little Falls B Route. Other differences, however, suggested that construction along the Foley Route would be infeasible or impractical. Existing and future residential development along this route, particularly in Sherburne and Wright Counties, was identified as a major routing constraint. Additionally, the route would



MINNCAN PROJECT

Figure 5
Greenfield Route Alternatives

DATE: 12/09/05
REVISED: 12/09/05
SCALE: 1:3,125,000
DRAWN BY:RSMcGREGOR
M:\Clients\J-L\KPL\Central_MN_ArcGIS\PUC_RA_Sup_F05_Altroutes.mxd



MINNCAN PROJECT

Figure 6
Little Falls B and Foley Route Alternatives

DATE: 12/09/05
REVISED: 12/09/05
SCALE: 1:3,125,000
DRAWN BY:RSMcGREGOR
M:\Clients\J-L\KPL\Central_MN_ArcGIS\PUC_RA_Sup_F06_LFB_Foley.mxd

affect more forest land and would cross the Mississippi River at two locations. Although the Little Falls B Route would affect more agricultural lands, it was identified as the preferred alternative because it presented fewer overall construction and environmental constraints than the Foley Route.

2.3.2 Refined Route Selection Process

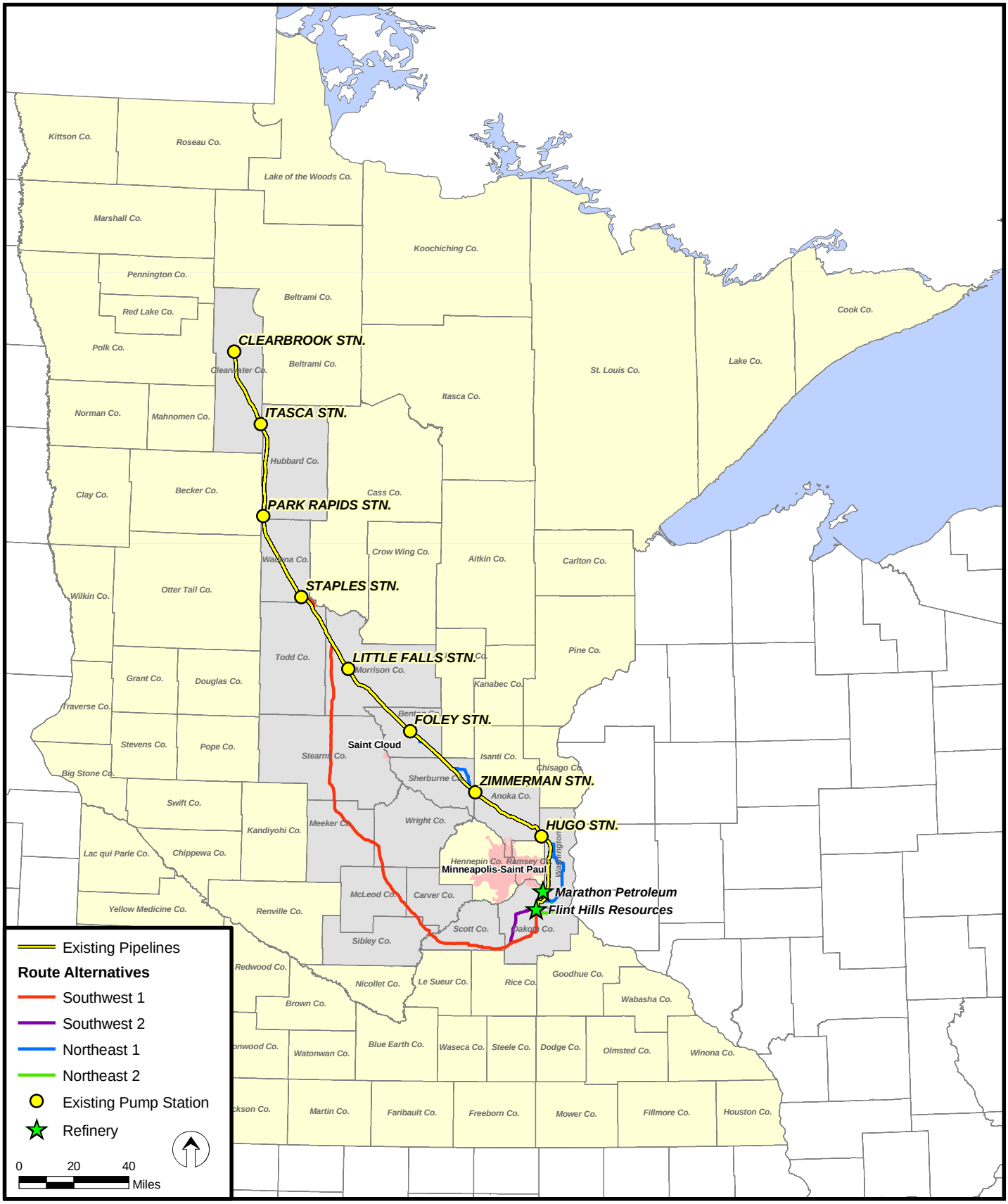
Following the selection of the Little Falls B Route as the primary greenfield option, MPL changed the southern terminus of the pipeline from the interconnect with the Wood River Pipeline in southern Dakota or Rice Counties to an existing delivery point within the Flint Hills Resources refinery in northern Dakota County. This change required a reconsideration of routing options for the project. Because the southern terminus was moved much closer to the Minnesota refineries, a route following the existing MPL system along its entire corridor potentially would provide a more direct route from the Clearbrook Station than a greenfield option to the west and south of the Twin Cities. MPL recognized that residential and commercial encroachment on the existing corridor remained a serious constraint to construction, but the overall reduced length of the corridor (up to 40 miles compared to a greenfield option) suggested that this route could potentially result in less environmental impacts and significant cost savings.

MPL subsequently revised its analysis of routing options for the project. This analysis compared a greenfield option west of the Twin Cities with an option that follows the existing MPL system. The greenfield option utilized the Little Falls B Route from the Clearbrook Station through Scott County, but new route variations were identified to allow for the interconnect at the Flint Hills Resources refinery. The existing route option followed the existing pipelines from the Clearbrook Station to the refinery, with route variations identified to circumvent areas with the densest residential and commercial developments along the existing corridor. The routing alternatives and variations for both the greenfield and existing route options were compared using the publicly available environmental and land use data described in Section 2.3.1.

Two routes, referred to here as the Southwest 1 and Southwest 2 Routes, were defined for the greenfield option. Both follow the Little Falls B Route from Clearbrook through Scott County, and then diverge along eastern and western routes in Dakota County to the Flint Hills Resources refinery. The western route (Southwest 2) follows an existing KPL pipeline to the refinery and the eastern route (Southwest 1) eventually follows an electric transmission line to the refinery. Three routes, referred to here as the Existing Pipeline, Northeast 1, and Northeast 2 Routes, were defined for the existing route option. The Existing Pipeline Route follows the MPL system along its entire length. The Northeast 1 and 2 Routes also follow the MPL system, but route variations were added in Benton, Sherburne, Washington, and Dakota Counties to avoid densely developed areas. Additionally, the Northeast 1 and Northeast 2 Routes diverged along eastern and western paths in Washington and Dakota Counties to the Flint Hills Resources refinery. MPL defined these five routes (Southwest 1, Southwest 2, Existing Pipeline, Northeast 1, and Northeast 2) as its major route alternatives; each of these routes is depicted on Figure 7.

2.3.3 Comparison of Major Route Alternatives

MPL conducted a detailed quantitative analysis of environmental impacts along each major route alternative. This analysis used the same sources of publicly available environmental data described in Section 2.3.1, supplemented by field reviews. The analysis primarily focused on



MINNCAN PROJECT

Figure 7
Major Route Alternatives

DATE: 12/09/05
REVISED: 12/09/05
SCALE: 1:3,125,000
DRAWN BY:RSMcGREGOR
M:\Clients\J-L\KPL\Central_MN_ArcGIS\2005\08\Overview_Figure6.mxd

land use issues and wetland and waterbody crossings. In total, MPL identified and compared a variety of factors for each route, including total length, intermittent waterbodies, perennial waterbodies, railroads, roads, interstates and highways, NWI-mapped wetlands, NWI-mapped forested wetlands, center pivot irrigation systems, forest land, agricultural land, developed land, open land, state/federal lands, number of individual land parcels, and residential development areas. The results of this comparative analysis are summarized in Table 3.

TABLE 3
Summary of Environmental, Agricultural, and Land Use Data for the Major Route Alternatives

	Units	Existing Route	Northeast Alternative #1	Northeast Alternative #2	Southwest Alternative #1 (Preferred Route)	Southwest Alternative #2
Total Length	miles	257.3	269.8	273.1	294.6	294.1
Perennial Waterbodies Crossed	number	64	65	65	64	66
Intermittent Waterbodies Crossed	number	104	107	107	119	113
Perennial Streams 0-20 feet in Width[a/]	number	38	36	38	36	35
Perennial Streams >20 feet in Width[a/]	number	26	29	27	28	31
Railroads Crossed	number	14	10	10	12	14
Roads Crossed	number	398	369	373	308	335
Interstates and State Highways Crossed[b/]	number	31	32	33	31	30
Total NWI-mapped Wetlands Crossed	number (miles)	543 (36.9)	538 (35.5)	536 (35.6)	513 (32.6)	510 (32.3)
NWI-mapped Forested Wetlands Crossed[c/]	number (miles)	46 (5.0)	45 (4.1)	45 (5.1)	39 (2.8)	40 (2.8)
Center Pivot Irrigation Systems Crossed	number (miles)	25 (8.6)	25 (8.5)	27 (9.2)	21 (8.0)	17 (6.2)
Forest Land Crossed[d/]	miles	54	54	52	46	45
Agricultural Land Crossed[d/]	miles	143	162	168	211	203
Developed Areas Crossed[d/]	miles	15	10	10	1	9
Open Land Crossed[d/]	miles	9	8	7	2	4
State/Federal Lands Crossed	miles	11.8	12.3	12.4	4.2	4.2
Parcels Crossed	number	1,740	1,624	1,583	1,388	1,593
Residential Development Areas Crossed[e/]	miles	11.8	8	7.2	0	5.4

[a/] Subset of Perennial Waterbodies Crossed. Crossing width at proposed crossing location.

[b/] Interstate and State Highways Crossed are a subset of Roads Crossed.

[c/] NWI Forested Wetlands are a subset of NWI-mapped Wetlands.

[d/] Open land use classification does not include wetlands. Agricultural lands include pasture. Data based upon satellite imagery taken in the early 1990's and classified by the USGS in 1999. Landuse for metro area (Washington and Dakota Counties) based upon 2003 and 2005 aerial photographs. Forested impacts along the existing routes include areas currently maintained as right-of-way by Minnesota Pipe Line.

[e/] Residential Development Areas determined with 2003 aerial photography.

MPL identified several substantive differences between the greenfield and existing route options. All three existing route alternatives are significantly shorter than the greenfield alternatives. The existing route alternatives would affect more forest lands, open lands, and residential/commercial lands, but less agricultural lands. The greenfield alternatives would cross more waterbodies, but fewer miles of wetland areas. A similar number of railroads would be crossed by both options, but the existing route options would cross significantly more roads.

Finally, the existing route options would cross significantly more state and federal lands, including a major crossing of the Sherburne National Wildlife Refuge.

The most significant differences identified between the greenfield and existing route alternatives consisted of total length, residential/commercial lands affected, and agricultural lands affected. The Existing Pipeline Route, at 257 miles in length, is the shortest of the five alternatives; the Northeast 1 and 2 Routes are approximately 270 miles long, while the Southwest 1 and 2 Routes are about 295 miles long. Construction of the existing route alternatives would result in less land disturbance overall because of the shorter length of these routes.

Despite the reduced land disturbance, however, the higher proportion of residential and commercial lands along the existing route alternatives is a significant obstacle to pipeline construction. Approximately 15 miles of developed lands (residential and commercial) would be crossed by construction along the Existing Pipeline Route. Even with the variations designed to avoid the most congested areas, construction of the Northeast 1 or 2 Routes both would cross 10 miles of developed lands. In contrast, the Southwest 1 and 2 Routes would cross 1 and 9 miles of developed lands, respectively. Similarly, construction along the existing route alternatives would affect significantly more individual land parcels and residential development areas than the greenfield alternatives. The existing route alternatives would cross between about 1,600 and 1,700 parcels and between 7.2 and 11.8 miles of residential development areas; the greenfield alternatives would cross between about 1,400 and 1,600 parcels and between 0 and 5.4 miles of residential development areas.

The data on residential and commercial lands indicates that construction along any of the existing route alternatives would not be practical. Construction through these areas would affect a higher proportion of landowners and potentially conflict with existing land uses. Consequently, construction of these existing route alternatives likely would result in significant public opposition to the project, which could ultimately result in delays to the construction schedule as well as increased costs for right-of-way acquisition and/or litigation. In contrast, construction along either greenfield alternative would affect less residential and commercial lands and fewer total parcels, proportionately reducing impacts on landowners and developed areas.

Construction along the greenfield alternatives would affect more agricultural lands than construction along the other alternatives. The existing route alternatives would cross between 143 and 168 miles of agricultural lands, whereas the greenfield alternatives would cross between 203 and 211 miles. Because agricultural lands would be restored and returned to active production, however, impacts on these lands would be temporary and generally limited to the period of construction. MPL would minimize and mitigate impacts to agricultural lands by implementing the measures specified in its AIMP (Appendix C).

Collectively, MPL's data indicate that construction along a greenfield corridor is preferable to the existing route alternatives identified in this analysis. The existing routes are shorter, but impacts on residential and commercial lands and individual landowners would be much greater. Encroachment on the existing MPL pipelines precludes expansion of the existing right-of-way corridor in many areas, and variations designed to avoid the most congested areas are not practical. Despite a potential savings in cost, MPL concluded that constructing through the residential and commercial areas along the existing route alternatives simply is not feasible in some areas and not practical in others. Although the greenfield alternatives would affect more agricultural lands, impacts to these lands largely would be temporary and mitigated through implementation of measures described in the AIMP (Appendix C). Additionally, MPL concluded that impacts on wetlands and public lands would be less along the greenfield alternatives.

Based on this analysis, MPL eliminated the Existing Pipeline, Northeast 1, and Northeast 2 Routes as viable alternatives.

2.3.4 Identification and Refinement of the Preferred Route

Having selected the greenfield option as the preferred alternative, MPL compared potential environmental effects associated with constructing along the Southwest 1 and 2 Routes (Table 3). These two alternatives follow the same route to about Interstate 35. After crossing Interstate 35, the Southwest 2 Route follows the existing KPL pipeline through Lakeville and Apple Valley to the refinery. After crossing the interstate, the Southwest 1 Route traverses south of Farmington to an intersection with an existing power line located west of U.S. Highway 52, and then mostly follows this power line for about 7 miles to the refinery.

Both routes are approximately 295 miles in length, and both would cross similar or equal numbers of wetlands and waterbodies, forest and open lands, roads and railroads, and public lands. The most significant differences between these routes consist of the proportion of developed and agricultural lands along the two routes. Construction along the Southwest 1 Route would cross 1 mile of developed lands; in contrast, construction along the Southwest 2 Route would cross 9 miles of developed lands in and around Lakeville and Apple Valley. Construction along the Southwest 1 Route, however, would cross approximately 8 more miles of agricultural lands.

Because the Southwest 1 Route would have the least impact on residential and commercial lands and landowners, MPL selected this alternative as its preferred route (Figure 1). MPL subsequently refined this route to further minimize impacts on landowners and the environment. These refinements included minor route variations to reduce the number of individual land parcels crossed, to minimize the number of waterbodies and wetlands crossed, and to avoid planned developments to the extent practicable. This final preferred route mostly avoids developed lands and lands that may be developed in the foreseeable future. A more detailed analysis of potential environmental affects associated with this route (hereafter referred to as the proposed pipeline route, proposed route, or pipeline route) is presented in the remainder of this document.

3.0 SOCIOECONOMICS

Construction and operation of the MinnCan Project will result in both temporary and long-term socioeconomic impacts in the counties crossed by the project. During construction, there will be temporary increases in local population, demand for short-term housing, use of transportation systems, and expenditures in local economies for goods and services. Construction also will result in temporary impacts to agricultural and timber production. Long-term impacts associated with the project include payment of local property and/or ad valorem taxes and the creation of both permanent and temporary jobs for pipeline operation and maintenance activities.

This section provides a description of existing socioeconomic conditions in the counties along the pipeline corridor and an analysis of temporary and long-term impacts on those conditions.

3.1 EXISTING SOCIOECONOMIC CONDITIONS

MPL reviewed 2004 U.S. Census Bureau and 2005 Minnesota Department of Employment and Economic Development LAUS data to gather information on existing socioeconomic conditions in the 13 counties to be affected by the project. The following paragraphs provide discussions on current population levels and density, per capita income, workforce, unemployment rates, and manufacturing in these counties. Data on existing conditions also are summarized in Table 4.

County population levels within the project area range from a low of 8,437 persons in Clearwater County to a high of 379,058 persons in Dakota County. In general, population levels are lowest in the northern counties (Clearwater, Hubbard, Wadena, Todd, and Morrison) and highest in the southern counties (McLeod, Carver, Scott, and Dakota), particularly in the vicinity of the Twin Cities. Stearns County has a higher population than its neighboring counties (Morrison and Meeker) because it contains the City of St. Cloud. In addition to having smaller populations, the northern counties also experienced slower growth rates in population than the southern counties between 2000 and 2004. Clearwater and Wadena Counties, for example, had growth rates of 0.2 and -0.8 percent, while Carver and Scott Counties had growth rates of 17.0 and 28.3 percent.

Population density (an indicator of extent of development) in the counties affected by the project averages 133.2 persons per square mile. This is higher than the statewide average of 64.1 and it largely results from higher population densities in the counties near the Twin Cities. The northern counties (Clearwater, Hubbard, Wadena, Todd, and Morrison) have the lowest population densities of the counties along the pipeline route with a combined average of 21.9 persons per square mile. Stearns, Meeker, Wright, McLeod, and Sibley Counties have moderately high population densities with a combined average of 80.9 persons per square mile. The counties within the Twin Cities metropolitan area (Carver, Scott, and Dakota) support the highest population densities with a combined average of 405.8 persons per square mile.

TABLE 4
Existing Socioeconomic Conditions in the Project Area

State County	2004 (est.) Population [a/]	2004 Population Density [a/]	2003 Per Capita Income [b/]	November 2005 Civilian Labor Force [c/]	November 2005 Unemployment Rate (percent)[c/]		2000 Top Employment Industries[b/]
Minnesota	5,100,958	64.1	$34,031	2,933,859	3.6	20.9%	Educational, health, and social services
						16.3%	Manufacturing
						11.9%	Retail Trade
Clearwater	8,437	8.5	$21,374	3,888	7.8	27.8%	Educational, health, and social services
						11.5%	Retail trade
						11.1%	Manufacturing
Hubbard	18,849	20.4	$23,514	9,075	5.3	23.6%	Educational, health, and social services
						13.0%	Retail trade
						12.2%	Manufacturing
Wadena	13,603	25.4	$21,244	6,634	6.2	24.8%	Educational, health, and social services
						15.8%	Manufacturing
						12.4%	Retail trade
Todd	24,647	26.2	$20,810	12,634	4.5	24.1%	Manufacturing
						19.2%	Educational, health, and social services
						10.7%	Retail trade
Morrison	32,689	29.1	$22,479	18,093	4.2	20.8%	Educational, health, and social services
						18.1%	Manufacturing
						11.6%	Retail trade
Stearns	141,055	104.9	$27,399	81,895	3.4	22.7%	Educational, health, and social services
						17.0%	Manufacturing
						16.1%	Retail trade
Meeker	23,277	38.3	$24,808	12,001	3.9	28.0%	Manufacturing
						19.8%	Educational, health, and social services
						10.4%	Retail trade
Wright	106,889	161.8	$29,039	60,209	3.4	20.6%	Manufacturing
						17.4%	Educational, health, and social services
						12.5%	Retail trade
McLeod	36,190	73.6	$27,779	19,646	3.6	32.9%	Manufacturing
						16.6%	Educational, health, and social services
						11.2%	Retail trade
Carver	82,122	230.0	$40,807	46,462	2.8	20.5%	Manufacturing
						16.7%	Educational, health, and social services
						11.6%	Professional, scientific, management, administrative and waste management services

TABLE 4, cont'd.
Existing Socioeconomic Conditions in the Project Area

State County	2004 (est.) Population [a/]	2004 Population Density [a/]	2003 Per Capita Income [b/]	November 2005 Labor Force [b/]	November 2005 Unemployment Rate (percent)[b/]	2000 Top Employment Industries[/]	
Sibley	15,230	25.9	$23,922	7,758	4.0	27.3%	Manufacturing
						16.6%	Educational, health, and social services
						9.5%	Agriculture, forestry, fishing, hunting, and mining
						9.5%	Retail trade
Scott	114,794	321.8	$32,870	65,831	3.1	18.3%	Manufacturing
						14.8%	Educational, health, and social services
						11.8%	Retail trade
Dakota	379,058	665.5	$38,272	231,464	3.4	16.9%	Educational, health, and social services
						13.9%	Manufacturing
						11.7%	Retail trade

Sources: [a/] U.S Census Bureau, 2004
[b/] Northwest Area Foundation (NWAF) Indicator Website (www.indicators.nwaf.org), 2003
[c/] Minnesota Department of Employment and Economic Development, LAUS Data, (www.deed.state.mn.us/lmi/toold/laus.htm), November 2005.

The largest civilian labor forces are located in counties within or near the Twin Cities metropolitan area. Dakota County has the largest civilian labor force (231,464) in the project area; Scott and Wright Counties each have a labor force of approximately 60,000; and Carver County has a labor force of nearly 50,000. The civilian labor force in Stearns County also is high, with workers concentrated in and around St. Cloud. The northern counties have the lowest civilian labor forces in the project area, ranging from a high of about 18,000 in Morrison County to a low of about 4,000 in Clearwater County.

The November 2005 unemployment rate in the project area varied from 2.8 percent in Carver County to 7.8 percent in Clearwater County (compared to a statewide average of 3.6 percent). Per capita income in 2003 ranged from a low of $20,810 in Todd County to a high of $40,807 in Carver County. In general, per capita income is lowest in rural counties with low population densities and high unemployment rates, and highest in urban counties with high population densities and low unemployment rates.

Employment in the project area is concentrated in the manufacturing, education, health, social services, and retail trade industries. Education, health, and social services are the top employment industries in the northern counties, followed by manufacturing and retail trade. In the southern counties, including those in the Twin Cities metropolitan area, manufacturing is the dominant industry, followed by educational, health, and social services. Although not reflected in the census bureau data, agriculture is an important industry in the counties along the pipeline route; as discussed in more detail in Section 4.0, approximately 72 percent of the route crosses agricultural land.

In general, the pipeline route avoids population centers and residential areas. Nineteen municipalities are located within approximately 1 mile of the pipeline route (Table 5). The majority of these communities have populations of less than 1,000 persons. The largest communities are Staples, Belle Plaine, and Rosemount, with populations of 3,089, 4,218, and 17,997, respectively. Four communities, Staples, Eden Valley, Coates, and Rosemount, will be crossed by the proposed pipeline. In addition, the pipeline will be located in close proximity to Belle Plaine, Elko, Hamburg, and Albany.

TABLE 5
Municipalities within 1.0 Mile of the Pipeline Route

County City/Townships	Approximate Milepost	Population (2004)
Clearwater County		
City of Clearbrook	0	536
City of Bagley	11	1,212
Wadena County		
City of Menahga	68	1,220
City of Sebeka	76	710
Wadena/Todd Counties		
City of Staples*	99	3,089
Morrison County		
City of Flensburg	133	244
City of Upsala	144	412
Stearns County		
City of St. Anthony	152	84

TABLE 5, cont'd
Municipalities within 1.0 Mile of the Pipeline Route

County City/Townships	Approximate Milepost	Population (2004)
City of Albany	156	1,939
City of Roscoe	169	116 [a/]
Stearns/Meeker Counties		
City of Eden Valley*	177	898
Wright County		
City of Cokato	203	2,709
McLeod County		
City of Plato	228	326
Carver County		
City of Hamburg	232	534
Scott County		
City of Belle Plaine	244	4,218
City of New Market	268	824
City of Elko	269	525
Dakota County		
City of Coates*	292	30 [a/]
City of Rosemount*	295	17,997

* Cities/Townships, a portion of which will be crossed by the proposed pipeline route
[a/] Population, 2000
Source: U.S. Census Bureau, 2004
U.S. Census Bureau, 2000
www.city-data.com, 2005

3.2 SOCIOECONOMIC IMPACTS AND MITIGATION

3.2.1 Construction Schedule and Workforce

Construction of the project is scheduled to occur over an 8-month period, beginning in 2007, with an in-service date of early 2008. MPL anticipates that the total workforce over this period will be approximately 1,000 workers. Workers generally will be dispersed along the length of the construction corridor rather than concentrating at a single work site.

MPL, through its construction contractors and subcontractors, will attempt to hire local workers, where the local workforce possesses the required skills. Construction personnel hired from outside the project area will augment the local workforce and consist of supervisors, environmental inspectors, and highly skilled mechanical, electrical, and instrumentation/control tradesmen. Non-local workers will relocate to the project area for the duration of construction.

Local workers will commute from their residences to project work sites on a daily basis. Non-local workers will reside in the vicinity of the project for short periods and they will not typically be accompanied by family members. As a result, incremental demand from non-local workers for public services will be small.

Local communities will benefit from monies paid to construction workers, both local and non-local, throughout the construction period. Workers will spend a portion of their earnings locally

providing significant revenues to local communities. Both local and non-local workers will utilize hospitality services such as restaurants, grocery stores, and gasoline stations. Non-local workers will require temporary housing in addition to hospitality services. Additionally, the construction contractors and subcontractors will purchase some materials from local vendors, and lease land and equipment for temporary field offices and material storage areas.

Operation of the MinnCan Project will require MPL to hire up to four additional full-time employees. The new employees will be based locally at existing MPL facilities in Clearbrook, Little Falls, or Rosemount. The new permanent jobs will contribute to local economies through payroll taxes and by the use of services, such as hospitality services, retail vendors, and other businesses, by the new employees.

Local communities also will benefit from periodic employment created by pipeline operation and maintenance activities. Workers for these activities may be local or non-local. Communities will benefit from the monies spent by temporary workers on local hospitality services and temporary housing. Additionally, construction contractors or MPL employees may purchase materials from local vendors.

3.2.2 Housing

MPL does not expect that construction crews will encounter difficulties finding temporary housing in the project area. Local workers will commute from their residences. Non-local workers will utilize hotels, motels, and apartments or bring their own mobile housing units (such as travel trailers or campers) and stay at local campgrounds. Because workers generally will be dispersed along the length of the construction corridor, demands for temporary housing within local communities will be minimized.

As noted above, operation of the pipeline will create up to four new full-time positions. This number of people will have a negligible impact on housing demands in the affected communities.

3.2.3 Transportation

Short-term impacts on the transportation system may result from construction of the pipeline across roads and railroads, movement of construction equipment and material to work areas, and daily commuting of the construction workforce to work sites. These impacts are not expected to be significant.

MPL typically will construct the pipeline across paved roadways and railroads using road-boring equipment. This equipment installs the pipeline beneath the transportation corridor, thereby avoiding disruptions to vehicular or railcar movement and physical impacts to road/railroad beds. Unpaved roadways will be crossed by boring or by using the open-cut method. The latter method could temporarily disrupt road traffic as the pipe trench is excavated across the roadway. To minimize traffic delays at open-cut crossings, MPL will establish traffic detours before excavating the roadbed. If no reasonable detours are feasible, at least one traffic lane of the road will be maintained, except for brief periods when road closure is essential to lay the pipeline. MPL will minimize the duration of open-cut crossings and in most cases will complete these road crossings in one day or less. Additionally, MPL will attempt to avoid closing roads during peak traffic hours.

To maintain safe conditions, MPL will direct its construction contractors to adhere to local weight restrictions and limitations for its construction vehicles, and to remove soil that is left on the road surface by the crossing of construction equipment. In addition, when it is necessary for construction equipment to move across paved roads, mats, or other appropriate measures will be used to minimize damage to the road surface.

MPL anticipates that up to 16 truck loads per mile of pipeline will be needed on area roads to deliver the pipe along the pipeline route. Truck traffic associated with transporting this pipe as well as other construction-related travel associated with the project may increase the workload of local police due to monitoring of vehicle weight and width restrictions and/or assistance with traffic control. In addition, local police may need to assist with short-term detours at pipeline road crossings or delays in traffic flow from large, slow-moving vehicles. MPL does not anticipate that these project-related demands on local police forces will be significant.

The movement of construction personnel, equipment, and materials from contractor and pipe storage yards to the construction work area will result in additional short-term impacts on the local transportation system. Several construction-related trips will be made each day to and from the job site. This level of traffic will remain fairly constant throughout the construction period, and will typically peak during early morning and evening hours. MPL anticipates that road congestion will increase during these peak hours but will not significantly disrupt the normal flow of traffic in the project area.

Road congestion could be caused by construction workers commuting to and from work sites on a daily basis. Because pipeline construction generally is scheduled to take full advantage of daylight hours, most workers will commute during off-peak hours (*i.e*., early morning and evening). In addition, construction workers typically will leave their personal vehicles at contractor yards and share rides to work sites with other workers; this will help reduce road congestion in the vicinity of work sites. Finally, workers generally will be dispersed along the entire length of the construction corridor, as opposed to concentrating at a single work site, thereby reducing impacts on traffic at any one location.

As noted above, operation of the MinnCan Project will create up to four new permanent jobs. Given the small number of new employees, the additional traffic generated by these employees on a daily basis will not result in a significant increase in local traffic volume.

3.2.4 Loss of Agricultural and Timber Production

As indicated in Section 4.2, construction of the MinnCan Project will require the temporary use of approximately 2,868 acres of agricultural land, including hayfields and pasture. Landowners will be compensated for agricultural-related losses according to agreements negotiated between each landowner and MPL. Long-term effects on crop yields are not expected because MPL will use construction and restoration techniques designed to protect or restore soil productivity. These techniques are described in MPL's AIMP (Appendix C).

Construction also will result in the removal of approximately 508 acres of timber resources within the construction corridor. To mitigate for the impact of this loss, MPL will give the landowners the option to take custody of merchantable timber.

3.2.5 Tax Revenues

Long-term economic benefits associated with operation of the pipeline will include increased tax revenues at the state and county level in the form of property and/or ad valorem taxes. MPL estimates that the MinnCan Project will generate approximately $9 million in annual local tax revenues for the counties, depending on the number of pipeline miles within the county and the placement of pipeline-related facilities such as pump stations.

4.0 LAND USE

4.1 EXISTING LAND USE

Land use along the pipeline route was classified using the USGS Land Use and Land Cover Classification System. This system utilized satellite imagery taken in the early 1990s to classify land use into 21 categories. For the MinnCan Project, these USGS land use categories were combined into five general categories: open land, forest land, agricultural land, developed land, and wetland/open water based on prevalent land use and vegetation cover types. Land use along the pipeline route was classified by milepost into one of the five categories. Land use classifications also were verified using recent (2003 and 2005) aerial photographs. Definitions of the five land use categories are presented below.

- Forest Land consists of tracts of wooded upland and forested wetlands.

- Open Land consists of non-forested vacant land. It also includes the maintained right-of-way through forest lands along MPL's existing pipelines (*i.e*., from MP 0 to 119.3).

- Agricultural Land consists of pasture and actively cultivated fields.

- Developed Land consists of existing utility facilities, manufacturing or industrial facilities, commercial or retail facilities, and residential areas. This category also includes landscaped areas associated with residential or commercial developments.

- Wetland/Open Water consists of streams, rivers, and lakes, and emergent, scrub-shrub, and open riparian wetlands.

In addition to these land use categories, the pipeline route also crosses state, county, and local roadways. The land area at each road crossing, however, was included as part of the adjoining land use category. For example, a roadway through forest land was included within that category.

4.2 LAND USE AFFECTED BY PIPELINE CONSTRUCTION AND OPERATION

The proposed pipeline will be constructed using a 100-foot-wide construction right-of-way and temporary extra workspaces at feature crossings (*e.g*., roads, waterbodies, etc). For the 294.6-mile-long pipeline, construction of the project will affect approximately 4,000 acres of land. The predominant land use identified along the proposed route is agricultural land, which accounts for 2,868 acres (or 72 percent) of the total construction area. Of the agricultural land affected, approximately 61 percent (or 1,749 acres) is cultivated and the remaining 39 percent (or 1,119 acres) is pasture land. Other land uses, in descending order of prevalence, are forest land (508 acres or 13 percent), wetland/open water (469 acres or 12 percent), open land (144 acres or 4 percent), and developed land (12 acres or less than 1 percent). Table 6 summarizes land use categories by county within the planned construction corridor for the pipeline route.

TABLE 6
Land Use Categories Affected by Construction of the Project [a/]

County	Agricultural Land	Forest Land	Wetland/ Open Water	Open Land	Developed Land	Total
	Acres					
Clearwater County	175.9	117.9	57.8	65.6	0.5	417.7
Hubbard County	266.8	83.4	33.2	53.3	1.3	438.0
Wadena County	356.1	79.9	77.4	4.2	2.4	520.0
Todd County	64.0	57.3	35.1	1.0	0.2	157.6
Morrison County	268.0	74.5	73.8	16.6	0.8	433.7
Stearns County	365.5	9.9	54.3	0.0	1.8	431.5
Meeker County	288.1	11.0	20.7	0.0	0.8	320.6
Wright County	122.8	1.1	8.6	0.0	0.6	133.1
McLeod County	195.5	5.0	35.5	0.0	0.7	236.7
Carver County	70.4	4.8	4.0	0.0	0.7	79.9
Sibley County	96.3	6.1	18.7	0.0	0.0	121.1
Scott County	327.7	42.9	42.9	0.0	0.8	414.3
Dakota County	271.3	14.0	6.6	2.8	1.4	296.1
Total	2,868.4	507.8	468.6	143.5	12.0	4,000
Percent of Total	71.7%	12.7%	11.7%	3.6%	0.3%	

[a/] In addition to construction right-of-way, acreages include typical temporary extra workspace for road, railroad, and waterbody crossings. Other areas requiring temporary extra workspace (*e.g*, foreign utility crossings) have not been identified at the time of this application and are expected to be minor.

Where the pipeline route parallels MPL's existing pipeline corridor, an additional 35-foot-wide strip adjacent to the existing maintained corridor will be maintained permanently in an herbaceous state to facilitate inspection of the pipeline. Where the pipeline will be constructed in a new pipeline corridor, MPL will retain a 50-foot-wide permanent right-of-way, which will be maintained during operations. Right-of-way maintenance impacts on vegetation are further described in Section 7.1. Table 7 summarizes land use categories by county within the additional maintained corridor or new permanent right-of-way that will be affected by operation of the pipeline.

TABLE 7
Land Use Categories Affected by Operation of the Project

County	Agricultural Land	Forest Land	Wetland/ Open Water	Open Land	Developed Land	Total
	Acres					
Clearwater County	55.8	54.8	18.3	3.4	0.2	132.5
Hubbard County	85.9	39.6	10.6	4.4	0.4	140.9
Wadena County	114.0	26.6	24.4	0.4	0.9	166.3
Todd County	23.8	18.6	11.7	0.0	0.1	54.2
Morrison County	119.6	34.3	32.5	0.0	0.3	186.7
Stearns County	162.6	4.4	24.2	0.0	0.8	192.0
Meeker County	125.3	4.8	8.9	0.0	0.4	139.4
Wright County	55.2	0.5	3.8	0.0	0.2	59.7

TABLE 7, cont'd.
Land Use Categories Affected by Operation of the Project

County	Agricultural Land	Forest Land	Wetland/ Open Water	Open Land	Developed Land	Total
	Acres					
McLeod County	86.6	2.2	15.8	0.0	0.3	104.9
Carver County	30.2	2.0	1.7	0.0	0.3	34.2
Sibley County	42.9	2.7	8.3	0.0	0.0	53.9
Scott County	143.6	18.8	18.9	0.0	0.4	181.7
Dakota County	122.8	6.4	3.0	1.3	0.7	134.2
Total	1,168.3	215.7	182.1	9.5	5.0	1,581
Percent of Total	74.0%	13.6%	11.5%	0.6%	0.3%	

In addition to pipeline construction, MPL will construct a new mid-point pump station along the greenfield portion of the route. This new pump station will be located in Morrison County between MPs 140 and 146. The facilities of the pump station typically cover approximately 1 to 2 acres. MPL will attempt to locate the facility in an agricultural area to reduce potential impacts on wetlands or forested areas. The pump station will require 4,100-volt electricity and may require construction of a short transmission line to connect to an existing nearby electric transmission line. The other aboveground facilities (*e.g*., originating pump station, meter facilities) either will be sited within the maintained and permanent pipeline right-of-way or within the property area of existing facilities (*i.e*., Clearbrook Station, Flint Hills Resources refinery).

Approximately 112 miles of the 295-mile route will be installed adjacent to MPL's existing pipelines. The proposed pipeline route departs from the MPL right-of-way near the City of Staples (between MPs 98 and 105) and at about MP 119.3 in Morrison County. From MP 119.3 to MP 294.6, the proposed pipeline generally follows a greenfield route and will not be located adjacent to other existing rights-of-way with two exceptions: 1) between MPs 286.0 and 287.4 and MPs 288.2 and 293.8 in Dakota County, the proposed route parallels an existing electric transmission line right-of-way; and 2) the proposed route parallels about 6.7 miles of existing road rights-of-ways located primarily in Scott and Dakota Counties. MPL currently does not anticipate that the proposed construction right-of-way will overlap these existing power line or road rights-of-way.

4.2.1 Ownership Status of Lands Crossed by the Pipeline

As shown on Table 8, the pipeline route predominantly crosses private lands located outside of municipal areas (274.2 miles, or approximately 93 percent of the route). The route also crosses federal (1.0 mile), state (3.2 miles), and county (11.1 miles) lands, and incorporated areas (5.1 miles). Federal lands crossed by the route consist of two National Waterfowl Production Areas. State lands crossed by the route include parcels within the Mississippi Headwaters State Forest, the Villard Wildlife Management Area, and the Glacial Lakes and Luce Line State Trails. County lands consist of county-managed forest lands. Incorporated areas crossed by the pipeline consist of Staples, Eden Valley, Coates, and Rosemount. Public Lands and Designated Recreation Areas are further discussed in Section 11.0.

TABLE 8
Ownership of Lands Crossed by the Pipeline Route

Land Type Location	Crossing Length (miles)	Percentage of Route (%)
Federal lands	1.0	<1
State Lands	3.2	1
County Lands	11.1	4
Incorporated Areas:		
Staples	1.3	<1
Eden Valley	0.3	<1
Coates	1.0	<1
Rosemount	2.5	<1
Private Land Outside Incorporated Areas	274.2	93
Total	294.6	100

Sources: MDNR, 1998
MDNR, MIS Bureau, 2003
MDNR, 2005a

4.2.2 Areas with Comprehensive Land Use Plans

The proposed pipeline route crosses two designated rivers where comprehensive land use plans have been established: the Mississippi River and the North Fork of the Crow River. The Mississippi River crossing, at approximate MP 26.4, is within an area designated as Wild by the Mississippi Headwaters Board. The crossing of the North Fork of the Crow River, at approximate MP 188.4, is a state-designated Wild and Scenic River. As discussed in Section 9.1.2, MPL will use HDD procedures, if feasible, to construct the pipeline across both of these rivers, thus avoiding impacts to the rivers and the adjacent riparian areas. In addition, MPL will continue to consult with the Mississippi Headwaters Board, Clearwater County, Meeker County, and the MDNR to ensure that the pipeline is designed and constructed in a manner that minimizes impacts on the land use objectives for these areas.

4.3 GENERAL CONSTRUCTION AND OPERATION IMPACTS AND MITIGATION

4.3.1 Agricultural Land

Construction of the proposed pipeline temporarily will impact about 2,868 acres of agricultural land, or approximately 72 percent of the total land affected. Of the agricultural land affected, approximately 61 percent (or 1,749 acres) is cultivated and the remaining 39 percent (or 1,119 acres) is pasture lands. In cultivated areas, construction will result in a short-term loss of crops and may interfere with planting or harvesting, depending on the timing of construction. Impacts on agricultural areas will be minimized by the segregation and replacement of topsoil, rock removal, and deep tillage of construction areas to alleviate compaction. Additional agricultural mitigation practices are described in MPL's AIMP (Appendix C). Compensation for loss of crops will be addressed during easement negotiations between each landowner and MPL. Following construction and restoration, agricultural activities will be allowed to resume along the permanent right-of-way.

During construction, MPL will maintain landowner access to fields, storage areas, structures, and other agricultural facilities, and will maintain drainage systems that cross the right-of-way to the maximum extent practicable. MPL generally will bury the pipeline to a depth of 4.5 feet in cultivated agricultural land; however, where adjacent to existing pipelines, MPL will bury the new pipeline at a similar depth to the existing pipelines. Drainage systems damaged by construction will be repaired in accordance with the procedures specified in the AIMP (Appendix C).

The proposed pipeline will cross 21 center-pivot irrigation systems. MPL will coordinate with the owners of these irrigation systems to minimize the disruption of irrigation activities as specified in the AIMP (Appendix C).

MPL also will take appropriate measures to protect livestock in pasture lands during construction. After construction, permanent fences and gates will be rebuilt to their former condition. Following installation of the pipeline, disturbed pasture areas will be revegetated.

4.3.2 Forest Land

Approximately 508 acres of forest land will be disturbed by pipeline construction. Short- and long-term impacts will result from construction through forested areas (see Section 7.1). To facilitate installation of the pipeline, trees and brush will be removed from the construction right-of-way and temporary workspaces. In the northern portion of the route, the proposed pipeline mostly will be constructed adjacent to MPL's existing pipelines and the construction right-of-way will partly overlap the existing maintained corridor, thus minimizing potential impacts on forested areas. Along the greenfield route, MPL routed the pipeline to avoid forest lands to the extent practicable.

Following pipeline construction through forest lands, the construction right-of-way will be restored and revegetated. Consistent with standard industry practices, approximately 216 acres of new permanent right-of-way in forest lands will be maintained in an herbaceous state to facilitate aerial inspection of the pipeline. The remainder of the temporary construction right-of-way and extra workspaces through forest lands (approximately 292 acres) will be allowed to revert to their natural state.

4.3.3 Wetland/Open Water

Approximately 469 acres of wetlands and open water will be affected by pipeline construction. These wetlands and open water areas are distributed along the entire length of the proposed pipeline route. Construction impacts associated with the crossing of wetlands and waterbodies are discussed in Sections 9.1.4 and 9.2.4, respectively.

4.3.4 Open Land

Approximately 144 acres of open land will be temporarily disturbed by pipeline construction. As discussed in Section 4.1, this land use category includes non-forested undeveloped uplands and existing utility rights-of-way, including the right-of-way along MPL's existing pipelines. Most of the open land identified along the route is located in Clearwater, Hubbard, and Wadena Counties. Open land will be temporarily disturbed during grading, trenching, backfilling, and restoration. After construction of the pipeline, open land will be restored and revegetated.

4.3.5 Developed Land

Approximately 12 acres of developed land will be temporarily disturbed by pipeline construction. An examination of recent aerial photographs (2005) indicates that about 330 residences are located within 500 feet of the proposed construction right-of-way, of which 14 residences are located within 50 feet of the right-of-way. Of the 14 residences located in close proximity to the proposed pipeline route, nine are located adjacent to the existing Minnesota Pipeline while five are located along the greenfield portion of the route. There also are six industrial/commercial buildings located within 50 feet of the construction right-of-way. Two of these buildings are located along the greenfield portion of the route and the remaining four buildings are located adjacent to the existing Minnesota Pipeline. No residences or commercial/industrial buildings, however, are located within the proposed construction right-of-way.

Two significant impacts on residential and commercial areas may result from construction and operation of the pipeline: short-term disturbances associated with construction, and encumbrances of property for future uses within the permanent right-of-way (*e.g*., limitations on the placement of future permanent structures). Residences and buildings within 50 feet of the proposed right-of-way likely will experience more direct effects of construction and operation of the project. In general, as distance to the construction area increases, impacts on residences and buildings decrease.

Temporary construction impacts on residences and buildings could result from increased noise levels or dust generated by construction equipment, personnel, and trenching across roads or driveways. The heavy equipment needed to construct the pipeline will generate unavoidable short-term increases in ambient noise levels. Typical bulldozers, backhoes, and sideboom tractors used to install large-diameter pipelines generate 80 to 90 decibels of the A-weighted scale (dBA) within 50 feet of the equipment. Increases in ambient noise levels due to heavy equipment operation will be limited to the period of construction and generally confined to daylight hours.

Noise generated by operation of the pipeline will be limited to areas surrounding MPL's proposed pump stations. Noise surveys performed by KPL staff have indicated that the typical pump station generates about 100 dBAs immediately at the pump source. These surveys indicate a noise level of approximately 65 dBA, including surrounding ambient sources, at a distance of approximately 100 feet from the pump source.

Construction-related dust emissions generally will be of short duration and dependent on soil type, weather conditions, and the extent of ground disturbance. To minimize dust emissions, the construction right-of-way and access roads near residential areas will be sprayed with water as needed to control dust during active construction. After construction, revegetation of the right-of-way will prevent ongoing dust emissions.

Construction near residences and buildings also could result in disturbance of lawns; removal of trees, landscaped shrubs, or other vegetative screening; and removal of aboveground structures, such as sheds or trailers, from within the right-of-way. Restoration or compensation for these impacts will be addressed during easement negotiations between each landowner and MPL.

Pipeline easements on residential and commercial properties will preclude new structures, such as pools, garages, or sheds, from within the permanent right-of-way.

4.3.6 Transportation Corridors

The pipeline will cross a number of federal, state, county, city/township, and private/commercial roads in addition to several railroads. Road crossings are listed by county in Appendix E and railroad crossings are summarized in Table 9.

TABLE 9
Railroads Crossed by the Pipeline Route

County	Approximate Milepost	Description	Section	Township	Range
Clearwater	11.1	Burlington Northern Santa Fe Railway	28	147	37
Todd	103.4	Burlington Northern Santa Fe Railway	8	133	32
Morrison	113.9	Burlington Northern Santa Fe Railway	25	132	32
Meeker	178.1	Canadian Pacific Railway	3	121	31
Wright	203.5	Burlington Northern Santa Fe Railway	32	119	28
McLeod	217.9	Dakota Rail, Inc.	1	116	28
Carver	228.1	Twin Cities & Western Railroad Co.	18	115	26
	231.5	Minnesota Prairie Line	28	115	26
Scott	243.0	Union Pacific Railroad	3	113	25
	255.7	Union Pacific Railroad	22	113	23
Dakota	275.8	Canadian Pacific Railway	22	113	20
	279.2	Canadian Pacific Railway	7	113	19

Construction methods will vary among roadway types crossed by the pipeline. MPL will install the pipeline by boring beneath most paved roads and all railroads; this method will allow the roads and railroads to remain open during construction and will not disturb the road or railroad beds. Two major highways (U.S. Highway 2 at MP 11.0 and U.S. Highway 10 at MP 113.9) and the two adjacent railroads (Burlington Northern Santa Fe at MPs 11.1 and 113.9) may be crossed using conventional bore or the HDD method, which would avoid disruption of these roads and railroads. Most unpaved roads and private driveways will be crossed using the open-cut construction method, which will require temporarily closing the roads and possibly implementing detours (see Section 3.2.3). Construction at each open-cut road crossing typically will be limited to one day and will not significantly affect local traffic patterns. Detour, warning, traffic control, and safety signs will be posted as required by federal, state, and local agencies.

Designated Roadways

The pipeline route crosses three designated roadways: the Great River Road, the Lake Country Scenic Byway, and the Minnesota River Valley Scenic Byway. Construction-related impacts and mitigation for these roadways are described below.

The Great River Road

The Great River Road is a national scenic byway that travels 2,550 miles from the river's source in Itasca, Minnesota south through ten states to Louisiana, where the Mississippi River enters the Gulf of Mexico. In Minnesota, the Great River Road is 575 miles long, and provides travelers with opportunities ranging from outdoor recreation and wildlife viewing, to enjoying theater and museums in the Twin Cities. The pipeline route crosses two segments of the Great

River Road: County Highway 40 at MP 26.3 in Clearwater County, and U.S. Highway 71/State Highway 200 at MP 37.7 in Hubbard County. The proposed pipeline will be constructed adjacent to MPL's existing pipelines at both of these crossings.

The predominant land use along both road segments is forest lands and timber clearing may be required at each crossing. MPL will use a portion of its existing maintained right-of-way for construction of the pipeline in these areas, thus minimizing the amount of tree clearing at these scenic road crossings. In addition, MPL will install the pipeline across these roads using conventional bore methods, which will avoid disturbing the roadbeds and disrupting the traffic.

Lake Country Scenic Byway

The Lake Country Scenic Byway crosses near more than 1,000 lakes and runs near or through a national forest, a state park, a national wildlife refuge, and six state forests in Minnesota. The byway has two components; one runs west-east between Detroit Lakes and Walker along State Highway 34, and the other runs north-south between Itasca State Park and Park Rapids along U.S. Highway 71. The pipeline route crosses both segments: U.S Highway 71 at MP 47.6 and State Highway 34 at MP 56.4. The designated scenic byway has an approved corridor management plan. At both crossings, the pipeline will be constructed adjacent to MPL's existing pipelines and conventional bore methods will be used to install the pipeline beneath these roads. As discussed above for the Great River Road, impacts at these scenic road crossings will be avoided and minimized by using a portion of the existing maintained right-of-way during construction and by using boring techniques to install the pipeline under the roads.

The predominant land uses along both highways are open and forest lands, and timber clearing may be required at each crossing. To mitigate for this impact, MPL will actively revegetate the disturbed areas along the roads following installation of the pipeline and will allow the temporary workspaces to naturally revegetate with woody species.

Minnesota River Valley Scenic Byway

The Minnesota River Valley Scenic Byway, a National and Minnesota Scenic Byway, extends over 300 miles between Browns Valley, South Dakota and Belle Plaine, Minnesota. The byway has an approved corridor management plan. The pipeline route crosses the byway along County Highway 6 at MP 241.1.

The predominant land use in the vicinity of the byway crossing is classified as agricultural land. Because the disturbed agricultural lands adjacent to this road crossing will be restored and returned to crop production following pipeline construction, there will be no permanent visual impacts at the byway crossing. The road will be bored, which will avoid disturbance to the roadbed and disruption of traffic along the byway.

4.3.7 Airports

The pipeline route crosses within 1 mile of four airports: the Bagley Municipal Airport near MP 11.5, the Sky Manor Airport near MP 47.6, the Staples Municipal Airport near MP 98.6, the Sowieja Landing Strip near MP 284.0, and private grass runways near MPs 233.0 and 291.5. None of the airports will be affected by pipeline construction; however, the grass runway located at MP 291.5 will be crossed by the pipeline. MPL will coordinate with the landowner to minimize impacts on the use of this landing strip.

5.0 TERRAIN / GEOLOGY

5.1 EXISTING TERRAIN AND GEOLOGY

The pipeline route crosses the Interior Plains of the United States, an extensive region that spreads across the center of North America. Within the plains, the pipeline route crosses the Western Lake section of the Central Lowlands physiographic province. Surface features in this section were formed mainly during the Wisconsin Glaciation. Topography in the section is characterized by large, gently rolling till plains, hilly areas formed by glacial moraines, and outwash plains. In addition, the section contains glaciolacustrine deposits from Glacial Lake Agassiz, which covered the northwestern portion of Minnesota during the Wisconsin Glacial Age.

Within the Western Lake section, the pipeline route crosses extensively glaciated terrain. Surficial geology is characterized by glacial outwash, ground and end moraines, and glacial lake sediments deposited by the Des Moines, Wadena, and Superior Lobes of Wisconsin age (Ojakangas and Matsch, 1982). Topography includes nearly level to gently rolling outwash and till plains, rolling to steeply irregular moraine complexes, and low to fairly prominent drumlins. Numerous lakes and wetland areas have formed in depressions contained within the glaciated terrain. Overall, elevations decrease from north to south with a relatively sharp decrease near the Minnesota River along the Sibley and Scott County lines. Elevation along the pipeline route is summarized by county in Table 10.

TABLE 10
Elevation Along the Pipeline Route

County	Approximate Milepost		Elevation Above Mean Sea Level (feet)		
	Beginning	Ending	Lowest	Average	Highest
Clearwater	0.0	31.3	1,345	1,503	1,618
Hubbard	31.3	64.5	1,411	1,497	1,676
Wadena	64.5	101.9	1,236	1,345	1,464
Todd	101.9	113.6	1,229	1,270	1,343
Morrison	113.6	146.1	1,147	1,247	1,381
Stearns	146.1	177.7	1,099	1,211	1,290
Meeker	177.7	200.7	1,014	1,102	1,201
Wright	200.7	210.6	1,013	1,055	1,091
McCleod	210.6	227.9	964	1,015	1,079
Carver	227.9	233.6	978	1,000	1,022
Sibley	233.6	242.5	710	953	1,011
Scott	242.5	272.4	719	990	1,147
Dakota	272.4	294.6	852	938	1,122

The project region is underlain by Late Archean to Paleoproterozoic metamorphic and igneous rocks, as well as Upper Cambrian to Upper Cretaceous stratified rocks (Morey and Meints, 2000). Along the pipeline route, however, depth to bedrock can exceed more than 150 meters (Ojakangas and Matsch, 1982); less than 1 percent of the route crosses areas with bedrock at depths of less than 5 feet (see Section 6.3.4). These shallow bedrock areas are in Dakota County and consist primarily of Prairie du Chien limestone and St. Peter sandstone. In areas where the pipeline is installed using HDD techniques, bedrock also could be at a depth where it

may be encountered. These areas will be identified from geotechnical borings at the HDD crossings and will be factored into the design of those crossings.

Near-surface deposits in the project area generally consist of thick sequences of Late Quaternary Age glacial deposits (see Figure 8). The pipeline route crosses large areas of sand and gravel outwash deposits that contain unconfined surficial aquifers. As discussed in Section 8.0, spill and leak prevention measures will be implemented both during construction and operations to prevent contamination of these aquifers.

There is a low probability of an earthquake of significant intensity or other seismic event in the project area. In addition, the pipeline route does not cross any Quaternary-age faults (National Atlas of the US, 2005).

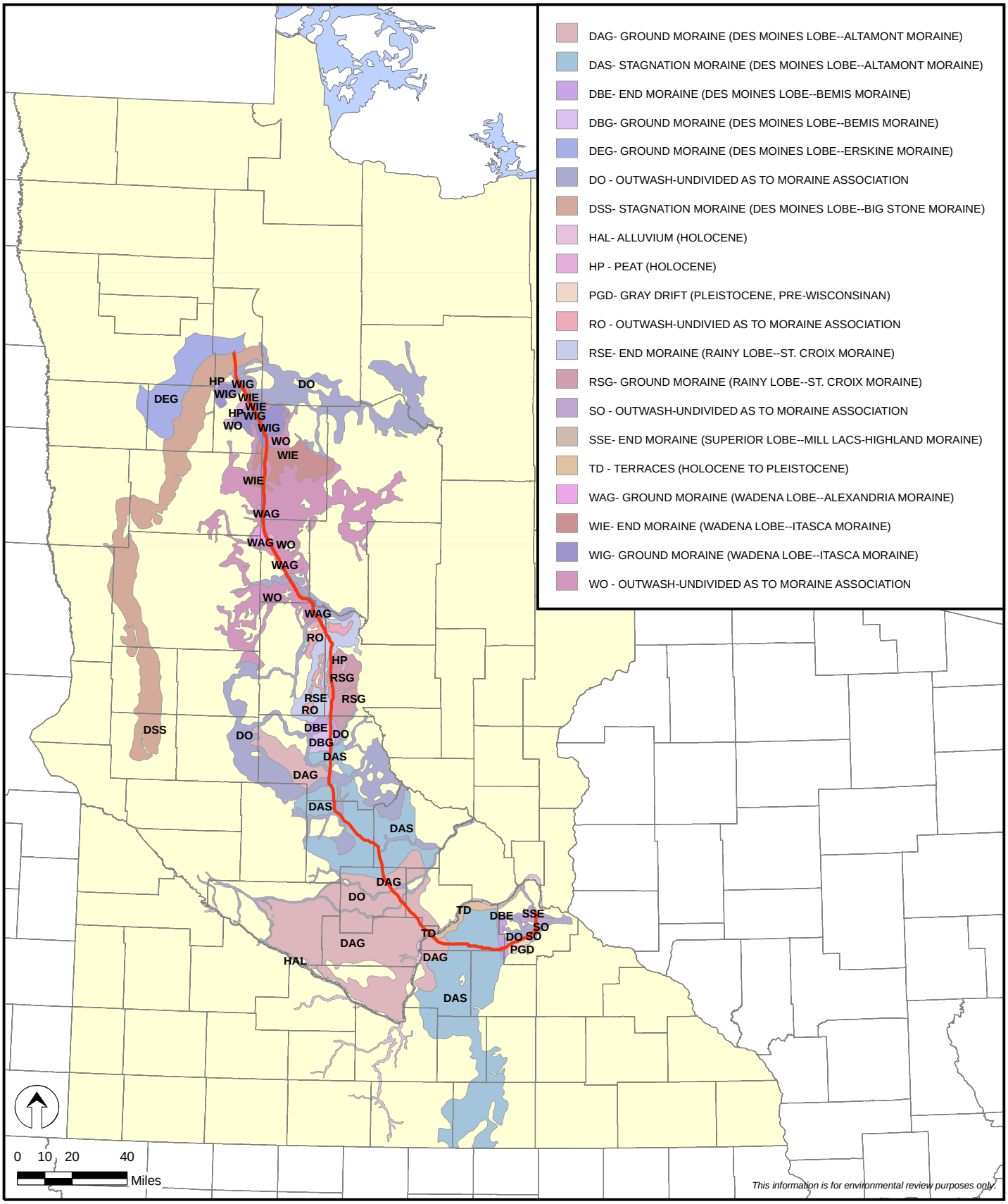
Mineral resources in Minnesota include industrial (*e.g.*, sand, gravel, and crushed stone) and metallic (*e.g.*, iron ore, nickel, and titanium) minerals. Numerous sand and gravel quarry operations are present within the counties along the pipeline route (National Atlas of the US, 2005), particularly in Scott and Dakota Counties. A review of USGS 7.5-minute series topographic quadrangles and recent aerial photography indicates that 16 active operations are located within 0.25 mile of the pipeline route (Table 11); none of these, however, will be directly affected by pipeline construction activities.

TABLE 11
Sand and Gravel Quarries Along the Pipeline Route

Approximate Milepost	Distance from Pipeline (miles)	Location Relative to Pipeline
6.7	0.2	West
9.2	0.2	West
70.4	0.2	East
71.8	0.2	West
81.8	0.2	West
100.1	<1.0	Northeast
113.2	<1.0	West
121.6	<1.0	East
134.4	0.1	West
160.6	0.2	East
166.6	0.2	East
169.5	<1.0	West
241.3	0.1	East
241.3	<1.0	West
275.6	0.2	Southeast
287.8	<1.0	West

5.2 GENERAL CONSTRUCTION AND OPERATION IMPACTS AND MITIGATION

Construction and operation of the proposed MinnCan Project will result in minor impacts on topography and geology. Primary impacts will be limited to construction activities and consist of temporary disturbance to slopes due to grading and trenching operations. These disturbances will be necessary to create a level and safe construction corridor.



MINNCAN PROJECT

Figure 8
Quaternary Geology in Project Area

DATE: 12/09/05
REVISED: 12/09/05
SCALE: 1:3,125,000
DRAWN BY:RSMcGREGOR
M:\Clients\J-L\KPL\Central_MN_ArcGIS\PUC_RA_Sup_F08_Quatgeo.mxd

NATURAL RESOURCE GROUP, INC.

MPL will minimize impacts by returning contours to pre-construction conditions to the extent practicable. In addition, MPL will implement the erosion control measures described in the Erosion Control Plan (Appendix B). These measures will consist of the installation of slope breakers, temporary sediment barriers, and permanent trench breakers, and revegetation and mulching of the construction right-of-way.

Blasting may be required if bedrock is encountered within the depth of the trench. The likelihood of blasting is low, as less than 1 percent (0.1 mile) of the proposed route crosses areas with shallow bedrock. Because this bedrock is sufficiently soft and/or fractured, blasting likely will not be needed to excavate the pipeline trench. If blasting is required, however, MPL will conduct these activities in accordance with applicable regulations.

The pipeline route crosses within 0.25 mile of 16 active sand and gravel quarries. None of these areas will be directly affected by pipeline construction; however, future quarry operations will be precluded where the pipeline crosses mineral resources. Six quarries are located adjacent to the existing pipelines (MPs 6.7, 9.2, 70.4, 71.8, 81.8, and 113.2); thus, quarrying currently is precluded in these areas. Five quarries (MPs 121.6, 160.6, 166.6, 241.3 (east), and 275.6) appear to be small-scale operations designed for local uses; construction of the proposed pipeline is unlikely to impact future operations at these sites. The five remaining quarries (MPs 100.1, 134.4, 169.5, 241.3 (west), and 287.8) appear to be larger commercial operations; construction of the proposed pipeline could constrain future expansion of these operations in the vicinity of the pipeline.

MPL does not anticipate impacts associated with seismic activity within the project area. Due to the limited potential for large, seismically induced ground movements, there is minimal risk of earthquake-related impacts on the pipeline, and no mitigation is needed.

6.0 SOILS

6.1 GENERAL SOIL COMPOSITION

The proposed pipeline route crosses the Northern Minnesota Gray Drift, Wisconsin and Minnesota Sandy Outwash, Central Wisconsin and Minnesota Thin Loess and Till, and Central Iowa and Minnesota Till Prairies Major Land Resource Areas (MLRAs). The dominant soils in the Northern Minnesota Gray Drift and Central Wisconsin and Minnesota Thin Loess and Till MLRAs are Boralfs. The dominant soils in the Wisconsin and Minnesota Sandy Outwash MLRA are Psamments. The dominant soils in the Central Iowa and Minnesota Till Prairies MLRA are Udolls, Udalfs, Aqualfs, and Aquolls.

In general, the pipeline route crosses soils that formed from a variety of parent materials, including sandy, silty, and loamy glacial tills and moraines, lacustrine sands, and sandy outwash. Based on geomorphic areas, outwash plains are most abundant in the northern counties (*i.e.*, in areas adjacent to MPL's existing pipelines), while moraine complexes comprise a majority of the remainder of the route (Figure 9). Table 12 provides a description of the geomorphic areas and general soil composition along the pipeline route. A more detailed analysis of these soils is provided in the following sections.

TABLE 12
General Soil Composition in the Project Area

From (MP)	To (MP)	Miles	Geomorphic Area	General Soil Composition [a/]
0.0	0.3	0.3	02A - Fosston Till Plain, Loamy	Deep silty or loamy, well drained, dark colored soils
0.3	5.9	5.5	003 - Alexandria Moraine Complex	Deep silty or loamy, well drained, dark colored soils
5.9	6.4	0.5	047 - Bagley Outwash Plain, Sandy to Gravelly	Sandy over sandy, well drained, light colored soils
6.4	6.9	0.5	003 - Alexandria Moraine Complex	Deep silty or loamy, well drained, dark colored soils
6.9	11.1	4.2	047 - Bagley Outwash Plain, Sandy to Gravelly	Sandy over sandy, well drained, light colored soils
11.1	13.0	1.9	02C - Falk Till Plain, Loamy	Deep silty or loamy, well drained, light colored soils
13.0	15.4	2.4	011 - Itasca Moraine Complex, Rolling	Loamy over mixed sandy and loamy, well drained, light colored soils
15.4	17.3	1.9	02C - Falk Till Plain, Loamy	Deep silty or loamy, well drained, light colored soils
17.3	46.4	24.9	011 - Itasca Moraine Complex, Rolling	Loamy over mixed sandy and loamy, well drained, light colored soils
		4.1	047 - Bagley Outwash Plain, Sandy to Gravelly	Sandy over sandy, well drained, light colored soils
46.4	50.6	4.3	008 - Park Rapids-Staples Outwash Plain	Loamy over sandy, well drained, dark colored soils
50.6	53.1	2.5	011 - Itasca Moraine Complex, Rolling	Loamy over mixed sandy and loamy, well drained, light colored soils
53.1	110.5	38.7	008 - Park Rapids-Staples Outwash Plain	Loamy over sandy, well drained, dark colored soils
		18.7	07A - Wadena Drumlin Area	Deep silty or loamy, well drained, light colored soils
110.5	112.5	2.0	009 - St. Croix Moraine Complex, Loamy, Rolling to Hilly	Loamy over mixed sandy and loamy, well drained, light colored soils

TABLE 12, cont'd.
General Soil Composition in the Project Area

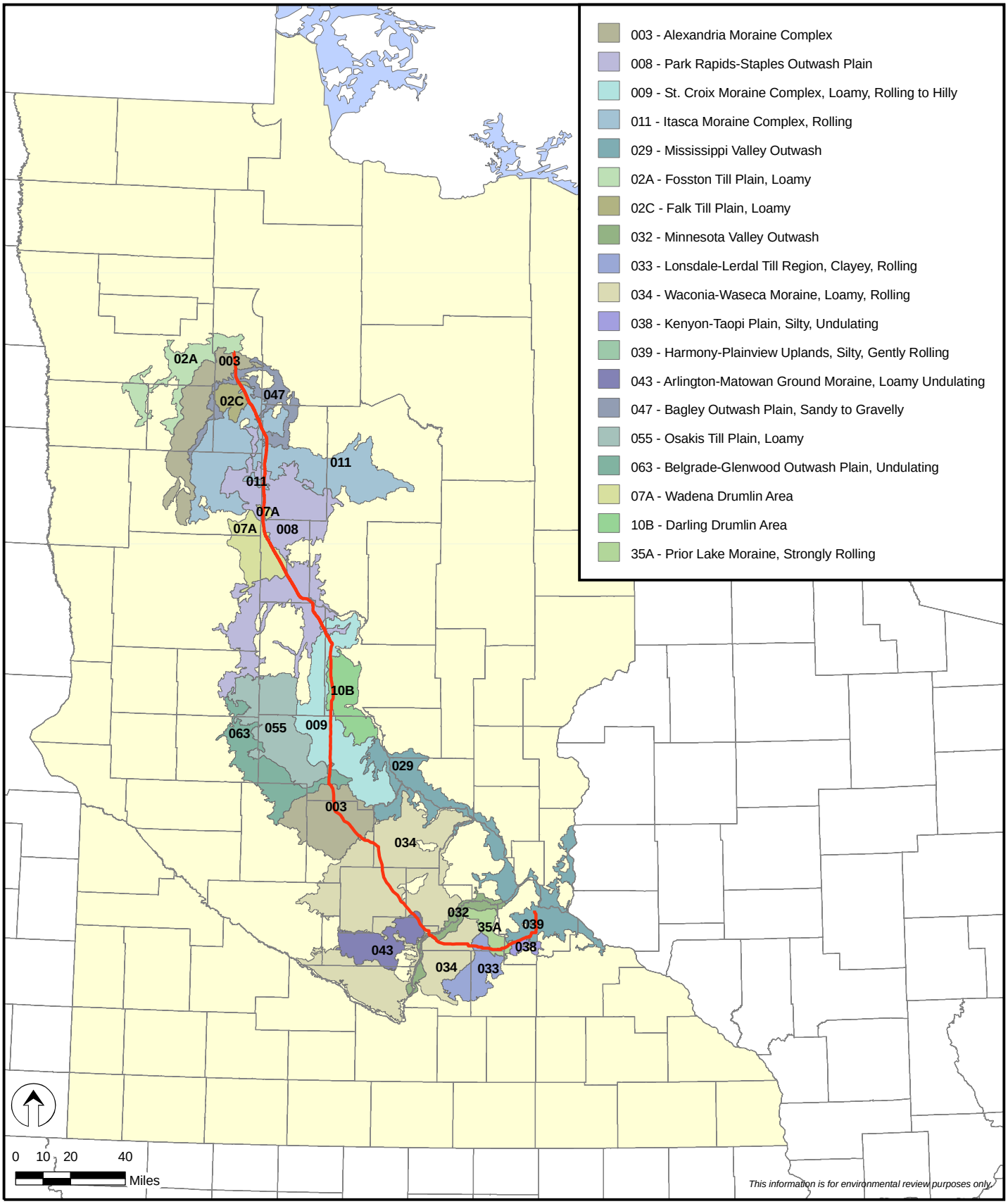
From (MP)	To (MP)	Miles	Geomorphic Area	General Soil Composition [a/]
112.5	113.6	1.1	008 - Park Rapids-Staples Outwash Plain	Loamy over sandy, well drained, dark colored soils
113.6	163.2	29.0	009 - St. Croix Moraine Complex, Loamy, Rolling to Hilly	Loamy over mixed sandy and loamy, well drained, light colored soils
		20.6	10B - Darling Drumlin Area	Deep silty or loamy, well drained, light colored soils
163.2	167.3	4.1	063 - Belgrade-Glenwood Outwash Plain, Undulating	Loamy over sandy, well drained, dark colored soils
167.3	168.6	1.3	055 - Osakis Till Plain, Loamy	Deep silty or loamy, well drained, dark colored soils
168.6	171.3	2.7	063 - Belgrade-Glenwood Outwash Plain, Undulating	Loamy over sandy, well drained, dark colored soils
171.3	195.9	24.6	003 - Alexandria Moraine Complex	Deep silty or loamy, well drained, dark colored soils
195.9	231.2	35.3	034 - Waconia-Waseca Moraine, Loamy, Rolling	Deep silty or loamy, well drained, dark colored soils
231.2	237.7	6.5	043 - Arlington-Matowan Ground Moraine, Loamy Undulating	Deep silty or loamy, poorly drained, dark colored soils
237.7	241.1	3.5	034 - Waconia-Waseca Moraine, Loamy, Rolling	Deep silty or loamy, well drained, dark colored soils
241.1	245.5	4.3	032 - Minnesota Valley Outwash	Alluvial undifferentiated soils
245.5	259.3	13.8	034 - Waconia-Waseca Moraine, Loamy, Rolling	Deep silty or loamy, well drained, dark colored soils
259.3	266.0	6.7	033 - Lonsdale-Lerdal Till Region, Clayey, Rolling	Deep silty or loamy, well drained, dark colored soils
266.0	274.5	8.5	35A - Prior Lake Moraine, Strongly Rolling	Deep silty or loamy, well drained, light colored soils
274.5	288.5	11.4	029 - Mississippi Valley Outwash	Sandy over sandy, well drained, dark colored soils
		2.6	038 - Kenyon-Taopi Plain, Silty, Undulating	Deep silty or loamy, well drained, dark colored soils
288.5	289.0	0.5	039 - Harmony-Plainview Uplands, Silty, Gently Rolling	Deep silty or loamy, well drained, light colored soils
289.0	294.6	5.5	029 - Mississippi Valley Outwash	Sandy over sandy, well drained, dark colored soils

[a/] Represents the most common soil landscape unit within each geomorphic region.

6.2 IDENTIFICATION OF SOIL CONDITIONS

6.2.1 Background and Methodology

Detailed soil characteristics along the pipeline route were identified and assessed using the Soil Survey Geographic Database (SSURGO; USDA-NRCS, 2003) or the MetroGIS Digital Soil Survey Database (MetroGIS; MetroGIS, 2005). The SSURGO database is a digital version of the original county soil surveys developed by the Natural Resources Conservation Service (NRCS) for use with geographic information systems (GIS). It provides the most detailed level of soils information for natural resource planning and management. Mapping scales in the project area generally range from 1:15,840 to 1:20,000, with a minimum delineation size of 2.5 to 4.0 acres. SSURGO is linked to an attribute database that gives the proportionate extent of the component soils and their properties for each map unit (USDA, 1995). The SSURGO



MINNCAN PROJECT

Figure 9
Geomorphic Regions in Project Area

DATE: 12/10/05
REVISED: 12/10/05
SCALE: 1:3,125,000
DRAWN BY:RSMcGREGOR
M:\Clients\J-L\KPL\Central_MN_ArcGIS\PUC_RA_Sup_F09_Soil_Atlas.mxd

NATURAL RESOURCE GROUP, INC.

database was used to define soils characteristics along the pipeline route in Clearwater, Hubbard, Wadena, Todd, Morrison, Stearns, Meeker, Wright, McLeod, and Sibley Counties.

The MetroGIS database is a digital version of mylar soil maps provided by the NRCS. This database was developed for use in regional planning for the seven counties in the Twin Cities metropolitan area. It can be adapted for applications in agriculture, forestry, and urban and land-use planning. The database joins digital soils datasets with selected attributes from the NRCS's Map Unit Interpretation Record (MUIR) database (MetroGIS, 2003a, 2003b, 2004). The MetroGIS database was used to define soils characteristics along the pipeline route in Carver, Scott, and Dakota Counties.

SSURGO and MetroGIS attribute data consist of physical properties, chemical properties, and interpretive groupings. Attribute data apply to the whole soil (*e.g.*, listed hydric, prime farmland soils or slope class) as well as to layer data for soil horizons (*e.g.*, texture or permeability). The soil attribute data can be used in conjunction with spatial data to describe the soils in a particular area.

6.2.2 Soil Characteristics and Assessments

MPL digitized and overlaid the pipeline route onto the SSURGO and MetroGIS databases to identify soil mapping units in the project area. Based on an analysis of these data, MPL identified soil characteristics that could affect or be affected by pipeline construction. These characteristics include: highly erodible soils; prime farmland and hydric soils; compaction-prone soils; presence of stones and shallow bedrock; droughty soils; depth of topsoil; and percent slope.

Tables 13 and 14 provide a summary of significant soil characteristics identified along the pipeline route by county. Table 15 lists topsoil depths for prime agricultural land crossed by the pipeline route. Individual soil characteristics are discussed separately below.

TABLE 13
Soil Characteristics in the Project Area

County	Total Miles	Highly Water Erodible	Highly Wind Erodible	Prime Farmland	Hydric	Compaction Prone	Stony/ Rocky	Shallow to Bedrock	Droughty
		miles (percent)							
Clearwater	31.3	7.5	9.0	15.0	6.3	1.0	17.1	0.0	0.0
Hubbard	33.2	13.3	12.3	2.5	5.2	0.5	17.9	0.0	0.0
Wadena	37.4	2.6	19.2	11.6	8.5	2.8	12.8	0.0	0.0
Todd	11.6	0.6	9.1	0.3	3.0	0.0	2.4	0.0	0.0
Morrison	32.5	7.0	9.3	13.3	7.6	7.0	24.4	0.0	0.0
Stearns	31.7	2.7	3.5	22.8	10.3	8.7	18.5	0.0	0.0
Meeker	23.0	3.9	1.9	12.2	9.1	7.9	10.4	0.0	0.1
Wright	9.9	2.1	1.0	6.1	3.5	3.1	5.2	0.0	0.0
McLeod	17.3	2.1	1.2	12.1	9.2	6.5	7.6	0.0	0.0
Carver	5.7	0.1	0.6	5.0	2.6	2.0	0.8	0.0	0.0
Sibley	8.9	1.0	0.3	7.4	4.9	4.9	2.3	0.0	0.0
Scott	29.9	9.1	2.1	17.5	9.0	6.9	13.2	0.0	0.3
Dakota	22.2	3.0	0.5	16.8	3.0	5.8	2.3	0.1	0.0
Total	294.6	55.0 (19)	70.1 (24)	142.5 (48)	82.2 (28)	57.1 (19)	134.8 (46)	0.1 (<1)	0.4 (<1)

TABLE 14
Topsoil Depth and Slope Class in the Project Area

County	Total Miles	Topsoil Depth					Slope Class				
		0-6 inches	>6-12 inches	>12-18 inches	>18-24 inches	>24 inches	0-5 percent	>5-8 percent	>8-15 percent	>15-30 percent	>30 percent
		Miles (percent)									
Clearwater	31.3	25.3	2.9	1.4	1.6	0.1	24.1	1.2	4.9	1.1	0.0
Hubbard	33.2	19.0	10.1	0.1	0.3	3.9	21.8	4.8	4.3	2.2	0.1
Wadena	37.4	7.4	25.0	1.4	1.5	2.1	34.3	0.0	2.9	0.2	0.0
Todd	11.6	6.0	5.1	0.3	0.2	0.0	10.4	0.0	0.9	0.4	0.0
Morrison	32.5	16.2	12.5	3.1	0.0	0.6	21.7	4.1	5.1	1.0	0.6
Stearns	31.7	3.6	16.1	7.6	1.1	3.4	28.4	0.1	2.7	0.4	0.0
Meeker	23.0	0.6	9.9	7.9	2.7	1.9	19.1	0.0	3.6	0.2	0.0
Wright	9.9	0.0	5.8	0.9	1.1	2.1	7.8	0.0	2.1	0.0	0.0
McLeod	17.3	0.0	10.7	0.9	2.6	3.0	15.2	0.9	1.2	0.0	0.0
Carver	5.7	0.0	0.8	3.1	1.1	0.7	5.6	0.0	0.1	0.0	0.0
Sibley	8.9	0.1	5.3	2.8	0.5	0.3	7.8	0.0	0.9	0.0	0.1
Scott	29.9	0.4	18.4	5.4	4.3	1.3	20.9	0.0	7.4	1.6	0.0
Dakota	22.2	0.6	6.5	12.5	1.4	1.1	20.2	0.0	1.9	0.0	0.0
Total	294.6	79.2 (27)	129.1 (44)	47.4 (16)	18.4 (6)	20.5 (7)	237.5 (81)	11.1 (4)	37.9 (13)	7.1 (2)	0.8 (<1)

TABLE 15
Topsoil Depth on Prime Agricultural Land in the Project Area [a/]

County	Total Miles	Topsoil Depth				
		0-6 inches	>6-12 inches	>12-18 inches	>18-24 inches	>24 inches
		Miles (percent)				
Clearwater	15.0	14.4	0.6	0.0	0.0	0.0
Hubbard	2.5	0.5	2.0	0.0	0.0	0.0
Wadena	11.6	0.0	11.6	0.0	0.0	0.0
Todd	0.3	0.0	0.3	0.0	0.0	0.0
Morrison	13.3	8.2	5.1	0.0	0.0	0.0
Stearns	22.8	2.5	12.2	6.9	0.8	0.4
Meeker	12.2	0.0	3.6	6.4	1.2	1.0
Wright	6.1	0.0	2.9	0.9	1.1	1.2
McLeod	12.1	0.0	7.7	0.9	2.6	0.9
Carver	5.0	0.0	0.7	3.1	1.1	0.1
Sibley	7.4	0.0	4.1	2.7	0.5	0.1
Scott	17.4	0.0	7.5	5.3	3.8	0.7
Dakota	16.8	0.2	2.4	12.0	1.4	0.7
Total	142.5	25.9 (18)	60.9 (43)	38.3 (27)	12.4 (9)	5.0 (4)

[a/] Includes prime farmland soils with no liming factor as well as soils considered to be prime farmland only if a limiting factor is mitigated (*e.g.*, artificial drainage or irrigation)

6.3 GENERAL CONSTRUCTION AND OPERATION IMPACT AND MITIGATION

Pipeline construction activities such as clearing, grading, trench excavation, and backfilling, as well as the movement of construction equipment along the right-of-way, may result in impacts on soil resources. Clearing removes protective cover and exposes soil to the effects of wind, sun, and precipitation, which may increase the potential for soil erosion and movement of sediments into sensitive environmental areas (such as wetlands). Grading and equipment traffic may compact soil, reducing porosity and percolation rates, which could result in increased runoff potential. Trench excavation and backfilling could lead to mixing of topsoil and subsoil and may introduce rocks to the soil surface from deeper soil horizons. Contamination from spills or leaks of fuels, lubricants, and coolants from construction equipment also could impact soils. MPL will minimize or avoid these impacts on soils by implementing the mitigation measures described in the Erosion Control Plan, AIMP, and WWCMP (Appendices B, C, and D).

6.3.1 Erosion by Wind and Water

Erosion is a continuing natural process that can be accelerated by human disturbance. Factors that influence the degree of erosion include soil texture, soil structure, length and percent of slope, vegetative cover, and rainfall or wind intensity. Soils most susceptible to erosion by water are typified by bare or sparse vegetative cover, non-cohesive soil particles with low infiltration rates, and moderate to steep slopes. Wind erosion processes are less affected by slope length or steepness. Clearing, grading, and equipment movement could accelerate the erosion process and, without adequate protection, result in discharge of sediment to adjacent waterbodies and wetlands.

A majority of the pipeline route (approximately 81 percent) is underlain by soils that are not likely to be susceptible to water erosion (Table 13); these soils generally have slopes that are less than or equal to 5 percent. The remainder (approximately 19 percent) is underlain by soils that the NRCS considers highly erodible or potentially highly erodible land. About 24 percent of the soils along the pipeline route have a wind erodibility group (WEG) classification of two or lower and, therefore, are considered susceptible to wind erosion.

MPL will implement the erosion control measures described in the Erosion Control Plan (Appendix B) to minimize erosion both during and after construction activities. These measures may include construction of silt fences, installation of slope breakers, temporary sediment barriers, and permanent trench breakers, and revegetation and mulching of the construction right-of-way. Erosion and sedimentation controls will be inspected and maintained as necessary until final stabilization is achieved. MPL also will implement dust mitigation measures, including the use of water trucks to moisten the right-of-way, as needed, to reduce impacts from wind erosion.

6.3.2 Prime Farmland and Topsoil Segregation

The USDA defines prime farmland as “land that is best suited to food, feed, fiber, and oilseed crops” (Soil Survey Division Staff, 1993). This designation includes cultivated land, pasture, woodland, or other lands that are either used for food or fiber crops or are available for these uses. Urbanized land and open water are excluded from prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime

farmland if the limiting factor is mitigated (*e.g.*, by controlling soil moisture conditions through artificial drainage). Approximately 31 percent of the pipeline route crosses prime farmland soils with no limiting factor. An additional 17 percent of the soils crossed are considered prime farmland only if a limiting factor is mitigated.

Impacts on prime farmland from construction of the pipeline could include interference with agricultural drainage (if present), mixing of topsoil and subsoil, and compaction and rutting of soil. These impacts could result from right-of-way clearing, trench excavation and backfilling, and vehicular traffic within the construction corridor. With the mitigation measures specified in the AIMP (Appendix C), however, these impacts will be temporary and will not result in a permanent decrease in soil productivity.

MPL will implement the measures described in its AIMP (Appendix C) to minimize impacts on prime farmland and promote the long-term productivity of the soil. These measures will include topsoil segregation, compaction alleviation, removal of excess rock, and restoration of agricultural drainage systems and existing erosion control structures.

Topsoil Segregation

Topsoil thickness is the result of factors such as wetness, topography, climate, and the predominant vegetation present when the soil was being formed. Other factors being equal, prairie soils have more topsoil than forest soils; and wet soils have more topsoil than dry soils. According to data presented in Tables 14 and 15, topsoil depths both for the overall route and for prime agricultural land, are generally less than 18 inches but can be thicker than 24 inches in some low-lying soils.

Topsoil depth along the route is naturally separated into two distinct areas that differ in climate, vegetation, and land use. The portion of the route north of about MP 150 is dominated by historic forest areas with relatively thin topsoil typically less than 10 inches thick. Much of the area is currently in pasture, shrubland, forest, and wetland. The portion of the route south of MP 150 is dominated by historic prairie areas with greater than 10 to 12 inches of topsoil. Much of the area south of MP 150 is in intensive agricultural use.

In consultation with the Minnesota Department of Agriculture (MDA), MPL proposes two procedures to minimize topsoil disturbance and topsoil and subsoil mixing associated with pipeline construction in these two different areas. On active cropland north of MP 150 the topsoil will be stripped to its full depth to a maximum of 12 inches from both the trench and the spoil storage areas. The segregated topsoil and subsoil will be stockpiled separately and replaced in the proper order during backfilling and final grading of the construction right-of-way. Stripping of the trench plus spoil side is proposed for these relatively shallow topsoils in order to create a sufficient volume of soil to be handled effectively with heavy construction equipment.

On active cropland south of MP 150 the topsoil will be stripped to its full depth to a maximum of 18 inches (or as otherwise agreed to with the MDA) from the trench area. MPL is proposing to limit the depth of topsoil stripping to 18 inches in order to avoid mixing with deeper soils that have unfavorable properties for crop growth. Subsoil removed from the trench will be kept separate from the stored topsoil. Topsoil stripping in this area is relatively deep and will occur only over the trench to minimize the total volume of topsoil that is disturbed and subsequently handled. The segregated topsoil and subsoil will be replaced in the proper order during backfilling and final grading of the construction right-of-way.

Additional procedures may be developed in consultation with the MDA to minimize adverse impacts to crop yields that could occur when thick, dark colored topsoils with markedly different soil properties are mixed. Deeper topsoil may be relatively dark in color, but tends to be less productive, contains more rocks, and may have unfavorable soil chemistry (*e.g.*, high carbonate content) that can affect plant nutrient uptake.

Implementation of proper topsoil segregation as detailed in the AIMP prepared by MPL in consultation with the MDA (Appendix C) will minimize the loss of crop productivity, ensure successful post-construction revegetation, and minimize the potential for long-term erosion problems. In the event of a conflict between the Routing Permit application and the AIMP, the provisions of the AIMP will prevail.

6.3.3 Soil Compaction and Rutting

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of soils. Construction equipment traveling over wet soils could disrupt the soil structure, reduce pore space, increase runoff potential, and cause rutting. The degree of compaction depends on moisture content and soil texture. Fine-textured soils with poor internal drainage that are moist or saturated during construction are the most susceptible to compaction and rutting. Approximately 19 percent of the pipeline route is underlain by soils that are prone to compaction. Counties with the largest amount of compaction prone areas along the proposed route include Morrison, Stearns, and Meeker Counties. In addition, approximately 11 percent of the pipeline route crosses soils with organic surface horizons. These horizons also may be susceptible to rutting during pipeline construction.

MPL will minimize compaction and rutting impacts by implementing the measures described in its Erosion Control Plan, AIMP, and WWCMP (Appendices B, C, and D). These measures may include temporarily suspending certain construction activities on susceptible soils during wet conditions, or constructing from timber mats or using low-ground-weight equipment in wetlands. On agricultural land, compaction impacts will be mitigated through the use of deep tillage operations during restoration activities.

6.3.4 Stony/Rocky Soils and Shallow Bedrock Soils

Trenching or grading can bring stones or rocks to the soil surface where they can damage farm equipment. Similarly backfilling shallow bedrock could redistribute rock to an overlying soil horizon, which may reduce soil moisture-holding capacity. Approximately 46 percent of the route crosses stony or rocky soils.

Less than 1 percent of the pipeline route crosses areas with shallow bedrock (*i.e.*, bedrock within 5 feet of the surface). These areas are in Dakota County. If bedrock is encountered within the trench, MPL only will backfill with this rock to the depth of the original bedrock layer. During clean up, MPL will use rock pickers or other rock removal equipment to remove rocks greater than 3 inches in diameter from the soil surface. Rock removal will be considered complete when rock on the right-of-way is similar to soils adjacent to the right-of-way.

6.3.5 Droughty Soils

Droughty, or dry, soils were identified on the basis of surface texture and drainage class. Well drained to excessively drained soils with a coarse surface texture (*i.e*., fine sand or coarser) may be difficult to revegetate. Drier soils contain less water to aid in the germination and eventual establishment of new vegetation. Coarser textured soils also have a lower water holding capacity, which could result in moisture deficiencies in the root zone, creating unfavorable conditions for many plants. Only a small portion of the pipeline route (less than 1 percent) crosses soils classified as droughty soils.

MPL will minimize the impacts of pipeline construction on droughty, non-cultivated soils by timely reseeding using species adapted to dry conditions and by applying mulch to conserve soil moisture. MPL will consult with appropriate soil conservation authorities to develop seed mixes and seeding dates adapted to the project area, including droughty soil areas.

7.0 VEGETATION, WILDLIFE, AND FISHERIES

7.1 VEGETATION

7.1.1 Existing Vegetation Resources

As described in Section 4.0, approximately 72 percent of the length of the pipeline route crosses predominantly agricultural land. These lands consist of pastures and row crops such as corn and soybeans. Potatoes also are a common crop in some of the northern counties in the project area. Approximately 16 percent of the length of the pipeline route crosses forest land consisting of both upland forests and forested wetlands. These lands generally are located in the northern counties between MPs 0 and 119.3 where the pipeline route generally parallels MPL's existing pipelines. The pipeline route also crosses wetlands (approximately 11 percent of the route length) and open land (approximately 1 percent of the route length). The wetlands are comprised of emergent marshes and scrub-shrub wetlands and the open land consists of maintained rights-of-way and fallow fields.

7.1.1.1 Ecological Classifications

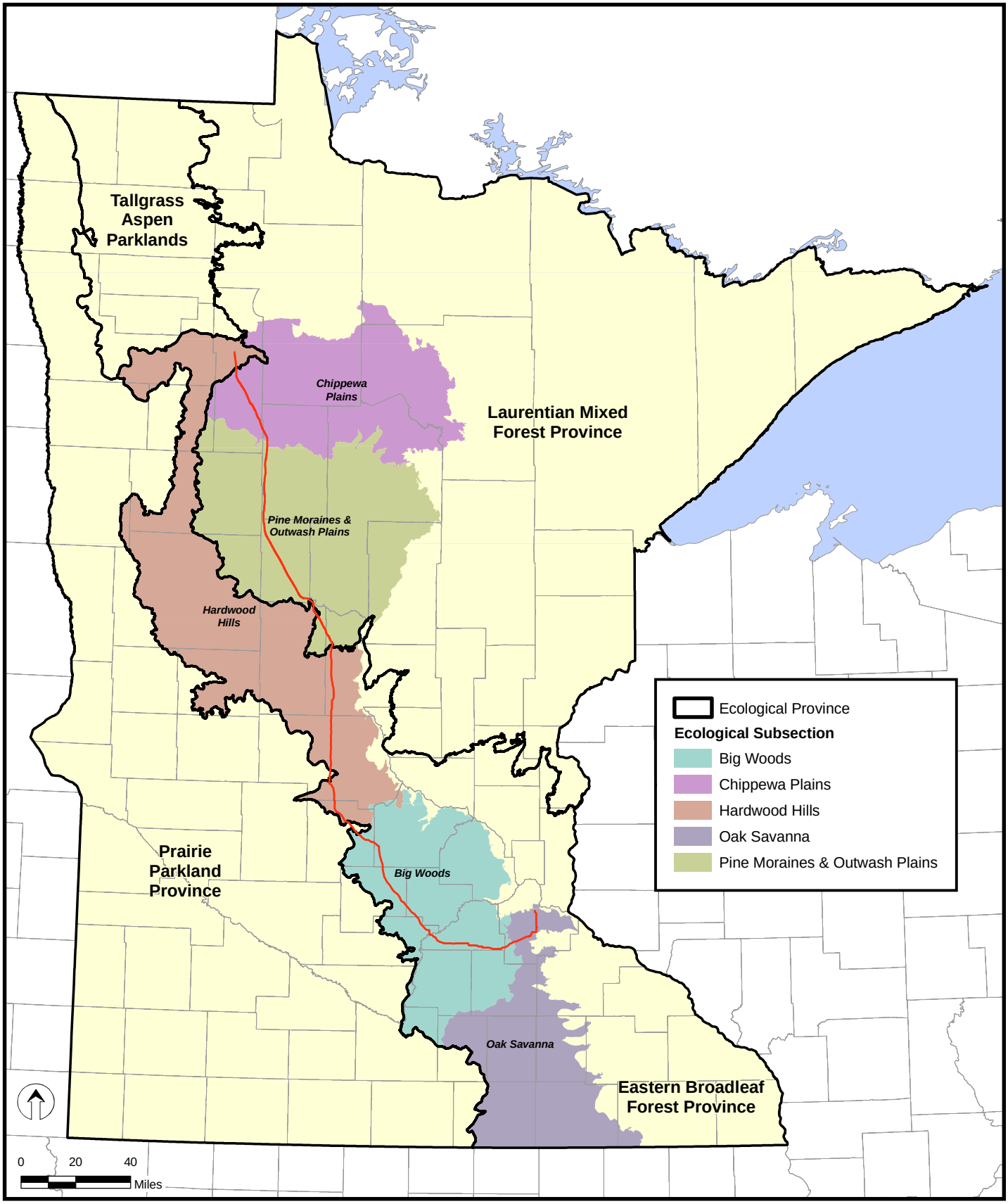
Based on the Ecological Classification System, the MinnCan Project primarily is located in the Laurentian Mixed Forest and Eastern Broadleaf Provinces. Within these provinces, the pipeline route crosses the Chippewa Plains, Pine Moraines and Outwash Plains, Hardwood Hills, Big Woods, and Oak Savanna ecological subsections (MDNR, 2005b). Figure 10 shows the boundaries of these ecological provinces.

The pipeline route crosses the Hardwood Hills subsection between approximate MPs 0 and 8 and MPs 120 and 193. Much of this area has been converted to agriculture. Natural communities along the pipeline generally are limited to wetlands and small woodlots. Vegetation communities include aspen, mixed hardwood forests, emergent marshes, and scrub-shrub swamps.

The pipeline route crosses the Chippewa Plains subsection between approximate MPs 8 and 53. The majority of this landscape remains natural. The landscape is characterized by aspen-birch forests with areas of white pine, red pine, maple, oak, and white spruce forests. Black spruce swamps and bogs characterize lowlands.

The pipeline route crosses the Pine Moraines and Outwash Plains subsection between approximate MPs 53 and 120. Much of this landscape has been cleared for agricultural purposes. Natural communities along the pipeline route generally are limited to wetlands and small woodlots characterized by aspen-birch and pine forests with some mixed hardwood forests. Wetlands include emergent marshes and scrub-shrub swamps.

The pipeline route crosses the Big Woods subsection between approximate MPs 193 and 278 and the Oak Savanna subsection between MP 278 and the pipeline terminus. Oak woodlands and savannas and maple-basswood forests historically dominated these landscapes, but the majority of these areas have been converted to agriculture. The natural communities along the pipeline route generally are limited to wetlands and forested riparian corridors.



MINNCAN PROJECT

Figure 10
Ecological Classifications in Project Area

DATE: 12/10/05
REVISED: 12/10/05
SCALE: 1:3,125,000
DRAWN BY:RSMcGREGOR
M:\Clients\J-L\KPL\Central_MN_ArcGIS\PUC_RA_Sup_F10_Eco.mxd

7.1.1.2 Typical Vegetative Communities

As indicated by the descriptions of the ecological units, aspen-birch forest is the most common upland forest type in the project area. Northern mixed hardwood forests and pine forests also are present along the pipeline route in addition to some forested wetlands. The majority of the wetlands are emergent marshes and scrub-shrub swamps. The more common vegetative communities along the pipeline route are described below.

Aspen-Birch Forest

Aspen-birch forests dominate the uplands along the northern portions of the pipeline route. Quaking aspen and paper birch are primary components. A tall shrub layer may be present consisting of beaked hazel, mountain maple, and saplings of other tree species. Small shrubs such as bush honeysuckle, gooseberry, and raspberry also may be present. The herb layer is diverse and dominated by large-leaved aster, bunchberry, Canada mayflower, wild sarsaparilla, and lady fern.

Mixed Hardwood Forest

Mixed hardwood forests also are prevalent along the northern portions of the pipeline route. These forests contain sugar maple, basswood, and birch as primary species. The forests often contain a conifer component and may include red oak on drier sites. A shrub layer consisting of honeysuckle, beaked hazel, leatherwood, and mountain maple may be present depending on the amount of available sunlight. Club mosses and forbs are frequent in the herb layer.

Pine Forests

Pine forests along the pipeline route generally are limited to Clearwater County and typically consist of a mix of white, red, and jack pines. These forests contain a shrub layer of honeysuckle, beaked hazel, blueberry, arrowwood, and deciduous trees. The herb layer usually is dominated by large-leaved aster, Canada mayflower, and wild sarsaparilla.

Forested Wetlands

Three types of forested wetlands are found along the pipeline route: black spruce swamps and bogs, tamarack swamps, and hardwood swamps. Black spruce and tamarack swamps and bogs mostly are limited to the northern counties along the pipeline route with sedges, grasses, and sphagnum moss common in the understory. Hardwood swamps are more common along the southern portions of the pipeline route. Green and black ash and maple are common in these areas. The understories of hardwood swamps are diverse and generally composed of forbs and ferns such as lady fern and cinnamon fern.

Scrub-shrub Swamps

Scrub-shrub swamps are common along the northern portions of the pipeline route. These scrub-shrub swamps contain speckled alder as the primary component. Shrubs such as willow and dogwood, and trees such as white cedars, tamaracks, black ash, and paper birch also may be present. Northern marsh fern, jewel-weed, and sedges are common in the herb layer.

Emergent Marshes

Emergent marshes are the most common type of wetland along the pipeline route. These wetlands generally are dominated by cattails, sedges, bulrush, and reed canary grass in addition to forbs such as blue vervain, joe-pye weed, and goldenrod. Along the northern portion of the pipeline route, emergent wetlands contain species typical of the Great Lakes region; in southern areas, emergent wetlands contain a greater proportion of plants associated with the prairie region. The northern portion of pipeline route also crosses a few small, open sphagnum bogs, which are dominated by a carpet of sphagnum moss with small shrubs such as leatherleaf, swamp laurel, and bog rosemary.

7.1.2 General Construction and Operation Impacts and Mitigation

During construction, existing vegetation will be removed from within the construction right-of-way and other workspace areas to facilitate the installation of the pipeline. The impact of clearing and the time required to achieve recovery of vegetation communities will depend on the size and age of the pre-existing vegetation. In general, impacts will be greatest in forest lands because they are more structurally complex than other vegetation types and take longer (perhaps 30 to 40 years) to become re-established. In addition to construction clearing, and as discussed in more detail below, the permanent right-of-way will be periodically cleared of trees and shrubs to facilitate aerial and ground inspection of the pipeline.

The loss of vegetation could have secondary impacts, including forest fragmentation and the loss of wildlife habitat. Other secondary impacts could include increased erosion from the conversion of deep rooted vegetation to shallow rooted vegetation on the right-of-way, and increased solar radiation which could dry the soil and stimulate the growth of early successional species within and immediately adjacent to cleared areas. The removal of trees on the right-of-way also could expose trees growing adjacent to the newly cleared areas to higher levels of wind, which may increase the risk of blow downs. The majority of these effects will be minor and temporary, however, and they will diminish upon restoration and revegetation of the right-of-way.

Forested areas that will be cleared during construction generally are limited to the northern portions of the project between MPs 0 and 119.3 where the pipeline route mostly parallels MPL's existing pipeline. In these areas, the spoil side of the construction corridor will overlap the existing maintained right-of-way. On the working side of the corridor, an approximately 65-foot-wide area will be cleared of trees; of this, an approximately 35-foot-wide area will be maintained as additional permanently cleared right-of-way. From MPs 97.7 to 104.7 and MPs 119.3 to 294.6, the pipeline will be located in new right-of-way; during construction, a 100-foot-wide working area will be cleared of trees, with a 50-foot-wide area to be maintained as permanently cleared right-of-way. In total, pipeline construction will result in the clearing of approximately 508 acres of forest land, of which 216 acres will be maintained as permanent pipeline right-of-way.

Impacts on vegetation along the pipeline route will be minimized through adherence to soil erosion control specifications and by confining clearing activities to the 100-foot-wide right-of-way and temporary extra workspaces. Upon completion of construction, MPL will restore the right-of-way and revegetate disturbed areas. Restoration of the construction right-of-way and reseeding with an appropriate seed mix will minimize the duration of vegetative disturbance.

Operation and maintenance of the proposed pipeline facilities will have additional effects on vegetation after site clearing and right-of-way restoration are completed. MPL will conduct routine vegetation maintenance as needed to facilitate aerial and ground inspection of the pipeline and to maintain visibility of pipeline markers located at property lines and feature crossings (*e.g.*, roads, waterbodies). In general, along the greenfield portion of the route a 50-foot-wide corridor centered over the pipeline will be cleared of brush and trees. Where the pipeline will parallel the existing pipelines an additional 35 feet will be maintained free of trees and brush adjacent to the existing approximately 65-foot-wide maintained corridor.

7.2 WILDLIFE

7.2.1 Existing Wildlife Resources

The MinnCan Project will be constructed in multiple biomes, including the deciduous and conifer-hardwood forest zones and the prairie zone. Wildlife habitats within these areas are diverse and include open areas, wetlands, and forested areas. Because the pipeline route crosses predominantly agricultural lands within these zones, wildlife habitat is more limited and confined primarily to the undeveloped areas. Existing wildlife resources in these areas are described below.

The pipeline route primarily crosses agricultural areas, which account for approximately 72 percent of all lands along the length of the route. Agricultural areas generally provide limited wildlife habitat. A few common wildlife species, including white-tailed deer, raccoon, skunks, and pheasant, however, will use these areas for feeding and occasional cover. Additionally, a few bird species such as starlings, crows, eastern meadowlark, and sparrows are found occasionally in agricultural fields.

Approximately 16 percent of the length of the pipeline route crosses forested areas. These areas primarily are found along the northern portion of the project where the pipeline will parallel MPL's existing pipeline. Some of the common mammalian species in deciduous forests include white-tailed deer, bear, eastern cottontail rabbit, woodchucks, raccoons, skunks, gray and fox squirrels, gray and red fox, and several species of bats. The structural diversity of the forest provides a variety of habitats that can support a large number of avian species, including songbirds, hawks, and owls (Tester, 1995).

Another 12 percent of the length of the pipeline route crosses wetlands, and pipeline construction temporarily will affect about 469 acres of non-forested wetland habitats. Emergent wetland types are the most prevalent along the pipeline route. Emergent wetlands provide habitat for a variety of aquatic wildlife, including muskrat, beaver, mink, waterfowl, wading birds, and numerous species of reptiles and amphibians. The scrub-shrub wetlands and forested wetlands crossed by the pipeline route provide additional habitat for terrestrial wildlife, such as the white-tailed deer, gray wolf, fox, bear, porcupine, and a variety of small mammals and songbirds.

About 1 percent of the pipeline route crosses open land or grasslands. Most of these open areas are fallow fields or maintained rights-of-way. The open, grassy pastures support several species of birds, numerous small rodents, and several species of snakes. Predatory species such as coyote, fox, and a variety of hawks hunt the grasslands for the abundant small rodents, birds, and reptiles. Other common wildlife species that occasionally may use the open areas include white-tailed deer, raccoon, squirrel, striped skunk, eastern cottontail rabbit, and white-tailed jackrabbit.

7.2.2 Special Wildlife Areas

Heron Rookeries

The MDNR's Natural Heritage Inventory database lists two Great Blue Heron rookeries located near MP 125.7. These sites are located approximately 170 and 1,100 feet from the pipeline route within the Little Elk Wildlife Management Area (MDNR, 2005c). Herons congregate annually in these rookeries to nest and raise young. The rookeries are located in wooded areas in or adjacent to wetlands and they usually are inhabited from April to August of each year.

Designated Wildlife Areas

The pipeline route crosses two national WPAs: Tyrone Flats from MPs 181.1 to 181.3 and MPs 181.7 to 182.0, and Perbix from MPs 232.8 to 233.3. These areas have been purchased by the U.S. Fish and Wildlife Service (USFWS) for the creation of migratory waterfowl habitat. Both production areas contain open water wetland and grassland habitats and they are managed for the production of waterfowl.

The project also crosses the Villard Wildlife Management Area between MP 104.2 and 104.5. This area is approximately 80 acres in size and contains primarily emergent wetland and forested habitats. The area is further described in Section 11.1. The pipeline also will be located adjacent to the Little Elk Wildlife Management Area near MP 126. This area is nearly 1,500 acres in size and consists of primarily wetland habitats formed by the impoundment of the South Branch of the Little Elk River. As noted above, this area supports two Great Blue Heron rookeries.

7.2.3 General Construction and Operation Impacts and Mitigation

Construction and operation of the proposed pipeline is not expected to have a significant impact on wildlife. Temporary impacts will occur during construction due to clearing of vegetation and disturbance of soils in the right-of-way. Long-term impacts will be limited to a loss of forest habitat as a result of clearing the temporary construction right-of-way and temporary extra workspaces through forested areas. Long-term effects on wildlife species will be limited because the pipeline predominantly will be constructed adjacent to an existing pipeline corridor or in agricultural areas. Overall, construction and operation of the project will not significantly alter the character of the landscape along the pipeline route.

Clearing the construction right-of-way will remove vegetative cover and will cause temporary displacement of the wildlife species along the pipeline route. The construction right-of-way and extra workspaces will remain relatively clear of vegetation until the project is completed. Some smaller, less mobile wildlife such as amphibians, reptiles, and small mammals may experience direct mortality during clearing and grading activities. The remaining wildlife, including the larger and more mobile animals, will disperse from the project area as construction activities approach. Displaced species may re-colonize in adjacent, undisturbed areas, or re-establish in their previously occupied habitats after construction is complete and suitable habitat is re-established. The intensity of construction-related disturbances will depend on the particular species and the construction time of year.

Impacts on herbaceous and shrub communities along the pipeline route from clearing and grading activities in both upland and wetland areas, are expected to be temporary and short-term. Following installation of the pipeline, disturbed upland areas will be restored and

revegetated and disturbed wetland areas will be restored and allowed to revegetate naturally. With appropriate restoration and revegetation, the pre-existing herbaceous and shrub habitats will become re-established quickly. Consequently, it is expected that the wildlife species that use these habitats also will return relatively soon after the vegetation is re-established.

Temporary right-of-way and extra workspaces will be actively revegetated with herbaceous species and allowed to revegetate naturally with tree and shrub species. The direct and long-term impacts on wildlife that use forests will be the temporary conversion of existing forested habitat to herbaceous-dominated habitat on the temporary construction right-of-way. It is expected that wildlife displaced from the cleared areas will relocate to nearby forests. Over time, natural growth and succession will restore the temporary portion of the construction right-of-way and the extra workspaces to a forested community.

A potential long-term impact on wildlife is associated with the clearing of forest vegetation in the northern portions of the project area. Because the pipeline route mostly parallels MPL's existing, maintained right-of-way in these areas, impacts to undisturbed forests will be minimized. The project will involve the permanent removal of 216 acres of forested habitat for the maintained right-of-way. These areas will be permanently converted to non-forest habitat for the life of the pipeline. It is anticipated that the incremental loss of this forested habitat along the existing cleared right-of-way will not significantly affect wildlife populations.

MPL will consult with the MDNR and USFWS regarding the restoration and revegetation of designated wildlife areas crossed, such as the Villard WMA, and the Tyrone Flats and Perbix WPAs.

7.3 FISHERIES

7.3.1 Existing Fisheries Resources

The pipeline route crosses 64 perennial streams and 119 intermittent streams, (see Section 9.0). Most of these waterbodies contain warm water fisheries; six, however, are coldwater fisheries designated as trout waters (LaSalle Creek, Straight River, Cat Creek (two crossings), Fawn Creek, and Vermillion River). Larger waterbodies supporting warmwater fisheries include the Mississippi River, Long Prairie River, Sauk River, North Fork of the Crow River, and Minnesota River.

MDNR Area Fish Managers were contacted for information on fisheries in the streams and rivers crossed by the project. Table 16 provides the list of representative fish species located in the streams and rivers in the project area.

TABLE 16
Representative Fish Species in the Project Area

Game Fish	Other Fish
Warmwater	
Walleye	Carp
Sauger	Bullhead
Northern pike	Suckers
Muskellunge	Sculpin
Sunfish	Burbot

TABLE 16, cont'd. Representative Fish Species in the Project Area	
Game Fish	Other Fish
Crappie	Redhorse
Perch	Minnows and other forage fish
Channel catfish	
Bluegill	
Smallmouth bass	
Largemouth bass	
Coldwater	
Brook Trout	
Brown Trout	

7.3.2 General Construction and Operation Impacts and Mitigation

In general, pipeline construction will result in temporary impacts on streams and rivers. Some potential impacts on fishery resources, such as sedimentation and turbidity, removal of streambank cover, introduction of water pollutants, or entrainment and impingement of aquatic organisms could result from construction activities. Overall, impacts from construction on fish and other aquatic organisms are expected to be localized and temporary. The magnitude of impacts on a fishery is a function of the stream crossing method used (see Section 9.1.3 for a discussion of these methods). To minimize the potential for adverse impacts on fisheries at river and stream crossings, MPL will implement erosion and sediment control measures specified in the WWCMP (Appendix D) and limit the duration of construction in these waterbodies.

Movement of fish upstream and downstream of the crossing site may be affected temporarily during construction across streams due to disturbances associated with the installation of temporary dams or sediment control barriers. The physical disturbance of the streambed temporarily may displace adult fish and may dislodge other aquatic organisms, including invertebrates. Some limited mortality of less mobile organisms such as small fish and invertebrates may occur within the trenching area. Aquatic plants, woody debris, and boulders that provide in-stream fish habitat also will be removed during trenching. Noise disturbances upstream and downstream of the site will deter fish that may otherwise inhabit the area. These disturbances are temporary, typically limited to 24 to 48 hours for most stream crossings, and are not expected to significantly affect fisheries resources. Studies have shown that natural re-colonization of disturbed areas will begin soon after restoration of the streambed and be completed within 1 year after construction (Schubert *et al*., 1985; Anderson *et al*., 1997).

Downstream sediment loads temporarily will be increased during open-cut stream crossings. These increased sediment loads temporarily may affect the more sensitive fish eggs, fish fry, and invertebrates inhabiting the downstream area. The suspended sediment levels, however, will quickly attenuate both over time and distance and will not adversely affect resident fish populations or permanently alter existing habitat (McKinnon and Hnytka, 1988). Suspended sediment levels will return to preconstruction levels once in-stream work is completed. Stream crossings with fine-grained (silty or clayey) substrates will produce more turbidity than those crossings with coarse-grained (sandy or gravelly) substrates.

Most streambank vegetation will be removed across the right-of-way during construction; however, a 10-foot-wide buffer of herbaceous vegetation typically will be left relatively undisturbed at waterbody crossings until immediately before the pipeline is installed across the waterbody. After construction, an area over the pipeline will be maintained in an herbaceous state and trees that are located near the pipeline will be cut and removed from the right-of-way. Changes in the light and temperature characteristics of some streams may affect the behavioral patterns of fish, including spawning and feeding activities, at the immediate pipeline crossing location.

Three rivers have been preliminarily identified for crossing using the HDD method, if feasible, including the Mississippi River, North Fork of the Crow River, and Minnesota River (see Section 9.1.3). While the HDD method will avoid many of the direct impacts (*e.g.*, bank clearing, bed disturbances) on the waterbody and associated fisheries, there is the possibility that an inadvertent release (frac-out) of drilling fluids could occur within the waterbody. This occurs when the drilling fluid (composed mostly of water and bentonite clay) finds pathways through natural fissures in the soil and rock between the drill path and waterbody. Impacts on waterbodies from a frac-out are primarily limited to increased turbidity. Geotechnical investigations will be conducted at each site preliminarily identified for HDD to confirm the suitability and design parameters for this method. If these investigations determine that there potentially could be installation problems using the HDD method at the waterbody crossing, an alternate environmentally acceptable method will be specifically designed for the crossing.

7.4 THREATENED AND ENDANGERED SPECIES

During the planning and routing stages of the project, MPL used information provided in the Minnesota Natural Heritage Inventory database to select a route that avoids threatened and endangered species and other sensitive resources to the extent practicable. Based on sensitive resources data provided in this database, the proposed route is located within about one-half mile of known occurrences of one federally listed species (bald eagle), three state-listed plant species (Bog Bluegrass, Sterile Sedge, and Kitten-tails), and one state-listed reptile (Blandings Turtle) (MDNR, 2005c).

7.4.1 Federally Listed Species

Bald Eagle

Three bald eagle (*Haliaeetus leucocephalus*) nesting pairs have been identified within 1 mile of the project, one of which is located within 500 feet of the pipeline route near MP 107.9. The bald eagle generally nests in undisturbed forested and open areas located near large bodies of water with abundant fish populations. Bald eagle pairs commonly have multiple nests in a nesting territory and may not use the same nest every year. Nesting and brood rearing in Minnesota occurs between February 1 and August 15. During the winter months, bald eagles congregate at night roosts and feeding areas located near ice-free waters that allow access to fish.

7.4.2 State-Listed Species

Bog Bluegrass

One occurrence of the Bog Bluegrass (*Poa paludigena*), a threatened plant species, was identified south of the pipeline route in the vicinity of MP 119.1. Occurrences of this species in Minnesota are associated with black ash dominated forested wetlands.

Sterile Sedge

One occurrence of the Sterile Sedge (*Carex sterilis*), a threatened plant species, was identified in the vicinity of MP 171.5 along the pipeline route. This plant typically grows in mineral rich calcareous fens. There is a MDNR-designated calcareous fen (ID No. 24729) located at the site where this species occurs. MPL routed the pipeline about 0.4 mile from the calcareous fen to avoid impacts on the plant and its habitat.

Kitten-tails

Two occurrences of Kitten-tails (*Besseya bullii*), a threatened plant species, were identified in the vicinity of MPs 243.2 and 244.4 along the pipeline route. The plant occurs in gravelly soils within dry prairies or open savannas woodlands.

Blandings Turtle

One occurrence of the Blandings Turtle (*Emydoidea blandingii*) a threatened reptile, was identified in the vicinity of MP 275.2. The Blanding's Turtle is a semi-aquatic species. The proposed pipeline route will be located on agricultural lands in the vicinity of this occurrence.

7.4.3 General Construction and Operation Impacts and Mitigation

MPL will continue to consult with the MDNR and USFWS regarding threatened and endangered species and their potential presence within project areas. If any of the species are identified as potentially occurring within the construction right-of-way, MPL will conduct surveys and develop mitigation plans as needed to avoid and minimize impacts on the affected species.

MPL also will consult with the MDNR and USFWS to determine the exact location of the bald eagle nesting sites. If these sites are located in close proximity to construction areas, MPL will develop mitigation plans to avoid adverse effects on the bald eagle. Possible mitigation may include conducting surveys before construction to determine if any bald eagle nests within 1/4 mile of the pipeline route are active and/or avoiding construction within 1/4 mile of active nests during the bald eagle's nesting season between February 1 and August 15.

8.0 WATER RESOURCES – GROUNDWATER

8.1 EXISTING GROUNDWATER RESOURCES

Groundwater is the primary source of water for private, public, and industrial uses in residences, communities, and commercial facilities located along the pipeline route. Groundwater occurs in surficial aquifers (water-bearing unconsolidated material deposited above the bedrock surface), buried drift aquifers, and bedrock aquifers.

Surficial Aquifers

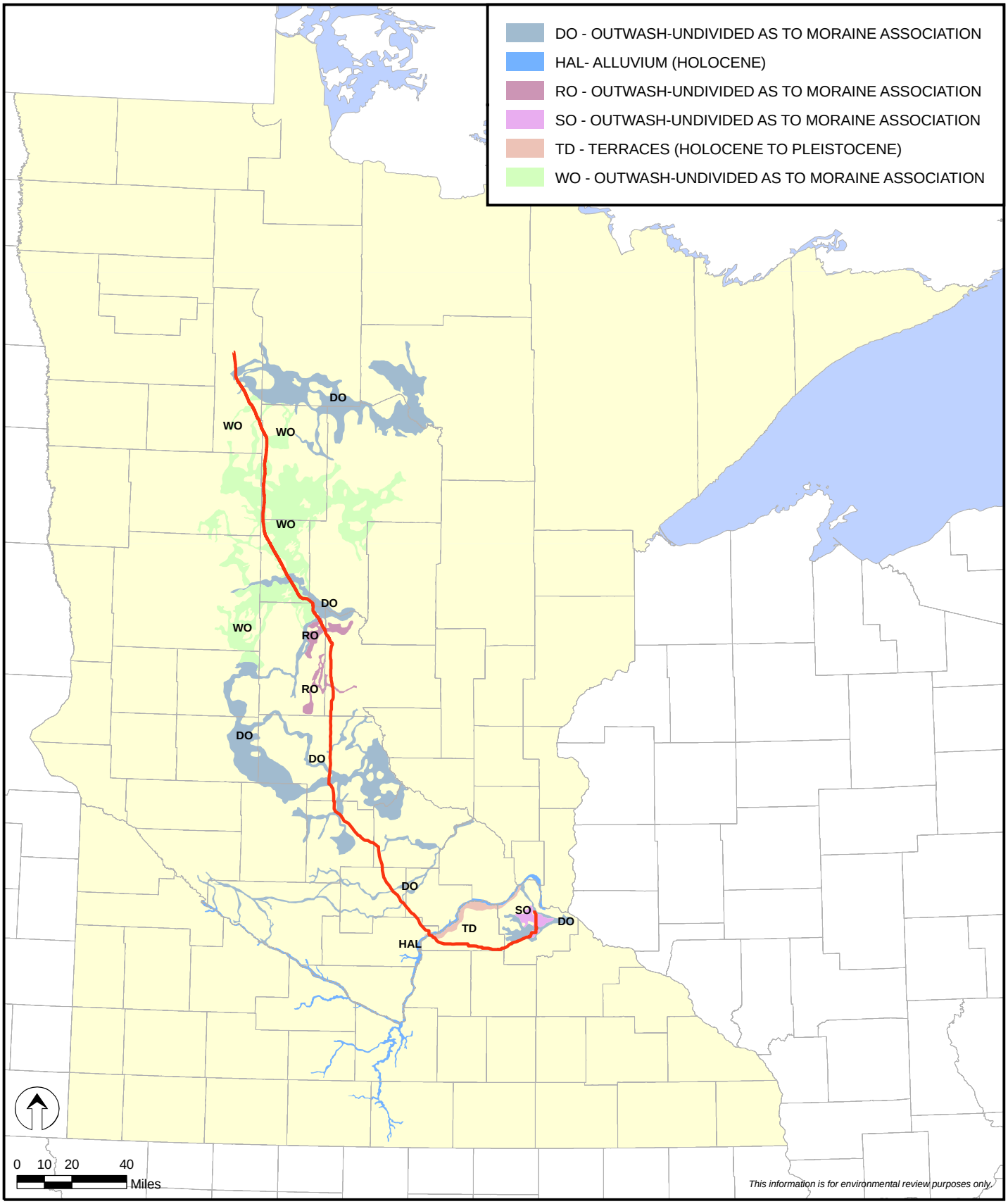
Surficial aquifers occur above the bedrock in unconsolidated sediments deposited by glaciers, streams, and lakes. The depth of the material is generally less than 100 feet, but may reach several hundred feet in some areas (Adolphson *et al*., 1981). Short-term groundwater yields from unconfined surficial aquifers vary, but can range from 10 gallons per minute (gpm) to approximately 3,000 gpm. Well depths in the glacial deposits typically range from approximately 30 to 380 feet (United States Geological Survey, 1985). Surficial aquifers are an important source of groundwater for much of the northern half of the project area and can provide adequate water volumes to supply municipalities and irrigation systems. There are fewer surficial drift aquifers near the southern end of the project (Scott and Dakota Counties), except in alluvium deposits along the major drainage ways. Figure 11 shows major surficial aquifers crossed by the proposed pipeline route. Water quality of these surficial aquifers can be affected by surface activities, including industrial and agricultural land use, due to the relatively shallow depth of the water table and the relatively coarse texture of the material overlying the aquifer.

Buried Drift Aquifers

Buried drift aquifers occur in well sorted sands and gravels deposited in bedrock valleys, alluvial channels, and outwash plains formed by advancing and retreating glaciers. These deposits subsequently were covered by fine textured materials (generally clays), which form a confining layer above the aquifer. The confined buried sand and gravel deposits typically are less than 30 feet thick but may extend to 150 feet thick in local areas. Buried drift aquifers have limited potential use for high capacity wells, but constitute the most important source of groundwater in Clearwater, Hubbard, Wadena, Todd, Morrison, Stearns, and Wright Counties for domestic use (MPCA, 1999). Well yields range from approximately 10 gpm to 1,000 gpm (Adolphson *et al*., 1981). The confining layer (*e.g*., clay material) above the aquifer generally protects it from contamination resulting from human activity at the surface. Water quality is typically very good in buried drift aquifers.

Bedrock Aquifers

Bedrock aquifers, which form in sedimentary rock formations and crystalline rocks, also are an important source of groundwater along the pipeline route. The importance of bedrock aquifers as a source for domestic and industrial water increases in the southern portion of the project, including Scott and Dakota Counties, where glacially deposited materials are relatively thin. Primary bedrock aquifers crossed by the pipeline route include the Franconia-Ironton-Galesville, St. Peter, Prairie du Chien, Jordan, and Mount Simon aquifers. Water well yields from these aquifers vary, but can range from 10 gpm to 2,400 gpm. The Prairie du Chien and Jordan aquifers provide about 75 percent of the annual ground water supply to the Twin Cities metropolitan area (Adolphson *et al*., 1981).



MINNCAN PROJECT

Figure 11
Surficial Aquifers in Project Area

DATE: 12/10/05
REVISED: 12/21/05
SCALE: 1:3,125,000
DRAWN BY:RSMcGREGOR
M:\Clients\J-L\KPL\Central_MN_ArcGIS\PUC_RA_Sup_F11_Surfaqs_b.mxd

NATURAL RESOURCE GROUP, INC.

8.1.1 Public Water Supply Wells

MPL reviewed the Minnesota Department of Health (MDH) water well database to identify public water supply wells near the pipeline route. No public water supply wells were identified within 500 feet of the pipeline route.

8.1.2 Federal and State Designated Aquifers

The pipeline route will not cross any U.S. Environmental Protection Agency (EPA)-designated sole-source aquifers (http://www.epa/gov/safewater/swp/ssa/reg5.html). The proposed route crosses about 600 feet of a Drinking Water Supply Management Area as designated by the MDH. This area is near MP 55.8 in the vicinity of Park Rapids. MDH rates the vulnerability of this area as high. The route does not cross any Wellhead Protection Areas (MDH, 2005); however, the route will pass approximately 800 feet to the west of a Wellhead Protection Area near Park Rapids.

8.1.3 Domestic Water Supply Wells

MPL reviewed the Minnesota Geologic Survey and Minnesota Department of Health water well information database (County Well Index or CWI) to identify domestic water supply wells along the pipeline route. The CWI is a computerized database that contains basic information for over 340,000 water wells drilled in Minnesota. The data is derived from water well contractors' logs of geologic materials encountered during drilling.

MPL's review of the CWI database identified 15 domestic water supply wells within 200 feet of the pipeline route. A list of these wells is provided in Table 17. MPL's review of the CWI database also identified one test well at MP 63.5 and two wells of unknown use at MPs 283.8 and 294.0 within 200 feet of the pipeline route.

TABLE 17
Domestic Water Supply Wells Within 200 Feet of the Pipeline Route

County	Approximate Milepost	Approximate Distance From Pipeline (feet)	Well Depth (feet)
Clearwater	0.0	163	51
	2.7	13	95
	8.8	180	175
Hubbard	35.1	195	131
	37.8	102	170
	60.4	122	57
Todd	106.4	174	60
	108.9	145	27
Stearns	167.2	117	87
Sibley	239.3	140	223
Scott	263.9	198	305
	265.7	120	250
	269.7	190	280
Dakota	280.1	188	310
	294.3	147	--

-- Well depth data not available

8.1.4 Contaminated Groundwater

MPL accessed a Minnesota Pollution Control Agency (MPCA, 2005a) database to identify sites with known or potential contamination within 0.5 mile of the proposed project (http://www.pca.state.mn.us/backyard/heighborhood.html). This database included federal regulatory listings such as the National Priority List (NPL, or federal Superfund); Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS, or potential NPL sites); No Further Response Action Planned (NFRAP); Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal (TSDs); and RCRA hazardous waste generators (RCRAGEN). State listings included the Permanent List of Priorities (PLP, or state-equivalent Superfund); Delisted PLP (DPLP); Voluntary Investigation and Cleanup (VIC); Permitted Solid Waste Facilities (PSW); Unpermitted Dumps (UPD); Closed Landfill Program (CLP); and the State Assessment Program (SAP).

Sixteen sites were identified within 0.5 mile of the proposed project. Based on MPCA information and review of aerial photographs, 13 of the 16 sites were determined to be more than 500 feet from the proposed route and, therefore, are not anticipated to affect the project. The three remaining sites are described below.

- The proposed route crosses south of the Alyn H. Angus Trust (VIC) site near MP 280.9. Based on information from Ms. Cathy O'Dell of the MPCA (2005b), the City of Farmington formerly operated a dump on the site. No testing has been conducted to determine whether contamination exists in the former dump; therefore, the site is considered a potential source of soil and groundwater contamination. MPL routed the proposed pipeline to avoid the former dump, thereby reducing the potential to encounter contamination.

- The proposed pipeline ends at the Flint Hills Resources refinery property which contains two sites: the Koch Refinery Company (CERCLIS, TSD, PSW, and DPLP) and Koch Refining Demolition Landfill (PSW) sites. MPL consulted with Flint Hills Resources refinery personnel (the name of the refinery has been changed from Koch to Flint Hills Resources) to route the pipeline on the refinery property and will coordinate with refinery personnel during construction to manage any potential encounters with soil or groundwater contamination.

8.2 GENERAL CONSTRUCTION AND OPERATION IMPACTS AND MITIGATION

Construction of the pipeline is not expected to have long-term impacts on groundwater resources due to the nature of the construction activities and the types of aquifers in the project area. Ground disturbance associated with pipeline construction generally will be limited to the upper 10 feet, which is above the water table of most regional aquifers. Construction activities such as trenching, backfilling, and dewatering, however, could encounter shallow, surficial aquifers and potentially result in minor short-term fluctuations in groundwater levels and increased turbidity within these aquifers. Shallow surficial aquifers generally exhibit rapid recharge and groundwater movement; therefore, the aquifers quickly will re-establish to pre-construction equilibrium, and turbidity levels will subside rapidly.

8.2.1 Blasting

Blasting to install the pipeline in a bedrock aquifer has the potential to impact water quality and yields in nearby water wells. As noted in Section 6.3.4, shallow bedrock may be encountered

during trenching in limited areas along the pipeline route (less than 1 percent of the pipeline route crosses shallow bedrock areas). Therefore, MPL does not anticipate that blasting will be required during project construction. To the extent it is necessary, however, MPL will implement safeguards to prevent or minimize effects to groundwater resources. MPL will develop a plan for monitoring (with landowner permission) groundwater quality and yield for public water supply wells within 400 feet of construction areas and private water supply wells within 200 feet of those areas. MPL will repair or replace potable water supply systems that are damaged by construction.

8.2.2 Spills and Leaks

The introduction of contaminants to groundwater due to accidental spills of construction related chemicals, fuels, or hydraulic fluid could have an adverse affect on groundwater quality, most notably in surficial aquifers with shallow water wells. With no overlying confining layer, surficial aquifers are relatively susceptible to contamination from releases at or near the ground surface. Bedrock aquifers also are susceptible to contamination from releases where the bedrock is at or near the ground surface.

Spill-related impacts from pipeline construction primarily are associated with fuel storage, equipment refueling, and equipment maintenance. To mitigate these effects, MPL will develop and implement a plan with specific measures for preventing, containing, and cleaning up accidental releases of fuels and other hazardous substances during construction of the pipeline. This plan will include measures described in Section IV of MPL's WWCMP (Appendix D) along with appropriate emergency contacts and reporting requirements.

Accidental leaks of crude oil during pipeline operation also could affect groundwater resources. As part of pipeline operations, KPL will implement an ongoing inspection program to protect the integrity of the pipeline system. Activities will include regular aerial and ground patrols; active participation in Gopher State One Call; external and internal corrosion prevention; in-line inspection; and regular evaluation of practices and procedures. Section 4415.0160 of the Application provides a description of KPL's programs for preventing accidental releases of crude oil.

KPL also has an Integrated Contingency Plan (ICP) that provides KPL and its employees with a single, comprehensive, and useful Emergency Response/Action plan. It was developed in accordance with the policy and guidance provided by the National Response Team (NRT) in their June 5, 1996 Federal Register Notice. The intent of the ICP is to prepare company personnel to respond to oil spills and other environmental emergencies. The general activities initiated when a release is identified include the following: the company's pipeline control center will shut down the pipeline and notify the its Compliance Manager; the Compliance Manager will activate the Spill Management Team and notify the appropriate federal, state, and local agencies; the leak will be isolated by closing pipeline valves; a general site assessment will be initiated; the company owned containment/recovery equipment will be deployed; and the Incident Command System will be activated per the ICP.

9.0 SURFACE WATER RESOURCES

In general, Minnesota is known for its abundant surface water resources, including lakes, rivers, and wetlands. From a water resource management perspective, Minnesota is divided into 10 major drainage basins, which are used by governing agencies to identify and assess water quality issues and develop water quality protection goals. The MinnCan Project will cross portions of four major drainage basins, including the Red River of the North Basin, Upper Mississippi River Basin, Minnesota River Basin, and the Lower Mississippi River Basin (see Figure 12).

Each major drainage basin is divided into major and minor watersheds that correspond to the drainage of a tributary or lake system. The proposed pipeline route crosses 14 major watersheds (see Figure 13). Six of these watersheds (Red Lake, Wild Rice, South Two Rivers, North Fork of the Crow River, Sauk River, and Buffalo Creek) have established watershed districts, while the Vermillion River watershed has a designated Joint Powers Organization. The primary purpose of these watershed districts and organizations are to conserve the natural resources of the state through land use planning, flood control, and other conservation projects.

9.1 WATERBODY CROSSINGS

9.1.1 Existing Waterbodies

Existing maps (USGS 7.5-minute-series topographic maps, NWI Maps, MDNR Protected Waters and Wetlands Maps, Minnesota Public Recreation Information Maps) and aerial photography were reviewed to identify waterbodies (lakes, streams, rivers, and drainage ditches) along the pipeline route. This review identified 183 waterbodies crossed by the proposed pipeline route, including 64 perennial streams and 119 intermittent streams. Sixty six of these waterbodies are designated as Protected Waters by the MDNR. The pipeline route crosses five major rivers that are approximately 100 feet or greater in width at the crossing location, including Hay Creek (MP 48.7), Straight River (MP 59.1), Long Prairie River (MP 107.8), North Fork of the Crow River (MP 187.7), and Minnesota River (MP 242.5). The mileposts, legal description, waterbody names, and notable resource characteristics for each waterbody crossing are provided in Appendix F and are summarized by county in Table 18.

TABLE 18
Summary of Waterbodies Crossed by the Pipeline Route [a/]

County	Perennial Waterbodies [b/]	Intermittent Waterbodies [c/]	Protected Waters [d/]	Wild and Scenic Rivers	State/County Canoe Routes	Trout Streams [e/]
Clearwater	4	12	5	1	1	-
Hubbard	6	1	5	-	-	2
Wadena	14	11	11	-	-	3
Todd	3	5	3	-	-	-
Morrison	5	9	5	-	-	-
Stearns	6	26	4	-	1	-
Meeker	8	6	7	1	1	-
Wright	1	4	1	-	-	-
McLeod	2	10	6	-	-	-
Carver	0	2	0	-	-	-
Sibley	2	4	4	-	1	-

TABLE 18, cont'd.
Summary of Waterbodies Crossed by the Pipeline Route [a/]

County	Perennial Waterbodies [b/]	Intermittent Waterbodies [c/]	Protected Waters [d/]	Wild and Scenic Rivers	State/County Canoe Routes	Trout Streams [e/]
Scott	10	13	12	-	-	-
Dakota	3	16	3	-	-	1
Total	64	119	66	2	4	6

[a/] Based on review of USGS 7.5-minute-series topographic maps, MDNR Protected Waters and Wetlands Inventory Maps, Minnesota Public Recreation Information Maps, and aerial photography.
[b/] P= Perennial as depicted on 1:24,000 USGS topographic maps
[c/] I = Intermittent as depicted on 1:24,000 USGS topographic maps
[d/] Protected = As depicted on MDNR Protected Waters and Wetlands Inventory Maps
[e/] Trout = Designated Trout Stream, Minnesota Rules 6264, Subp.4

9.1.2 Special Designated Waterbodies

Outstanding Resource Value Waters

The proposed route crosses two waterbodies designated as Outstanding Resource Value Waters (ORVW): Mississippi River and North Fork of the Crow River. These waterbodies are provided an additional level of protection to preserve their values for recreational, cultural, aesthetic, or scientific resources.

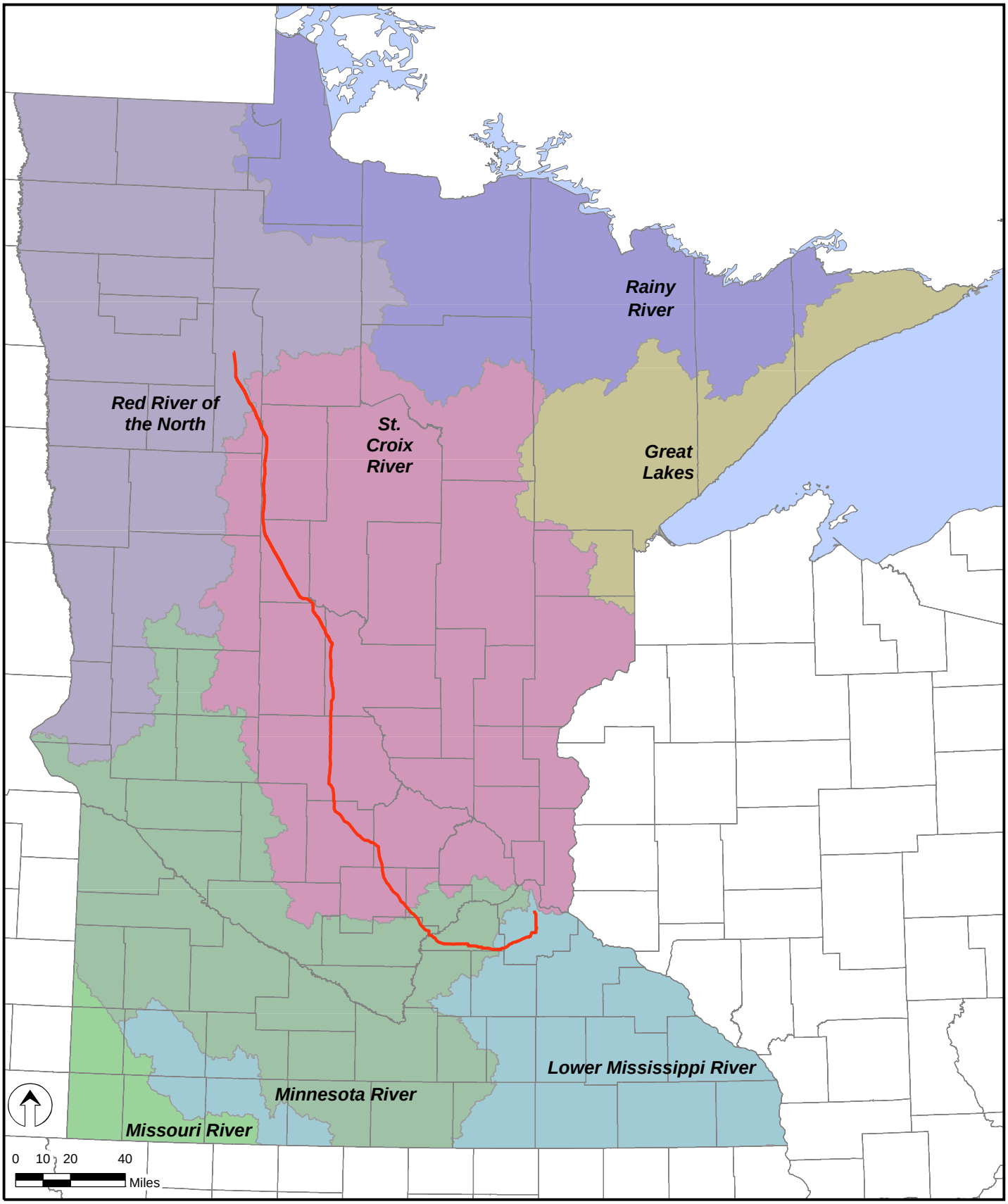
Wild and Scenic Rivers

As discussed in Section 11.1.2, the proposed pipeline route crosses the Mississippi River at MP 26.4 in a stretch of the river that has been designated by the Mississippi Headwaters Board as a Wild River. The Mississippi Headwaters Board's mission is to enhance and protect outstanding and unique natural, scientific, historical, recreational, and cultural values in the first 400 miles of the Mississippi River from its source at Lake Itasca in Clearwater County to the southern boundary of Morrison County.

The pipeline route also crosses the North Fork of the Crow River at MP 188.4. This section of the river is designated as a Minnesota Wild and Scenic River and is classified for recreational use. The river was added to Minnesota's Wild and Scenic River Program in 1976. This stretch of river also is designated as a State Canoe Route.

State and County Canoe/Boating Routes

The proposed pipeline route crosses three waterbodies listed as state Canoe/Boating Routes. These waterbodies include the Mississippi River (MP 26.4), North Fork of the Crow River (MP 188.4), and Minnesota River (MP 243.7). Additionally, the project will cross the Sauk River at MP 166.5, which has been listed by Stearns County as a county-designated canoe/boating route.

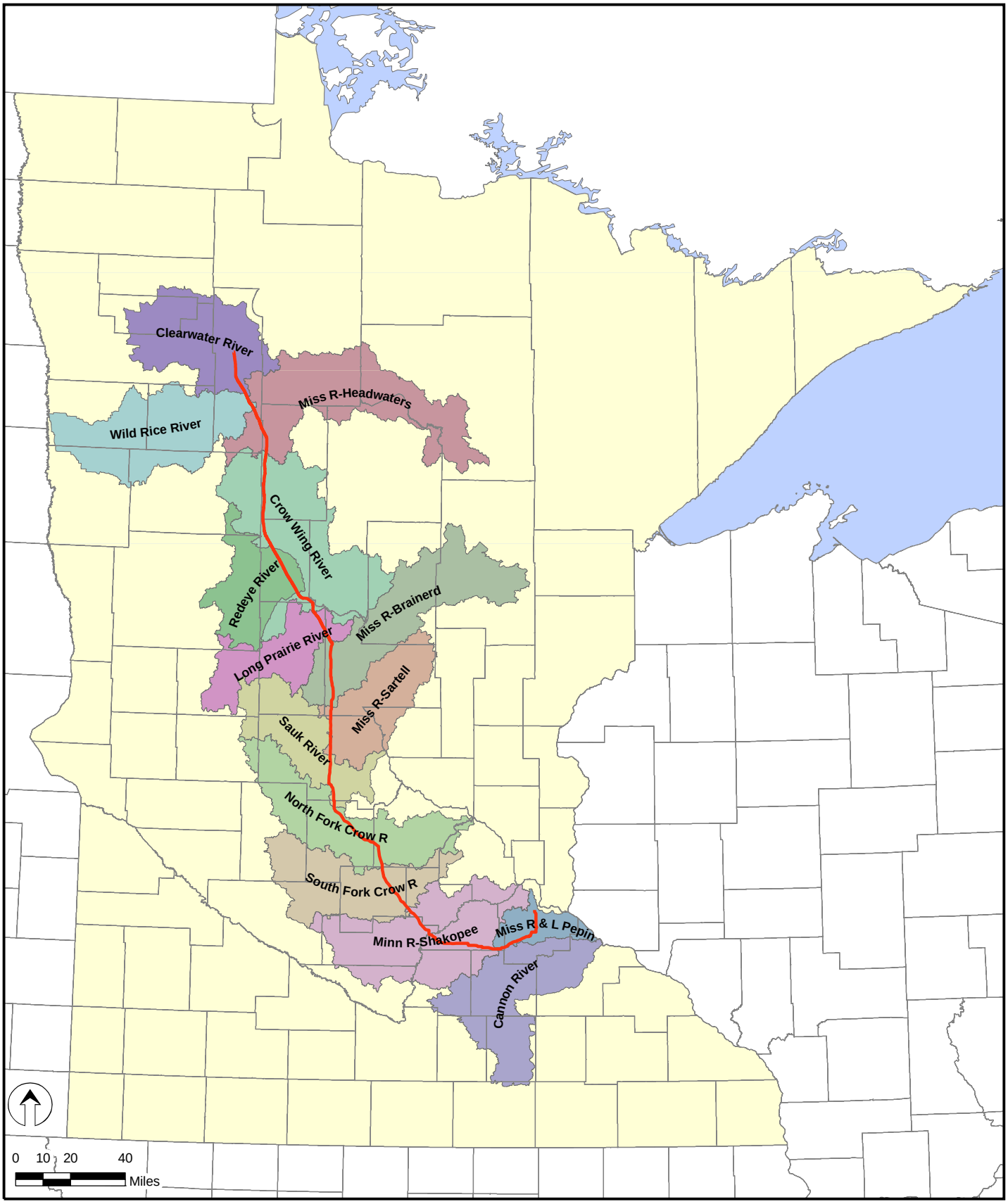


MINNCAN PROJECT

Figure 12
Major Drainage Basins

DATE: 12/10/05
REVISED: 12/10/05
SCALE: 1:3,125,000
DRAWN BY:RSMcGREGOR
M:\Clients\J-L\KPL\Central_MN_ArcGIS\PUC_RA_Sup_F12_Drain_Basins.mxd

NATURAL RESOURCE GROUP, INC.



MINNCAN PROJECT

Figure 13
Major Watersheds in Project Area

DATE: 12/10/05
REVISED: 12/10/05
SCALE: 1:3,125,000
DRAWN BY:RSMcGREGOR
M:\Clients\J-L\KPL\Central_MN_ArcGIS\PUC_RA_Sup_F13_Major_Watershed.mxd

NATURAL RESOURCE GROUP, INC.

State Designated Trout Streams

Minnesota Rule 6264, Subp. 4 designates trout streams in Minnesota. The pipeline route crosses six of these designated trout streams, including LaSalle Creek (MP 31.5), Straight River (MP 59.1), Cat River (MPs 71.2 and 72.5), Fawn Creek (MP 97.4), and Vermillion River (MP 287.5).

9.1.3 Waterbody Construction Methods

MPL is planning to install the pipeline under most streams using the open-cut method; however, a dry crossing method, such as the dam-and-pump or flume method, may be used where warranted by site conditions, stream type, and/or presence of sensitive species. MPL proposes to cross the designated trout streams using a dry crossing method (flume, dam-and-pump, or HDD), if technically feasible. MPL also is evaluating the use of the HDD method to cross the Mississippi River, North Fork of the Crow River, and Minnesota River. The following sections describe typical construction procedures that will be used to install the proposed pipeline across waterbodies.

Clearing and Grading

MPL will clear existing vegetation from the construction right-of-way as necessary to prepare for grading operations. A 10-foot buffer of undisturbed herbaceous vegetation will be maintained on stream banks until the trenching begins at the stream crossing. Woody vegetation within this buffer may be cut manually and removed during initial clearing of the right-of-way. Additionally, some limited grading at stream banks may be necessary to install temporary bridges across streams.

Prior to trenching, MPL may need to grade approaches to waterbodies to create a safe working surface and to allow for limitations on pipe bending. Temporary erosion control measures (*e.g.*, silt fences, straw bales) will be installed as necessary to minimize the potential for disturbed soils to enter the waterbody from the right-of-way (see the Erosion Control Plan and WWCMP in Appendices B and D, respectively). Extra workspaces at waterbody crossings typically will be set back 50 feet from the water's edge where topographic and other site conditions permit.

Spoil containment devices such as silt fence and/or straw bales will be installed and set back from the waterbody bank to minimize the potential for sediment to flow off the construction right-of-way and back into the waterbody. Grading will be directed away from the waterbody to reduce the potential for material to enter the waterbody.

Temporary Equipment Bridges

To allow the passage of equipment along the construction right-of-way, temporary bridges will be installed across waterbodies, with the possible exception of waterbodies that are too wide to bridge and minor waterbodies that do not have a state-designated fishery, such as agricultural and intermittent drainage ditches. Equipment bridges generally will be installed during the clearing and grading phase of construction. Construction equipment, with the exception of clearing/bridge installation equipment, will be required to use the bridge to cross over the waterbody. The clearing equipment typically must cross the streams prior to bridge installation. Care will be taken to minimize bed and bank disturbance during bridge installation.

Equipment bridges will consist of one of the following: clean rock placed over flume pipes; prefabricated construction mats placed over the waterbody with or without a culvert; or flexi-float or other temporary bridging. Equipment bridges will be designed to pass the maximum foreseeable flow of the stream, and maintained to prevent flow restriction while the bridge is in place. Bridges will be cleaned as necessary to minimize loose soil from equipment entering the stream. Bridges will be removed during final cleanup of the right-of-way.

Trenching and Installation

After the initial clearing and grading is completed, the pipeline will be installed across the waterbodies using one of these four methods: open-cut, dam-and-pump, flume, or HDD. These methods are described below.

Open-cut Method

The open-cut method is a waterbody crossing technique that often minimizes total duration of in-stream disturbance. This method will involve excavating the trench through the waterbody or ditch using draglines or backhoes operating from the stream banks. Spoil excavated from the waterbody bed or banks temporarily will be placed on the right-of-way at least 10 feet from the water's edge or in extra workspaces typically set back 50 feet from the water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. Spoil containment devices such as silt fences and/or straw bales will be installed to contain the spoil and to minimize the potential for sediment to flow off of the construction right-of-way and back into the waterbody.

During excavation of the in-stream trench, earthen "trench plugs" will be left at each end of the excavation to isolate the in-stream trench segment from the adjacent pipeline trench and to prevent the stream flow from entering the adjacent excavated pipeline trench. When the trench through the waterbody is excavated to the appropriate depth, the trench plugs will be removed and a prefabricated section of pipe will be positioned and lowered into the trench. The trench then will be backfilled and the pipeline ends will be tied into the adjacent pipeline segments.

MPL will attempt to complete in-stream trenching and backfilling within 24 hours for minor waterbodies (<10 feet wide) and within 48 hours for waterbodies greater than 10-feet-wide but less than 100-feet-wide. Site-specific crossing conditions, permit requirements, or weather conditions may extend the completion of crossings beyond these time frames.

Dam-and-Pump Method

The dam-and-pump method is a dry crossing method used for sensitive streams with low gradients and flow or sensitive streams with meandering channels. This method involves constructing temporary dams, generally consisting of sandbags, plastic sheeting, and/or steel bulkheads, across the waterbody upstream and downstream of the crossing prior to excavation. Pumps will be used to transport the stream flow around the construction area. Pumping activities will commence simultaneously with dam construction to prevent interruption of downstream flow. The downstream discharge will be directed into an energy-dissipation device (*e.g.*, splash pup, concrete weight, or equivalent) where required to prevent scouring of the waterbody bed or adjacent banks. The pump capacity will be greater than the anticipated flow of the waterbody being crossed. The pumping operation will be staffed continually and pumping will be monitored and adjusted as necessary to maintain flow of water downstream and prevent

excessive drawdown of the waterbody upstream of the construction area. Additionally, a backup pump or pumps will be onsite in the event that the primary pump(s) fails.

Once the dams and pumps have routed the stream flow around the construction area, the area between the dams will be pumped into a straw bale or similar dewatering structure. Dewatering structures will be located in well-vegetated upland areas, if present, and will be designed in a manner to prevent the flow of heavily silt-laden water into waterbodies or wetlands. Backhoes working from one or both waterbody banks, or within the isolated waterbody bed, will excavate the trench across the waterbody to the appropriate depth. Spoil will be temporarily stockpiled on the construction right-of-way at least 10 feet from the water's edge and/or in temporary extra workspaces at least 50 feet from the water's edge and contained by silt fence and/or staked straw bales.

After the trench is excavated to the proper depth, a prefabricated section of pipe will be positioned and lowered into the trench. The trench then will be backfilled with the material excavated from the stream, unless otherwise specified in federal or state stream crossing permits. The bottom contours of the streambed and the stream banks will be restored as near as practicable to preconstruction condition prior to removing the dams and returning the stream flow. Water that accumulates in the construction area will be pumped into a straw bale or similar dewatering structure prior to backfilling and/or removal of the dams.

Flume Method

The flume method is a dry crossing method used for sensitive, relatively narrow waterbodies free of large rocks and bedrock at the trenchline and that have a relatively straight channel across the construction right-of-way. The flume method generally is not appropriate for wide, deep, or heavily flowing streams. This method will involve placing one or more pipes (*i.e.*, flumes) in the waterbody bed to convey stream flow and isolate the construction area. The capacity of the flume(s) will be sufficient to transport the maximum flows that can be generated seasonally within the waterbody. Flume(s) typically will be 40 to 60 feet in length and will be installed before trenching. Flume pipes will be aligned to prevent impounding of water upstream of the construction area or to cause back-erosion downstream.

The upstream and downstream ends of the flume(s) will be incorporated into dams made of sandbags and plastic sheeting (or equivalent). The upstream dam will be constructed first and will funnel stream flow into the flume(s). The downstream dam will then be constructed to prevent water from flowing back into the area to be trenched. The dams will be monitored and adjusted as necessary to minimize leakage. The flume will remain in place until the portion of the pipeline under the stream is installed, the trench is backfilled, and the stream banks are restored.

Prior to trenching, the area between the dams typically will be dewatered. Then, backhoes located on one or both waterbody banks, or working within the isolated segment of the waterbody bed, will excavate a trench across the waterbody and under the flume(s). Excavated spoil material will be placed on the construction right-of-way and/or in temporary extra workspaces and will be contained by silt fences and/or staked straw bales. Water that accumulates in the construction area will be pumped into a dewatering structure prior to backfilling or removal of the dams.

After the trench is excavated to the proper depth, a prefabricated section of pipe will be positioned and lowered into the trench beneath the flume pipe(s). The trench then will be

backfilled with the material excavated from the stream unless otherwise specified in federal or state stream crossing permits. The bottom contours of the streambed and the stream banks will be restored as near as practicable to preconstruction conditions prior to removing the dams and flume pipes and returning the stream flow.

Horizontal Directional Drilling Method

MPL will evaluate use of the HDD method at selected waterbody crossings. This method can be used to minimize or avoid impacts on the streambed, banks, and associated riparian vegetation at the waterbody crossing. The feasibility of this method is dependent on subsurface geology and the length of the drill path. A standard straight crossing length of about 1,100 feet is needed for a 24-inch diameter pipeline. The method also requires temporary extra workspaces on both sides of the drilled area for materials and equipment associated with the drilling operation and to fabricate the pipeline segment that will be installed under the waterbody.

The HDD method will be accomplished in three general stages. The first stage will consist of drilling a small diameter pilot hole along a pre-determined path under the waterbody. The second stage will involve incrementally enlarging or "reaming" the pilot hole to a diameter that will accommodate the pipeline. The third stage will involve pulling a prefabricated segment of pipeline through the enlarged hole and then welding the pipe segment to the adjoining sections of pipeline.

Throughout the process of drilling and enlarging the pilot hole, a bentonite clay slurry ("drilling mud") will be circulated through the drilling tools to lubricate the drill bit, remove drill cuttings, and stabilize the open hole. Drilling mud will be recycled to the extent practicable, and after the pipeline is installed, the mud will be disposed of according to applicable regulations.

MPL will conduct geotechnical investigations to evaluate the feasibility of using the HDD method at the selected waterbodies. Geotechnical investigations are necessary because the pipeline route will cross regions with soils that may not be conducive to HDD technology, such as soils containing cobbles, boulders, layers of gravel, and/or non-cohesive sands. If these investigations determine that there potentially could be installation problems using the HDD method at the waterbody crossing, an alternate environmentally acceptable method will be specifically designed for the crossing.

Restoration and Revegetation

The following discussion on restoration and revegetation applies to streams crossed using the open-cut, dam-and-pump, and flume crossing methods. Typically, stream bank and streambed restoration and stream bank revegetation will not be necessary when the stream is crossed using the HDD method.

After the trench is excavated to the proper depth, a prefabricated section of pipe will be lowered into position and the trench will be backfilled with the material excavated from the stream. Backfilling will commence after the pipe is positioned in the trench at the desired depth. Backfill material will consist of the spoil material excavated from the trench unless otherwise specified in federal or state stream crossing permits. The bottom contours of the streambed and the stream banks will be restored as near as practicable to preconstruction contours and condition. Steep stream banks will be re-contoured to a more stable configuration. If there is a potential for significant bank erosion, the disturbed banks will be stabilized with rock riprap or other bank

protection measures. Jute thatching or erosion control blankets will be installed on the stream banks upslope of the riprap or on the entire bank if no riprap is used. The banks and adjacent disturbed areas will be seeded in accordance with seeding recommendations and/or permit stipulations, and mulch will be applied as needed on slopes. Stream banks will be stabilized and temporary sediment barriers will be re-installed within 24 hours of completing the crossing (weather and soil conditions permitting) to minimize the potential for sedimentation. Trench breakers will be installed at the stream banks, as needed, where slopes are adjacent to the waterbodies.

Flumes and temporary dams will be removed from the streambed after the crossing has been returned to original grade and the banks have been reconstructed and stabilized with erosion control materials. Temporary erosion control measures will be installed and maintained until permanent erosion control measures are installed and effective. Permanent slope breakers will be installed, where needed, across the full width of the right-of-way during final clean-up.

Where necessary for access, the travel lane portion of the construction right-of-way and the temporary bridge will remain in place until final clean-up activities. Temporary bridges will be removed after final clean-up, seeding, mulching, and other right-of-way restoration activities have been completed. The temporary erosion control measures will be removed after vegetation has been re-established.

The pipe section installed under the stream will be connected (tied-in) to the pipeline. If trench dewatering is necessary during the tie-in process, the water will be pumped into a filtration device located in a well-vegetated area and in a manner to prevent the flow of heavily silt-laden water into waterbodies or wetlands.

9.1.4 General Construction and Operation Impacts and Mitigation on Waterbodies

Pipeline construction across rivers and streams can result in temporary and long-term adverse environmental impacts if not mitigated. Temporary impacts from in-stream trenching could include an increase in the sediment load downstream of the crossing location. Sustained periods of exposure to high levels of suspended solids have been shown to cause fish egg and fry mortality and other deleterious impacts on fisheries and other aquatic resources. Surface runoff and erosion from the cleared right-of-way also can increase in-stream sedimentation during construction resulting in the shallowing of pools and a reduction of the quality of spawning beds and benthic substrate. MPL's proposed waterbody construction methods, specifically with respect to erosion control, bank stabilization, and bank revegetation, will minimize short- and long-term impact to the waterbodies along the pipeline route.

Long-term impacts on water quality can result from alteration of the streambanks and removal of riparian vegetation. Soil erosion associated with surface runoff and streambank sloughing can also result in the deposition of sediments in waterbodies. Sediments deposited on the stream bed gravels could result in fish egg mortality and damaged spawning habitat. Removal of riparian vegetation also can lead to increased light penetration into the waterbody, causing increased water temperature which potentially could be detrimental to coldwater fisheries.

MPL will avoid and minimize impacts to waterbodies by implementing the erosion and sediment control measures described in the WWCMP (Appendix D). MPL also will limit the duration of construction within waterbodies and limit equipment operation within waterbodies to the area necessary to complete the crossing. Disturbed areas at crossings will be restored and stabilized as soon as practical after pipeline installation.

Alternative construction techniques (such as HDD or dry crossing methods) may be used at selected waterbodies to avoid and minimize impacts to these waterbodies. The HDD method is a well-established construction technique for installing pipelines under large waterbodies that avoids impacts associated with conventional open-cut methods. HDD installations have the potential to affect waterbodies, however, through inadvertent releases of drilling muds during construction. If HDD is used to cross waterbodies, MPL will develop and implement an HDD Mitigation Plan that outlines the procedures to be followed to prevent an inadvertent release of drilling mud or to minimize environmental effects in the event that a release occurs.

Spills from refueling operations, fuel storage, or equipment failure in or near a waterbody could affect aquatic resources and contaminate the waterbody downstream of the release point. MPL will minimize the potential impact of spills of hazardous materials by adhering to the relevant provisions in its WWCMP (Appendix D).

9.1.5 Hydrostatic Testing

MPL will hydrostatically test the new pipe to verify its integrity prior to placing the pipeline in service. Hydrostatic testing will be conducted in accordance with the OPS regulations. The procedure consists of filling a section of pipe with water and maintaining a prescribed pressure for a prescribed period of time.

MPL is evaluating potential sources for appropriating hydrostatic test water, including major waterbodies crossed by or adjacent to the proposed pipeline and/or groundwater sources such as high-capacity irrigation wells or municipal wells. MPL also is evaluating transferring water from one test section to another to minimize the total quantity of water needed to complete the hydrostatic test. MPL will obtain the applicable water appropriation and discharge permits for hydrostatic testing activities.

Water used for hydrostatic testing will be discharged on land, returned to the waterbody where it was appropriated, or discharged to a different waterbody after hydrostatic testing is completed, depending on the National Pollutant Discharge Elimination System (NPDES) permit stipulations. If the water is discharged to an upland area, energy dissipation devices such as straw bale structures and controlled discharge rates will minimize the potential for erosion and subsequent release of sediment into nearby surface waters and wetlands. If hydrostatic test water is discharged directly into waterbodies, energy dissipation devices will be used to reduce the discharge energy to prevent stream bottom scour. MPL also will control the rate of discharge to prevent stream bottom scouring. No chemical additives will be introduced to the water used to hydrostatically test the new pipeline, and no chemicals will be used to dry the pipeline following the hydrostatic testing.

9.2 WETLAND CROSSINGS

MPL identified wetlands along the pipeline route using NWI map data in digital format. This allowed digital analysis of wetland crossings using ArcView GIS® software. In addition, aerial photographs of the pipeline route were used in conjunction with the NWI maps to determine if wetlands adjacent to the proposed right-of-way could be affected by pipeline construction.

For routing and planning purposes, MPL used the NWI data to estimate the number, size, and locations of wetlands along the pipeline route. MPL will conduct wetland delineation surveys along the pipeline route in the summer of 2006 to more accurately identify the wetlands that will be affected during project construction. Wetlands will be delineated and mapped in general

accordance with the Routine Determination Method as specified in the *Corps of Engineers Wetland Delineation Manual* (U.S. Army Corps of Engineers, 1987).

9.2.1 Existing Wetland Resources

The analysis of the NWI data identified approximately 32.6 miles of wetlands along the pipeline route, which is about 11 percent of the total length of the pipeline. Emergent wetlands (PEM) are the predominant wetland type, accounting for about 21 miles (or 64 percent) of the wetlands crossed by the pipeline route. Other wetland types along the pipeline route are: scrub-shrub wetlands (PSS; 7.5 miles or 23 percent); forested and/or partially forested wetlands (PFO, PEM/PFO, and PSS/PFO; 4 miles or 12 percent); and unconsolidated bottom wetlands (PUB; 0.1 mile or 0.4 percent). Wetlands listed as either riverine (R) or lucustrine (L) on NWI maps have been included in the waterbody discussion above. Table 19 provides a summary of the NWI wetland types identified along the pipeline route by county; this summary includes the length of the crossing and the area to be affected by construction and operation of the pipeline. Individual wetlands along the pipeline route are listed in Appendix G. Common plant species found in wetlands crossed by the pipeline route are discussed in Section 7.1.1.2.

TABLE 19
Summary of NWI-Mapped Wetland Impacts Identified Along the Pipeline Route

County	Wetland Type (Cowardin Classification) [a/]	Crossing Length (feet)	Area Affected During Construction (acres) [b/]	Area Affected During Operation (acres) [c/]
Clearwater	PEM	4,450	10.7	0.0
	PEM/SS	3,434	7.8	2.8
	PSS	5,372	12.2	4.3
	PSS/EM	1,713	4.0	1.4
	PFO [d/]	9,536	21.9	7.9
Subtotal		24,505	56.6	16.4
Hubbard	PEM	1,869	4.3	0.0
	PEM/SS	298	0.7	0.2
	PSS	806	1.8	0.6
	PSS/EM	1,988	4.8	1.6
	PFO [d\]	2,272	5.2	2.5
	PUB	95	0.2	0.0
Subtotal		7,328	17.0	4.9
Wadena	PEM	7,013	16.1	0.0
	PEM/SS	2,984	6.9	2.4
	PSS	6,561	14.9	5.6
	PSS/EM	4,857	11.2	3.9
	PFO	7,087	16.4	5.7
Subtotal		28,502	65.5	17.6
Todd	PEM	3,755	8.5	0.0
	PSS	10,164	23.3	9.1
Subtotal		13,919	31.8	9.1
Morrison	PEM	19,173	44.0	0.0
	PEM/SS	268	0.6	0.3
	PSS	4,213	9.6	4.3
	PSS/EM	820	1.9	0.9

TABLE 19, cont'd.
Summary of NWI-Mapped Wetland Impacts Identified Along the Pipeline Route

County	Wetland Type (Cowardin Classification) [a/]	Crossing Length (feet)	Area Affected During Construction (acres) [b/]	Area Affected During Operation (acres) [c/]
Morrison, cont'd.	PFO	520	1.2	0.5
	PUB	323	0.8	0.0
Subtotal		25,317	58.1	5.5
Stearns	PEM	18,053	41.6	0.0
	PSS	412	0.9	0.5
	PSS/EM	1,177	2.7	1.4
	PFO	250	0.6	0.3
	PUB	39	0.1	0.0
Subtotal		19,931	45.9	2.2
Meeker	PEM (PEM/UB)	6,324	14.5	0.0
	PSS/EM	1,570	3.6	1.8
	PFO	204	0.5	0.2
Subtotal		8,098	18.6	2.0
Wright	PEM	4,000	9.2	4.6
Subtotal		4,000	9.2	4.6
McLeod	PEM	12,275	28.2	0.0
Subtotal		12,275	28.2	0.0
Carver	PEM	1,482	3.4	0.0
Subtotal		1,482	3.4	1.7
Sibley	PEM	6,299	14.4	0.0
	PFO [d/]	361	0.8	0.4
	PUB	104	0.2	0.0
Subtotal		6,764	15.4	0.4
Scott	PEM	14,554	33.5	0.0
	PFO [d/]	839	1.9	1.1
	PUB	112	0.3	0.0
Subtotal		15,505	35.7	1.1
Dakota	PEM	4,631	10.7	0.0
Subtotal		4,631	10.7	0.0
All Counties	PEM (PEM/UB)	103,879	239.1	0.0
	PEM/SS	6,984	16.0	5.7
	PSS	27,528	62.7	24.4
	PSS/EM	12,125	28.2	11.0
	PFO [d/]	21,069	48.5	17.8
	PUB (PUB/EM)	673	1.6	0.0
Total		172,258	396.1	58.9

[a/] Cowardin Classification System:
PEM = Palustrine Emergent PSS = Palustrine Scrub/Shrub
PFO = Palustrine Forested PUB = Palustrine Unconsolidated Bottom

[b/] Acreage based on 100-foot-wide construction right-of-way

[c/] Acreage based on 35-foot-wide maintained right-of-way where paralleling existing pipeline(s)
Acreage based on 50-foot-wide maintained right-of-way where not paralleling existing pipeline(s)

[d/] Acreage for partially forested wetlands (PEM/PFO and PSS/PFO) have been included in the forested wetland affected acreage calculations.

Based on NWI wetland data, the proposed pipeline will cross 38 wetlands and/or wetland complexes where the total proposed crossing length is greater than 1,000 feet (Table 20). These 38 wetland crossings account for approximately 13.3 miles of the total wetland crossing lengths. Most of these larger wetlands are emergent wetlands that are temporarily flooded or seasonally flooded; however, nine of these wetlands are classified as forested or partially forested. The proposed route crosses seven of these nine large forested and/or partially forested wetlands in the northern portion of the route where the pipeline will be adjacent to MPL's existing pipelines. NWI data and a review of 2005 aerial photography suggests that several of the larger NWI mapped wetlands in Stearns, Meeker, Wright, McLeod, Sibley, and Scott Counties either are partially or completely farmed. MPL will verify the size and characteristics of these wetlands as part of its field delineations to be conducted in 2006.

TABLE 20
Summary of NWI-Mapped Wetland Crossings Greater than 1,000 Feet

County	Approximate Milepost	Wetland Type (Cowardin Classification) [a/]	Crossing Length (feet)	Area Affected During Construction (acres) [b/]	Area Affected During Operation (acres) [c/]
Clearwater	0.1 – 0.3	PSS/FO	1,187	2.7	0.9
	4.3 – 4.5	PSS/FO	1,365	3.1	1.1
	12.7 – 13.0	PSS/EM, PFO	1,773	4.1	1.4
	18.7 – 19.3	PFO/SS, PEM	3,277	7.5	2.6
Wadena	66.7 – 67.3	PEM/SS, PSS/EM	3,203	7.3	2.6
	71.0 – 71.2	PFO	1,052	2.4	0.8
	80.3 – 80.7	PFO/EM	1,808	4.2	1.5
	82.1 – 82.5	PSS/EM, PEM	2,141	4.9	1.7
	82.9 – 83.2	PEM, PFO/SS, PFO, PSS	1,703	3.9	1.4
	83.6 – 83.8	PEM, PSS, PEM/SS	1,465	3.4	1.2
Todd	104.2 – 104.4	PSS, PEM	1,268	2.9	1.0
	1047 – 105.2	PSS	2,572	5.9	2.1
	109.5 – 110.4	PEM, PSS	4,902	11.3	4.0
Morrison	119.5 – 119.9	PEM	1,665	3.8	1.9
	120.9 – 121.3	PEM	2,237	5.2	2.6
	122.4 – 122.7	PEM, PSS	1,552	3.6	1.8
	126.2 – 126.4	PEM	1,005	2.3	1.1
	137.4 – 137.7	PEM, PFO	1,713	3.9	2.0
	144.3 – 144.7	PEM, PSS, PEM/SS	1,961	4.5	2.3
Stearns	152.7 – 153.0	PEM	1,394	3.2	1.6
	153.5 – 154.2	PSS/EM, PEM	3,199	7.3	3.7
	157.7 – 157.9	PEM	1,094	2.5	1.3
	158.9 – 159.1	PEM	1,159	2.7	1.3
	166.2 – 166.5	PSS, PEM	1,289	3.0	1.5
Meeker	193.6 – 193.9	PEM	1,333	3.1	1.5
	196.3 – 196.7	PEM	1,645	3.8	1.9
	197.6 – 197.8	PSS/EM	1,147	2.6	1.3
Wright	206.6 – 206.8	PEM	1,268	2.9	1.5
	210.1 – 210.4	PEM	1,470	3.4	1.7

TABLE 20, cont'd.
Summary of NWI-Mapped Wetland Crossings Greater than 1,000 Feet

County	Approximate Milepost	Wetland Type (Cowardin Classification) [a/]	Crossing Length (feet)	Area Affected During Construction (acres) [b/]	Area Affected During Operation (acres) [c/]
McLeod	216.8 – 217.1	PEM	1,685	3.9	1.9
	221.7 – 222.1	PEM	2,169	5.0	2.5
	223.5 – 223.8	PEM	1,247	2.9	1.4
	227.3 – 227.8	PEM	2,350	5.4	2.7
Sibley	236.1 – 236.6	PEM, PEM/FO	2,365	5.4	2.7
	237.4 – 237.8	PEM	1,878	4.3	2.2
Scott	266.4 – 266.8	PEM	2,094	4.8	2.4
	269.8 – 270.1	PEM	1,155	2.6	1.3
Dakota	273.6 – 273.8	PEM	1,039	2.4	1.2

[a/] Cowardin Classification System:
PEM = Palustrine Emergent PSS = Palustrine Scrub/Shrub
PFO = Palustrine Forested PUB = Palustrine Unconsolidated Bottom
REM = Riverine emergent

[b/] Acreage based on 100-foot-wide construction right-of-way

[c/] Acreage based on 35-foot-wide maintained right-of-way where paralleling existing pipeline(s)
Acreage based on 50-foot-wide maintained right-of-way where not paralleling existing pipeline(s)

9.2.2 Protected Wetlands

The pipeline route crosses eight wetlands (public water wetlands) listed on the MDNR Protected Waters Inventory. Public water wetlands are Type 3, 4, and 5 wetlands, as defined in the USFWS Circular No. 39 (1971 edition), that are 10 acres or more in size in unincorporated areas or 2.5 acres or more in incorporated areas. Type 3, 4, and 5 wetlands are defined as inland shallow fresh marshes; inland deep fresh marshes; and inland open fresh water, shallow ponds, and reservoirs. These wetlands are regulated as public waters under MDNR's Public Waters Permit Program. The eight protected wetlands are listed in Table 21.

TABLE 21
Protected Wetlands Crossed by the Pipeline Route

County	Milepost	Wetland Identification Number
Clearwater	2.4	Wetland 442W
Hubbard	48.7	Wetland 554W
	56.6	Wetland 550W
Wadena	93.0	Wetland 40W
Sibley	243.5	Wetland 2W
Scott	244.0	Wetland 319W
	271.4	Wetland 302W
	271.8	Wetland 303W

9.2.3 Wetland Construction Methods

Typical pipeline construction in most wetlands will be similar to construction in uplands and will consist of clearing, trenching, dewatering, installation, backfilling, cleanup, and revegetation. Due to the unstable nature of some wetland soils, however, special construction techniques that

differ somewhat from standard upland procedures also will be implemented. In general, construction activities will be minimized in wetlands to reduce the disturbance to vegetation and soils and to maintain wetland hydrology. Descriptions of these activities and a typical construction schematic illustrating a wetland crossing are provided in the WWCMP (Appendix D).

Clearing and Grading

Vegetation within wetlands will be cut off at the ground level, leaving existing root systems intact to preserve natural sources of rootstock and to facilitate revegetation of the native wetland species after construction. Stumps only will be removed over the trench line and where necessary for safe operation of equipment. Trees, shrubs, and stumps that are removed will be disposed of properly outside of the wetlands.

Where wetland soil conditions cannot support construction equipment, timber construction mats will be installed to create a stable surface for the operation of equipment, or low ground pressure equipment will be used. Temporary sediment controls also will be installed as needed to minimize the potential for soil to leave the construction right-of-way.

Trenching, Pipe Assembly, and Installation

The pipeline trench typically will be excavated in wetlands using a backhoe excavator. In unsaturated wetlands, up to 12 inches of surficial soils will be stripped from the trench line and stockpiled separately from trench spoil to preserve existing seed stock and to promote revegetation following construction.

If the soils in the wetland area are stable and capable of supporting equipment with or without timber construction mats, the pipe will be strung, welded, and lowered into the trench similar to construction in upland areas. When water is present in the trench, the trench may be dewatered temporarily and/or the pipe may be flooded to sink it into the trench. The pipeline will be weighted with concrete or other methods to provide negative buoyancy and hold the pipeline at the prescribed depth.

It may not be feasible to use the construction methods described above for crossing large wetlands with standing water, saturated soils, and/or unstable soil conditions. In these wetlands, the trench typically will be dug by a backhoe supported on timber mats, but it often is not feasible to separate topsoil. The pipeline crossing will be assembled in an upland area and floated across the wetland in the excavated trench using the “push-pull" and/or "float" techniques. When the pipeline is in position, floats, if used, will be removed and the pipeline will be sunk into position and the pipe welded to the upland portion of the pipeline.

Backfilling, Cleanup, and Revegetation

After the pipeline is installed in the trench, MPL will backfill the trench with the spoil excavated from the wetland. In areas where the surficial soils have been segregated, these soils will be replaced after the subsoil is backfilled to facilitate the natural revegetation process. MPL will restore the original contours of the wetland to the extent practical and any excess backfill material will be removed to an upland area. If dewatering of the trench is necessary during the backfilling process, it will be conducted in a manner designed to prevent heavily silt-laden water from entering a waterbody or undisturbed portions of the wetland. Timber construction mats, if used, will be removed during the cleanup operations.

MPL will consult with the U.S. Army Corps of Engineers (COE) and the MDNR to determine the appropriate revegetation recommendations. In the absence of specific revegetation requirements from these agencies, and with the exception of farmed or saturated wetlands, MPL will seed unsaturated wetlands with a temporary cover crop of annual ryegrass. No lime, mulch, or fertilizer will be used in wetlands.

9.2.4 General Construction and Operation Impacts and Mitigation on Wetlands

The NWI data indicates that about 513 wetlands will be crossed by the project (Appendix G). Assuming a 100-foot-wide construction right-of-way, pipeline construction across these wetlands will result in temporary impacts to approximately 396 acres of wetland (Section 4.2 shows a larger acreage [469 acres] of wetlands and open water affected by the proposed project, which is based on USGS land use data and includes wetlands and open water). A summary of these wetland impacts is provided in Table 19.

No wetlands will be drained or permanently filled as a result of constructing the project; however, pipeline construction will result in minor, short-term disturbances to wetlands. These short-term effects include the temporary loss of wetland vegetation, aesthetics, and wildlife habitat due to clearing and other construction activities; soil disturbance due to trenching, equipment traffic, and the removal of stumps; and temporary increases in turbidity and fluctuations in wetland hydrology due to trenching and spoil storage. The impact on forested and scrub-shrub wetlands will be of longer duration than other wetland types since woody vegetation will require additional time to re-establish on the right-of way after construction. MPL will minimize wetland impacts by implementing the mitigation measures described in its WWCMP.

Approximately 239 acres of palustrine emergent wetland will be affected temporarily by pipeline construction. No long-term impacts are anticipated on emergent wetlands. The wetlands will be restored to preconstruction conditions and the herbaceous vegetation will be allowed to naturally revegetate in these areas.

Approximately 107 acres of palustrine scrub-shrub wetland and 48 acres of palustrine forested wetland will be cleared and temporarily disturbed during pipeline construction. The impacts to scrub-shrub wetlands and forested wetlands will be of a longer duration than emergent wetlands because the woody vegetation typical of these wetlands will require a longer time to re-establish on the temporary right-of-way after restoration.

After construction, MPL periodically will remove woody vegetation from forested and scrub-shrub wetlands within the permanently maintained right-of-way to facilitate aerial and ground inspections of the pipeline corridor. In areas adjacent to its existing pipeline corridor, MPL will maintain an additional 35-foot-wide right-of-way in an herbaceous state; MPL similarly will maintain a 50-foot-wide permanent right-of-way along the new corridor in an herbaceous state. These maintenance activities will result in the permanent conversion of about 18 acres of forested wetland to scrub-shrub and herbaceous wetland, and about 41 acres of scrub-shrub wetland to herbaceous wetland within the permanent and maintained rights-of-way.

10.0 CULTURAL RESOURCES

10.1 EXISTING CULTURAL RESOURCES

MPL reviewed existing site file data maintained by the Minnesota Historical Society to identify previously recorded cultural resources within the proposed construction right-of-way. This review identified two archaeological sites and one historic built property. One of the archaeological sites, a historic ghost town (21CRo), and the built property, a historic school house (DK-RSC-008), are known only from historical accounts and map sources; the locations and boundaries of these sites have not been verified by field survey. The other site (21HB61) consists of the remains of a historic school; its location was confirmed by a previous archaeological survey. None of the three resources have been assessed for listing in the National Register of Historic Places (NRHP).

MPL also checked the SHPO's site files to determine if any portion of the proposed route was surveyed previously for cultural resources. This review identified 11 previous inventories or other cultural resource investigations in the vicinity of the proposed route; however, it does not appear that these investigations examined any significant portion of the pipeline route (Caine and Goltz 2000, 2001; Hackett, 1978; Harrison, 2003; Johnson, 1991; Lofstrom and Van Brocklin Spaeth, 1978; Minnesota State Historic Preservation Office, 1977; O'Connell and Wedding, 1985; Peterson and Pfutzenreuter, 1979, 1980; and Winham *et al*., 1996).

10.2 CONSULTATION WITH FEDERAL AND STATE AGENCIES

MPL initiated consultation with the St. Paul District of the COE for its project. Pursuant to Section 106 of the National Historic Preservation Act (16 USC 470), the COE will review the project for effects to cultural resources that are listed on or eligible for listing on the NRHP prior to issuing Section 404 and Section 10 permits for the project. MPL also initiated consultation with the Minnesota State Historic Preservation Officer (SHPO). The SHPO will assist the COE in reviewing the project for effects to listed or eligible properties.

In conjunction with the COE and SHPO, MPL will develop a sensitivity model for the occurrence of undocumented cultural resources along the pipeline route. The model will stratify the route into areas with high, moderate, and low probabilities for containing previously undocumented resources. The model will be based on distributions of known sites in the vicinity of the pipeline route as well as environmental variables that are good predictors for site locations. These variables will include distance to water, landform, slope, and other variables.

Once the model is reviewed and approved by the COE and SHPO, MPL will develop and implement a protocol for field surveys. The surveys will target those areas identified in the sensitivity model as having high or moderate probabilities for containing undocumented cultural resources. The surveys also will attempt to relocate the previously recorded sites described above. Sites identified or relocated during the survey will be evaluated for listing in the NRHP. MPL anticipates that the field surveys will be conducted between the spring and fall of 2006. The survey results will be summarized in an inventory report and submitted to the COE and SHPO for review.

10.3 TRIBAL CONSULTATIONS

The COE is responsible for consulting with federally recognized Indian tribes as part of the Section 106 process. For the MinnCan Project, MPL anticipates that the COE will contact the

following tribes: Red Lake Band of Chippewa Indians, White Earth Band of Chippewa, Leech Lake Band of Chippewa, Mille Lacs Band of Objibwe, Upper Sioux Indian Community, Lower Sioux Indian Community, Shakopee Mdewakanton Sioux Community, and Prairie Island Indian Community. MPL will assist the COE with tribal consultations as directed.

White Earth Indian Reservation

A short segment of the proposed route, from approximate MP 13.5 to 17.8, passes through a township (T146N, R37W) that is located within the original proclamation boundaries of the White Earth Indian Reservation. This township, along with three others, however, was ceded to the United States in 1889. Four recent court cases have confirmed that these townships properly were ceded and no longer are part of the reservation. State of Minnesota vs. Clark (1979) concluded that the four townships are not part of the reservation. This was reaffirmed in White Earth Band of Chippewa Indians v. Alexander (1981), which held that "the four northeastern townships of the original reservation are no longer part of the White Earth Reservation". In White Earth Band of Chippewa Indians v. Alexander (1982), the court recognized the restoration of some lands to the reservation pursuant to the Indian Reorganization Act, but held that the four ceded townships were disestablished from the reservation. Finally, State of Minnesota v. Butcher (1997) concurred with the previous court findings that "the four ceded townships are no longer part of the White Earth Reservation". Therefore, MPL concludes that its project does not cross any portion of the White Earth Indian Reservation. The land along the proposed route between approximate MPs 13.5 and 17.8 currently is in private ownership.

10.4 GENERAL CONSTRUCTION AND OPERATION IMPACTS AND MITIGATION

As noted above, MPL will conduct a field survey to identify cultural resources along the pipeline route. If the survey identifies any sites that are eligible for listing in the NRHP, MPL will consult with the COE and SHPO to identify measures to avoid, minimize, or mitigate adverse effects on these sites. These measures may include routing the pipeline around identified sites; installing the pipeline beneath the sites using conventional bore or HDD technology; fencing sites or portions of sites to ensure that they are not disturbed during construction; monitoring of construction activities by an archaeologist; or archaeological data recovery at the sites.

MPL also will develop and implement an unanticipated discoveries plan. This plan will describe measures to be followed in the event that a previously undocumented cultural resource site is discovered during construction activities. These measures will include documenting and evaluating the site; consulting with the COE and SHPO; and implementing measures to avoid, minimize, or mitigate adverse effects to the site if the site is eligible for listing on the NRHP.

11.0 FEDERAL, STATE, AND COUNTY RECREATIONAL AREAS

11.1 EXISTING DESIGNATED RECREATIONAL AREAS

The pipeline route crosses several designated recreational areas, including WPAs, a wildlife management area (WMA), state and county managed forest lands, state- and county-designated trails and canoeing and boating routes, and designated scenic byways. Table 22 identifies the public lands and designated recreational areas along the proposed pipeline route.

TABLE 22
Public Lands and Designated Recreation Areas Crossed by the Pipeline Route

County Approximate Milepost	Land Management Agency	Features
Clearwater		
9.8 - 9.9 10.5 - 10.5	Minnesota Department of Natural Resources	State Forest Land
11.0 - 11.1	Clearwater County	County Forest Land
12.7 - 12.9 18.7 - 18.8	Minnesota Department of Natural Resources	State Forest Land
19.3 - 19.9 20.5 - 20.7 23.6 - 24.1 25.7 - 26.1	Clearwater County	County Forest Land
26.3	Great River Road State Scenic Byway	County Highway 40
26.4	Minnesota Department of Natural Resources Mississippi Headwaters Board	Mississippi River, State Designated Canoe and Boating Route
26.5 – 27.0	Clearwater County	County Forest Land
27.0 - 27.5	Minnesota Department of Natural Resources	Mississippi Headwaters State Forest
27.9 - 28.0 30.7 - 31.3	Clearwater County	County Forest Land
Hubbard		
31.3 - 31.5 31.8 - 31.8 32.1 - 33.2 35.4 - 35.9 36.7 - 37.5	Hubbard County	County Forest Land
37.7	Great River Road State Scenic Byway	U.S. Highway 71/ State Highway 200
38.0 - 40.0	Hubbard County	County Forest Land
40.0 - 40.3	Minnesota Department of Natural Resources	State Forest Land
40.3 - 41.5 41.8 - 42.3	Hubbard County	County Forest Land
47.6	Lake Country State Scenic Byway	U.S. Highway 71
51.7 - 52.9	Hubbard County	County Forest Land
56.4	Lake Country State Scenic Byway	State Highway 34
59.0 - 59.2	Minnesota Department of Natural Resources	State Forest Land
Wadena		
70.8 - 71.1	Minnesota Department of Natural Resources	State Forest Land
71.6 - 71.7	Minnesota Department of Natural Resources	State Designated Trout Stream

TABLE 22, cont'd.
Public Lands and Designated Recreation Areas Crossed by the Pipeline Route

County Approximate Milepost	Land Management Agency	Features
Todd		
104.2 - 104.5	Minnesota Department of Natural Resources	Villard Wildlife Management Area
109.4 - 109.6 110.0 - 110.2	Todd County	County Forest Land
Morrison		
114.5 - 114.8	Morrison County	County Forest Land
118.6 - 118.8	Minnesota Department of Natural Resources	State Forest Land
Stearns		
155.8	Stearns County Parks Department, Lake Wobegon Trails Organization	Lake Wobegon Regional Trail
166.2	Stearns County Parks Department	Sauk River-County Canoe Route
169.1	Minnesota Department of Natural Resources	Glacial Lakes State Trail
Meeker		
181.1 - 181.3 181.7 - 182.0	U.S. Fish and Wildlife Service	Tyrone Flats Waterfowl Production Area
188.4	Minnesota Department of Natural Resources Meeker County	North Fork of the Crow River – State Designated Canoe and Boating Route, State Wild and Scenic River designation
McLeod		
214.6	Minnesota Department of Natural Resources	Luce Line State Trail
225.4 - 225.7	Minnesota Department of Natural Resources	Buffalo Creek
Carver		
232.8 - 233.3	U.S. Fish and Wildlife Service	Perbix Waterfowl Production Area
Sibley		
242.4	Minnesota River Valley State Scenic Byway	County Highway 6
242.5	Minnesota Department of Natural Resources	Minnesota River, State Designated Canoe and Boating Route
Total Federal-owned land		1.0 mile
Total State-owned land		3.2 miles
Total County-owned land		11.1 miles

Sources: MDNR, 1998
MDNR, MIS Bureau, 2003
MDNR, 2005a

11.1.1 Federally Designated Recreation Areas

National Waterfowl Production Areas

WPAs are federal lands acquired through the sale of duck stamps and managed by the USFWS for the production of waterfowl. These lands are part of the National Wildlife Refuge System and are open to the public for recreational activities, including hunting and bird watching; motorized recreation is prohibited.

The proposed pipeline will cross two WPAs. The first one, Tyrone Flats WPA, is located in Meeker County, and the pipeline route crosses it between MPs 181.1 and 181.3 and between

MPs 181.7 and 182.0, adjacent to Kalkenbrenner Slough. The area is under the management of the Litchfield Wetland Management District. This WPA does not have improved recreational facilities.

The pipeline route crosses the Perbix WPA between MPs 232.8 and 233.3 in Carver County. This WPA is 219 acres in size, of which 60 acres are wetlands. The area is under the management of the Minnesota Valley National Wildlife Refuge. This WPA does not have improved recreational facilities.

MPL will consult with the USFWS on the crossings of these WPAs and will comply with the applicable permit requirements.

11.1.2 State-Designated Recreation Areas

State Forest Land

The pipeline route crosses approximately 3.2 miles of state managed forest land, including 0.5 mile of the Mississippi Headwaters State Forest. State forest lands are managed for natural resources in addition to providing recreational opportunities for a variety of outdoor activities such as hunting, bird watching, berry picking, and nature photography. In general, the pipeline route crosses isolated forested parcels without improved recreational facilities. These parcels generally are accessed by forest roads and logging trails. MPL will be required to obtain a license from the MDNR to construct the pipeline across these state forests.

State Wildlife Management Areas

WMAs are state lands that are actively managed for wildlife production and provide habitat for many wildlife species. WMAs are open to the public for recreational activities such as bird and wildlife watching, hunting, and trapping. WMAs generally are closed to motorized vehicles and horses. The proposed pipeline will cross the Villard WMA between MPs 104.2 and 104.5. The pipeline route also will be located within close proximity to the Little Elk WMA near MP 126. Similar to the state forests, MPL will be required to obtain a license from the MDNR to construct the pipeline across the Villard WMA.

State-Designated Trails and Canoe and Boating Routes

<u>Mississippi River</u>

The pipeline route crosses the Mississippi River in Clearwater County at MP 26.4. This section of the river is a state-designated Canoe and Boating Route managed by the MDNR. The MDNR has developed this portion of the river with canoe access sites, primitive campsites, and drinking water sources. The nearest developed facility is located approximately 1.5 miles downstream of the proposed pipeline crossing location and it includes a canoe carry-in access site, primitive campsites, and a drinking water source.

The U.S. Department of the Interior conducted a Wild and Scenic River Study of the Mississippi River in 1977. As an alternative to Federal Wild and Scenic River Designation, the Mississippi Headwaters Board was formed in 1980 to protect and enhance the shoreland areas adjacent to the river along its first 400 miles. At the pipeline crossing location, the Mississippi River is classified as a Wild River. This designation provides a 2,000-foot-wide corridor in which certain land use changes must be certified by the Board.

To avoid environmental impacts and disrupting boating traffic on this segment of the river, MPL will install the proposed pipeline across the Mississippi River using HDD techniques, if feasible. In addition, MPL will consult with the Mississippi Headwaters Board regarding the construction and operation of the proposed pipeline.

Glacial Lakes State Trail

The pipeline route crosses the future east extension of Glacial Lakes State Trail at MP 169.1 in Stearns County. This trail is managed by the MDNR for hiking, horseback riding, and snowmobiling. The trail currently is undeveloped at the proposed pipeline crossing location. The MDNR is developing the trail in segments with an additional 8 miles scheduled for construction in 2006. Currently, completion of the trail at the proposed crossing location has not been scheduled. MPL will coordinate with the MDNR on appropriate methods for installing the pipeline across this trail.

North Fork of the Crow River

The pipeline route crosses the North Fork of the Crow River at MP 187.6 in Meeker County. This section of the river is a State Canoe and Boating Route managed by the MDNR. The MDNR has developed the canoe route with access sites, primitive campsites, and drinking water sources. The nearest developed facilities are a primitive campsite located approximately 1.5 miles downstream of the pipeline route crossing and a carry-in canoe access and county park located about 0.5 mile upstream of the crossing.

The North Fork of the Crow River also is listed as a State Wild and Scenic River, with a classification of Recreation. The Recreation classification pertains to those river segments which have adjacent developed areas, but still can be managed under the requirements of the State Wild and Scenic River Act. MPL will install the pipeline across this river using HDD techniques, if feasible. MPL also will consult with Meeker County, who is responsible for managing land use adjacent to this segment of the river.

Luce Line State Trail

The pipeline route crosses the Luce Line State Trail at MP 214.6 in McLeod County. The trail is managed by the MDNR and is used for hiking, biking, horseback riding, snowshoeing, cross country skiing, and snowmobiling. This section of the trail is lined with stands of sugar maple and basswood. The proposed pipeline crossing will be located on a segment with a crushed aggregate base. MPL will coordinate with the MDNR on appropriate methods for installing the pipeline across this trail.

Minnesota River

The pipeline route crosses the Minnesota River which comprises the border of Sibley and Scott Counties at MP 242.5. This section of the river is a state-designated Canoe and Boating Route managed by the MDNR. The MDNR has developed this portion of the river with canoe access sites, boat launches, and primitive campsites. The nearest developed facility is located approximately 4 miles downstream of the proposed pipeline crossing location and consists of a boat launch.

To avoid environmental impacts and disrupting boating traffic on this segment of the river, MPL will install the proposed pipeline across the Minnesota River using HDD techniques, if feasible.

11.1.3 County-Designated Recreation Areas

County Forest Land

The pipeline route crosses approximately 11.1 miles of county-managed forest land. These lands are managed for various natural resource components in addition to providing recreational opportunities such as hunting and fishing. County-managed forest lands are located in four of the thirteen counties (Clearwater, Hubbard, Todd, and Morrison) along the pipeline route. There are no improved or designated recreation facilities located in the vicinity of the pipeline route within the county forest lands.

Lake Wobegon Regional Trail

The pipeline route crosses the Lake Wobegon regional trail at MP 155.8 in Stearns County. This trail, which opened in 1998, is a 46-mile-long, 10-foot-wide bituminous surface trail. It is used by bicyclers, hikers, runners, and snowmobilers. The trail is promoted by the Lake Wobegon Trails Organization, which is a coalition of community groups, including local chambers of commerce, visitor bureaus, and the Jaycees. MPL will coordinate with the Stearns County Park and Recreation Department regarding the construction of the pipeline across the trail.

Sauk River County Canoe Route

The pipeline route crosses the Sauk River at MP 166.2 in Stearns County. This river is managed by the Stearns County Parks Department as a canoe route. The Sauk River extends for more than 90 miles in Stearns County crossing wetlands, hardwood forests, and agricultural lands. Parks, accesses, and campsites have been developed along the river. The nearest designated recreation area to the project is located 5 miles downstream of the pipeline route crossing. MPL will consult with Stearns County on the installation of the pipeline across the Sauk River.

11.1.4 Designated Scenic Byways

The pipeline route crosses three designated state scenic byways. These byways commonly are used by travelers visiting vacation destinations. The pipeline route crosses the Great River Road at MPs 26.3 and 37.7, the Lake Country Scenic Byway at MPs 47.6 and 56.4, and the Minnesota River Valley Scenic Byway at MP 241.1. These scenic byways and road crossings are discussed in more detail in Section 4.3.

11.2 GENERAL CONSTRUCTION AND OPERATION IMPACTS AND MITIGATION

Construction and operation of the proposed pipeline are not anticipated to have significant impacts on recreational lands crossed by the pipeline. The first 119 miles of the pipeline route generally will be constructed adjacent to MPL's existing pipeline corridor, which will minimize potential impacts on public lands and recreational areas in these areas. The proposed pipeline will have only minor and temporary impacts on federal, state, and county recreational areas. Impacts on recreational use of public land areas primarily will be limited to temporary inconveniences and localized disturbances, including noise, dust, and visual intrusions associated with construction activities. There will be no long-term impact to recreational activities within the public lands areas as the result of construction and operation of the pipeline. As discussed in Section 7.1, vegetation maintenance of the permanent right-of-way will be

required along the pipeline corridor, which could have limited visual impacts on public lands that are densely forested.

Project construction temporarily could restrict public use of the recreational areas crossed by the pipeline. Potential impacts on recreational activities will be dependent on the timing of construction, the season in which the recreational activity occurs, and the construction methods used. Public access to federal, state, and county lands will be maintained to the greatest extent possible during construction. Short-term closures of some areas may be necessary during construction. After construction is completed, the public lands will be restored to allow previous uses and recreational activities to continue. MPL will consult with the USFWS, MDNR, and county land management agencies to avoid and minimize impacts on recreational areas.

Boating and recreational use of the rivers crossed by the project may be affected during construction of the pipeline, including state- and county-designated canoe routes. Depending on the crossing method used, impacts on river users may include construction noise, downstream turbidity, or temporary obstructions such as sediment curtains or construction equipment at the crossing location. MPL will coordinate with the MDNR and local governments regarding the river crossings.

REFERENCES

Adolphson, D.G., J.F. Ruhl, and R.J. Wolf. 1981. Designation of Principal Water-Supply Aquifers in Minnesota. U.S. Geological Survey. Water-Resources Investigations 81.51.

Anderson, P.G., C.G.F. Fraikin , and T.J. Chandler. 1997. Natural gas pipeline crossing of a coldwater stream: Impacts and Recovery. Proceedings of the 6th International Symposium, Environmental Concerns in Rights-of-Way Management, February 22-26, 1997, New Orleans, LA.

Caine, C. A. H. and G. E. Goltz. 2000. Phase I Archaeological Survey of Beauty Lake Estates, Beauty Lake,

Environmental Protection Agency. Designated Sole Source Aquifers in EPA Region V. http://www.epa.gov/safewater/swp/ssa/reg5.html.

Hackett, J. J. 1978. Inventory of Rural and Community Places in Wright County. State Historic Preservation Office files, Minnesota Historical Society, St. Paul.

Harrison, C. 2003. Report on the Archaeological Reconnaissance Survey Conducted for the Sibley Aggregate Mine Project, Blakely Township, Scott County, Minnesota. State Historic Preservation Office files, Minnesota Historical Society, St. Paul.

Johnson, C. M. 1991. Phase I Archaeological Survey of the East and West Wetland Compressor Areas, McLeod Landfill Floodplain Project, McLeod County, Minnesota. Institute for Minnesota Archaeology Reports of Investigations #168,

Kanivetsky, R. 1979. Hydrogeologic Map of Minnesota: Quaternary Hydrogeology, Map S-6 Minnesota Geological Survey, University of Minnesota.

Lofstrom, T. and L. Van Brocklin Spaeth. 1978. Carver County: A Guide to Its Historic and Prehistoric Places. State Historic Preservation Office files, Minnesota Historical Society, St. Paul.

McKinnon, G.A. and F.N. Hnytka. 1988. The effect of winter pipeline construction on the fishes and fish habitat of Hodgson Creek, NWT. Can. Tech. Rep. Fish. Aquat. Sci. 1598.

MetroGIS. 2003a. Metadata for the Digital Soil Survey for Carver County, Minnesota. Accessed October 2005. Available online at http://www.datafinder.org/metadata/ soils_carv.htm

MetroGIS. 2003b. Metadata for the Digital Soil Survey for Scott County, Minnesota. Accessed October 2005. Available online at http://www.datafinder.org/metadata/ soils_scot.htm

MetroGIS. 2004. Metadata for the Digital Soil Survey for Dakota County, Minnesota. Accessed October 2005. Available online at http://www.datafinder.org/metadata/ soils_dako.htm

MetroGIS DataFinder. 2005. Digital Soil Survey for Carver, Dakota, and Scott County, Minnesota. Available online at: http://www.datafinder.org/catalog.asp.

Minnesota Department of Employment and Economic Development. 2005. LAUS Data, November 2005. http://www.deed.state.mn.us/lmi/toold/laus.htm. Accessed December 2005.

Minnesota Department of Health. 2005. Personal Communications between Tim Drake (Natural Resource Group, Inc.) and Mike Baker (MDH). November 30, 2005.

Minnesota Department of Natural Resources. 1998. Gap Stewardship – Federal Lands GIS Layer. Compiled 1976 to 1998 by BRW, Inc., at a scale based upon ¼ ¼ section lines.

Minnesota Department of Natural Resources – MIS Bureau. 2003. State Land Ownership GIS Layers. Digitized in 1999 at scale based upon ¼ ¼ section lines.

Minnesota Department of Natural Resources. 2005a. Public Recreation Information Maps: Fosston, Lake Itasca, Detroit Lakes, Pine River, Brainerd, St. Cloud, Litchfield, Glencoe and Metro Area – South. Published 2000-2005.

Minnesota Department of Natural Resources. 2005b. Ecological Classification System. www.dnr.state.mn.us/ecs/index. Accessed October 2005.

Minnesota Department of Natural Resources. 2005c. Minnesota Natural Heritage Database. Used with permission by Natural Resource Group, Inc.

Minnesota Department of Transportation, Office of Transportation and Data Analysis. 2005. County Maps. http://www.dot.state.mn.us/tda/html/counties.html. Accessed October 2005.

Minnesota Pollution Control Agency. 1999. Baseline Water Quality of Minnesota's Principal Aquifers. Northwest Region. Minnesota Pollution Control Agency.

Minnesota Pollution Control Agency. 2005a. Contamination database. http://www.pca.state.mn.us/backyard/heighborhood.html. Accessed 2005.

Minnesota Pollution Control Agency. 2005b. Telephone communication on November 18, from T. Drake and B. Braun (Natural Resource Group, Inc.) to C. O'Dell (Minnesota Pollution Control Agency).

Minnesota State Historic Preservation Office. 1977. Historic Resources of Carver County, Vols. 1-3. State Historic Preservation Office files, Minnesota Historical Society, St. Paul.

Morey, G. B. and J. Meints. 2000. Geologic Map of Minnesota Bedrock Geology. University of Minnesota. Minnesota Geologic Survey.

National Atlas of the United States. 2005. Quaternary Faults and mining operation data, accessed October 2005. http://nationalatlas.gov/natlas/Natlasstart.asp

Northwest Area Foundation. 2003. Indicator Website. http://www.indicators.nwaf.org. Accessed December 2005.

O'Connell, B. and K. C. Wedding. 1985. Archaeological Survey of Rice County, Minnesota: A Reconnaissance Survey Sponsored by the Minnesota Historical Society and the Historic Preservation Division of the United States Department of the Interior's National Park Service

(Contract #85-C1399). State Historic Preservation Office files, Minnesota Historical Society, St. Paul.

Ojakakangas, R. W. and Matsch, C. L. 1982 Minnesota's Geology. University of Minnesota Press, Minneapolis, 255 pp.

Peterson, L. D. and T. J. Pfutzenreuter. 1979. Minnesota Trunk Highway Archaeological Reconnaissance Survey Annual Report. State Historic Preservation Office files, Minnesota Historical Society, St. Paul.

Peterson, L. D. and T. J. Pfutzenreuter. 1980. Minnesota Trunk Highway Archaeological Reconnaissance Survey Annual Report. State Historic Preservation Office files, Minnesota Historical Society, St. Paul.

Schubert, J. P., W. S. Vinikour, and D. K. Gartman. 1985. Effects of Gas-Pipeline Construction on the Little Miami River Aquatic Ecosystem, Final Report (September 1983-April 1985). Gas Research Institute Report No. GRI-86/0024.

Soil Survey Division Staff. 1993. Soil Survey Manual. USDA Agricultural Handbook 18. U. S. Government Printing Office, Washington, DC.

State of Minnesota v. Butcher. 1997. 563 N.W. 2d 776 (S. Ct. Mn).

State of Minnesota v. Clark. 1979. 282 N.W. 2d 902 (S. Ct. Mn.). Footnote 13.

Tester, J.R. 1995. Minnesota's Natural Heritage, An Ecological Perspective.

United States Census Bureau. 2000. “American Fact Finder.” http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_lang=en&_ts=146053816482. Accessed October 2005.

United States Census Bureau. 2004. “American Fact Finder”. http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_lang=en&_ts=136896911381. Accessed October 2005.

United State Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Waterways Experiment Station, Vicksburg Massachussetts.

United States Department of Agriculture, Natural Resources Conservation Service. 1995. Soil Survey Geographic (SSURGO) Data Base Data Use Information. Miscellaneous Publication Number 1527.

United States Department of Agriculture, Natural Resources Conservation Service. 2003. Soil Survey Geographic (SSURGO) database for Clearwater, Hubbard, Wadena, Todd, Morrison, Stearns, Meeker, Wright, McLeod, and Sibley County, Minnesota. Available online at: http://www.ncgc.nrcs.usda.gov/products/datasets/ssurgo/

United States Geological Survey. 1985. National Water Summary 1984, Water-Supply Paper 2275.

University of Minnesota. 1980. Minnesota Soil Atlas-Bemidji Sheet. Miscellaneous Report 168-1980, Agricultural Experiment Station, University of Minnesota.

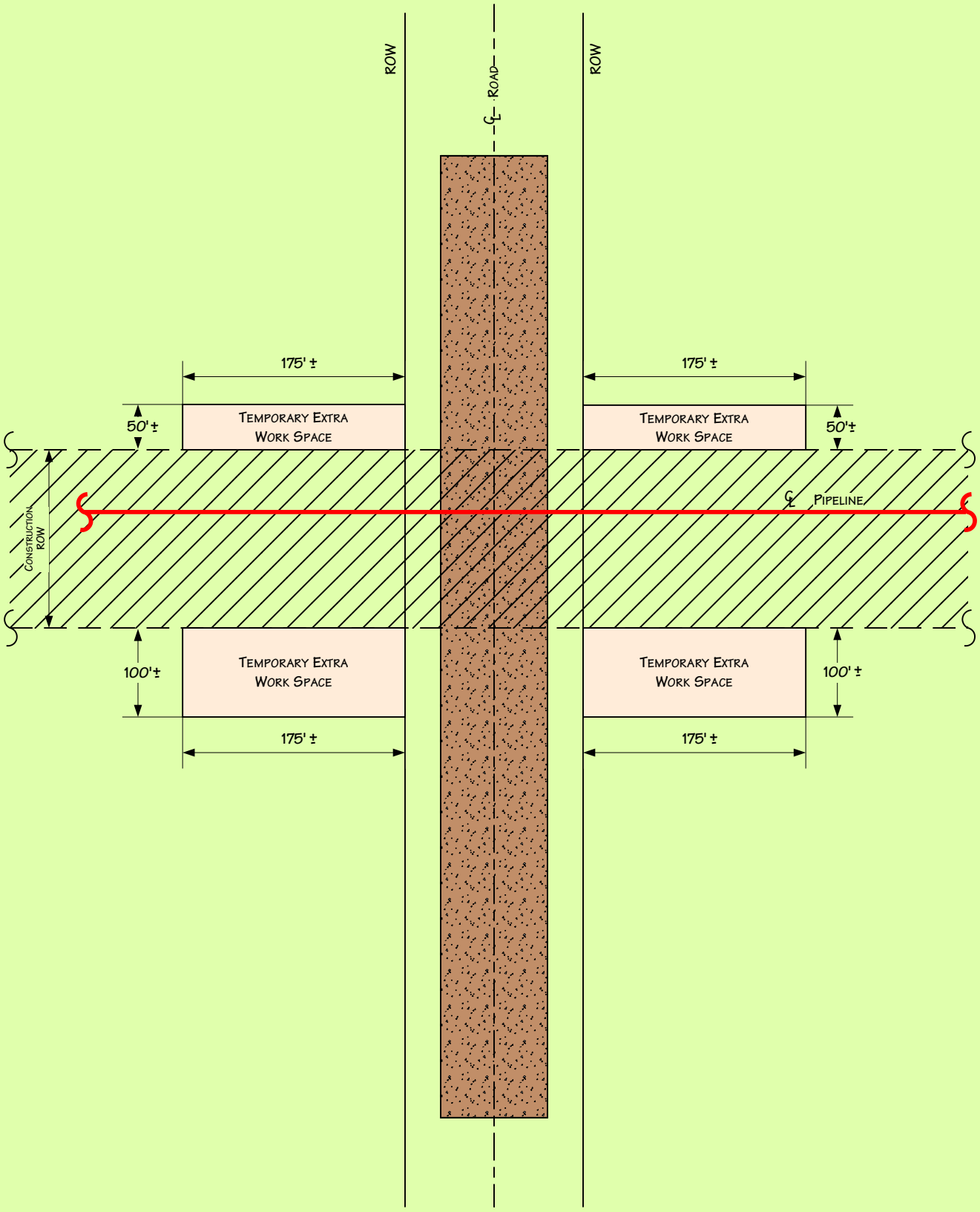
White Earth Band of Chippewa Indians v. Alexander. 1981. 518F. Supp. 527 (D. Minn).

White Earth Band of Chippewa Indians v. Alexander. 1982. 683 F.2d 1129.

Winham, R. P., T. V. Gillen, E. J. Lueck, J. D. Strait, and L. A. Hannus. 1996. An Intensive Cultural Resources Survey for Portions of Northern Natural Gas Company's Proposed Peak Day 2000 Expansion in Carver, Rice, Scott, Washington, and Wright Counties, Minnesota. State Historic Preservation Office files, Minnesota Historical Society, St. Paul.

Appendix A

Typical Extra Workspace Schematics



For environmental review purposes only.

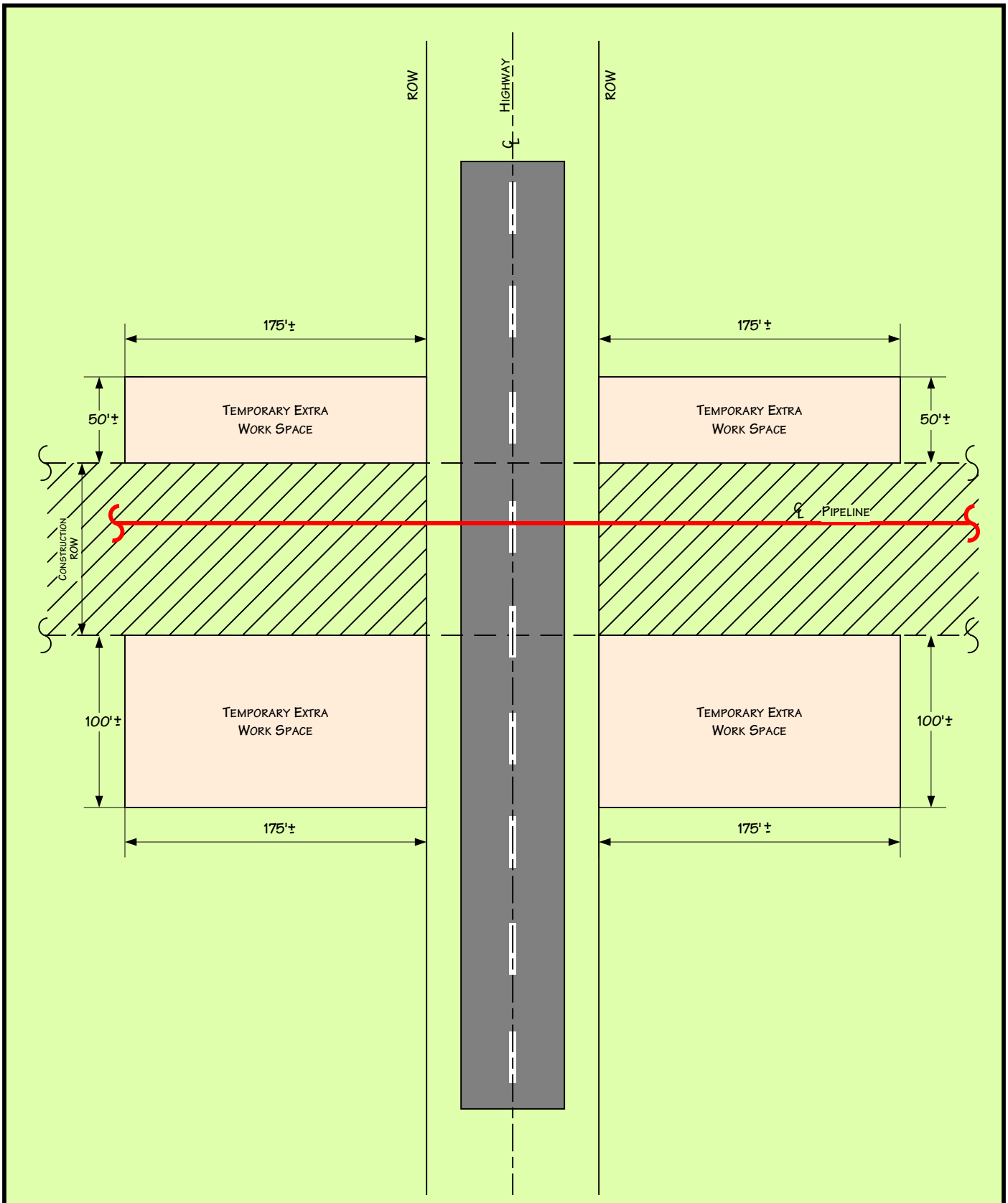
MINNCAN PROJECT

Figure A-1

Typical Temporary Extra Workspace at Open-cut Crossings of County, Township, and Private Roads

DATE:	11/2/2005
REVISED:	1/3/2006
SCALE:	NTS
DRAWN BY:	KJA3361

K:\524\2004-558\50\ROW_DRAWINGS2.VSD



NOTE: TEMPORARY EXTRA WORKSPACE FOR FOUR-LANE HIGHWAY CROSSINGS WILL BE DESIGNED ON SITE-SPECIFIC BASIS .

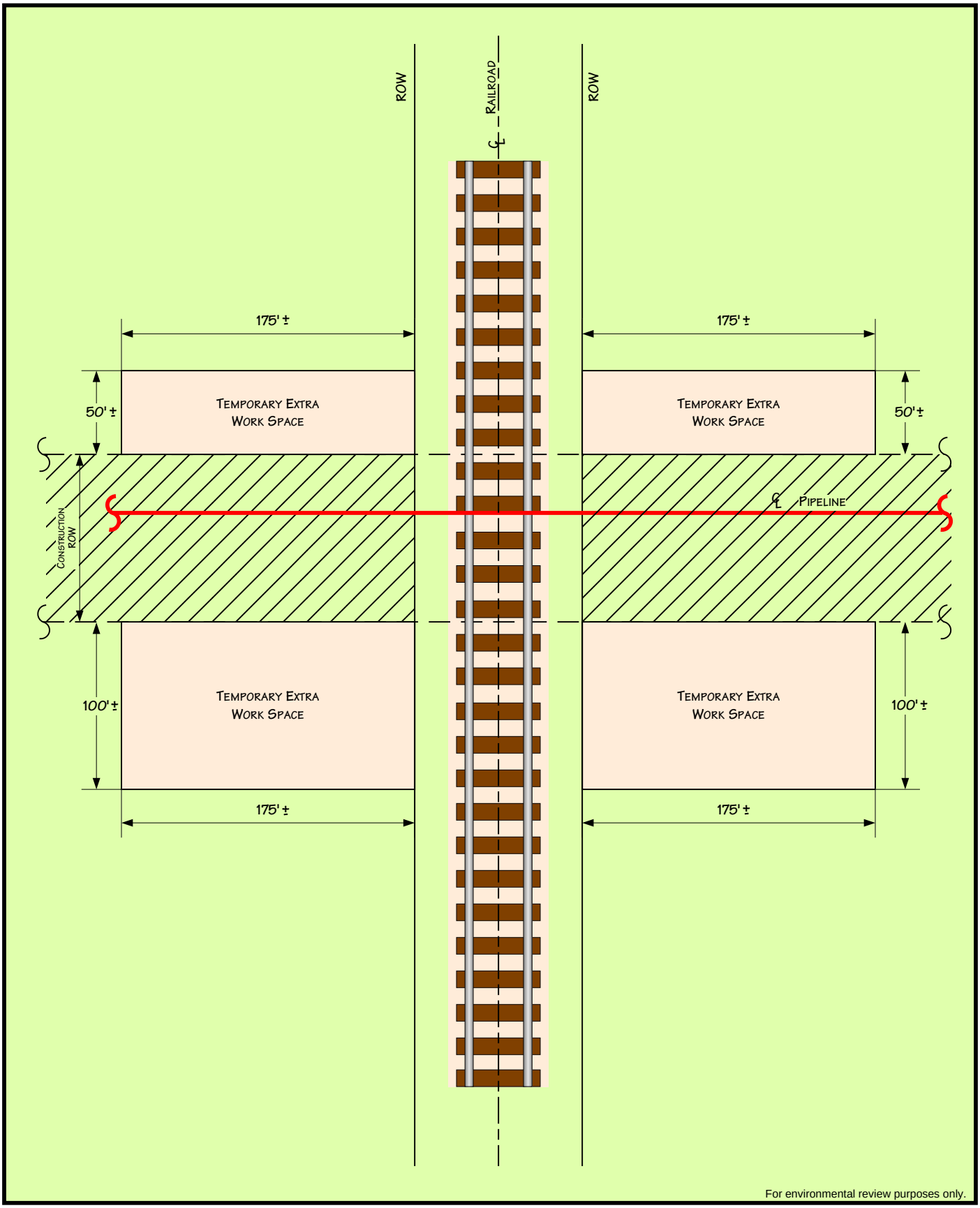
For environmental review purposes only.

MINNCAN PROJECT

Figure A-2
Typical Temporary Extra Workspace at Bored Highway Crossings

DATE:	11/2/2005
REVISED:	1/3/2006
SCALE:	NTS
DRAWN BY:	KJA3361

K:\524\2004-558\50\ROW_DRAWINGS2.VSD



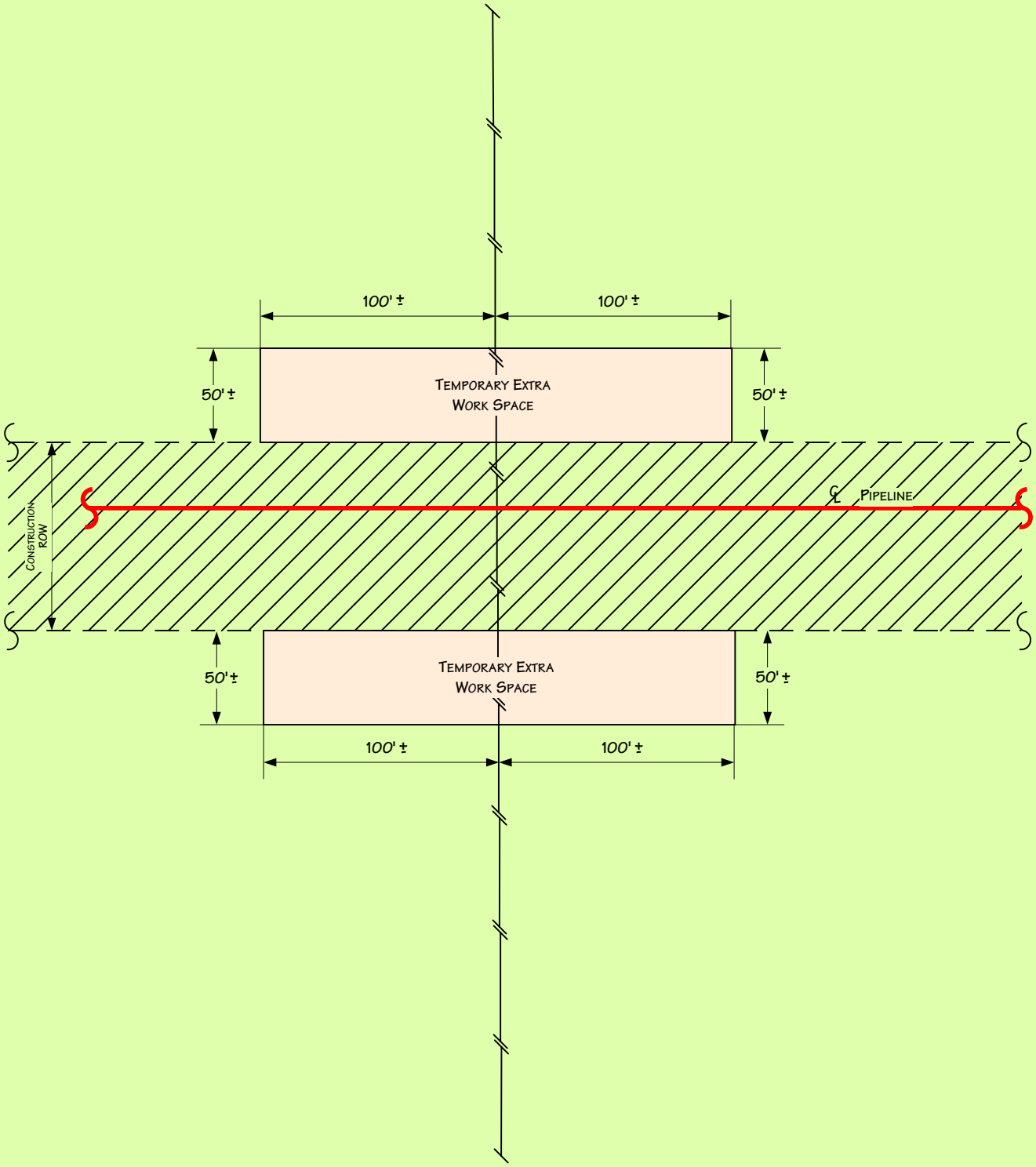
For environmental review purposes only.

MINNCAN PROJECT

Figure A-3
Typical Temporary Extra Workspace at Bored Railroad Crossings

DATE:	11/2/2005
REVISED:	1/3/2006
SCALE:	NTS
DRAWN BY:	KJA3361

K:\524\2004-558\50\ROW_DRAWINGS2.VSD



For environmental review purposes only.

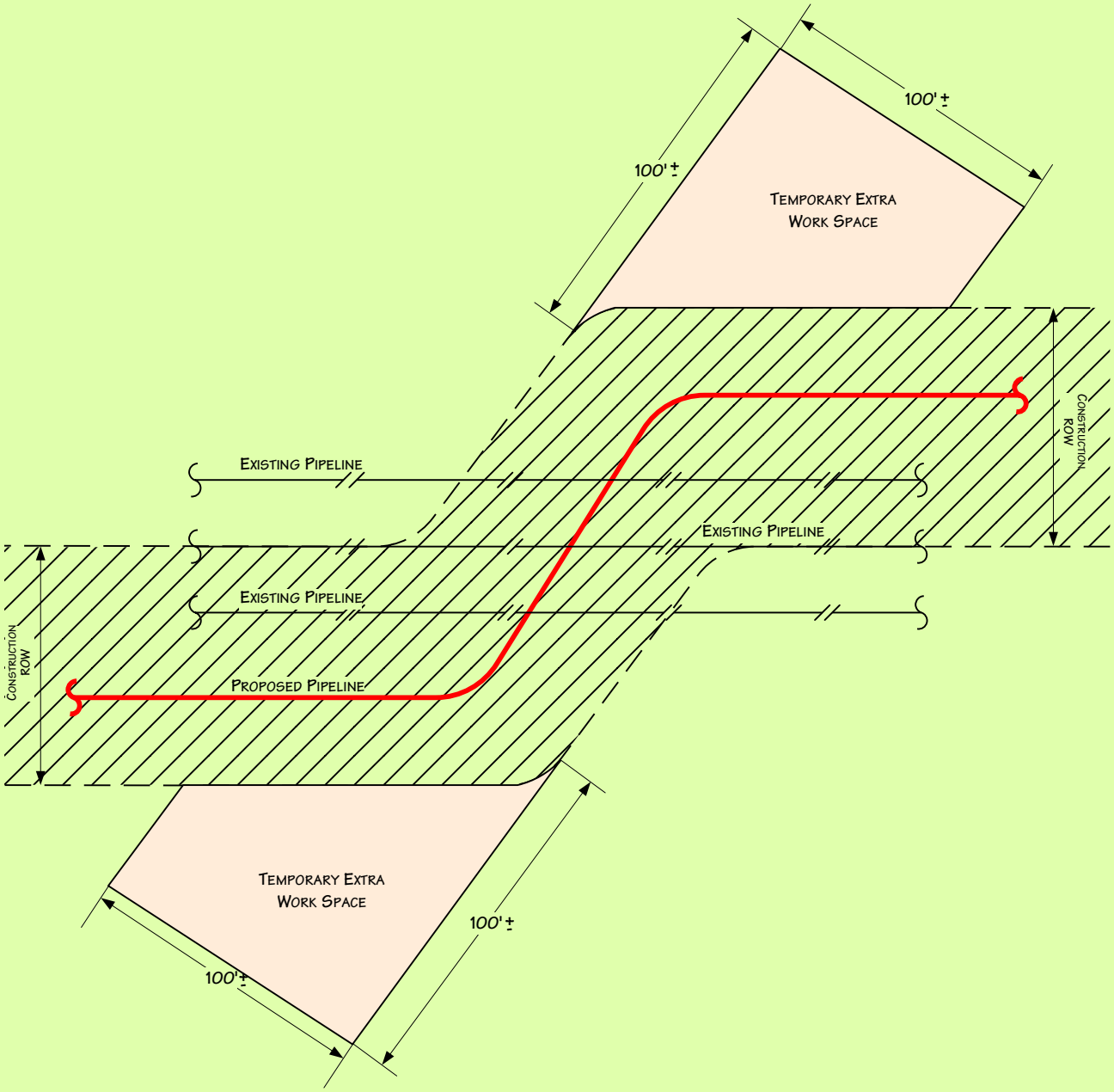
MINNCAN PROJECT

Figure A-4

Typical Temporary Extra Workspace at Foreign Pipeline and Utility Crossings

DATE:	11/2/2005
REVISED:	1/3/2006
SCALE:	NTS
DRAWN BY:	KJA3361

K:\524\2004-558\50\ROW_DRAWINGS2.VSD



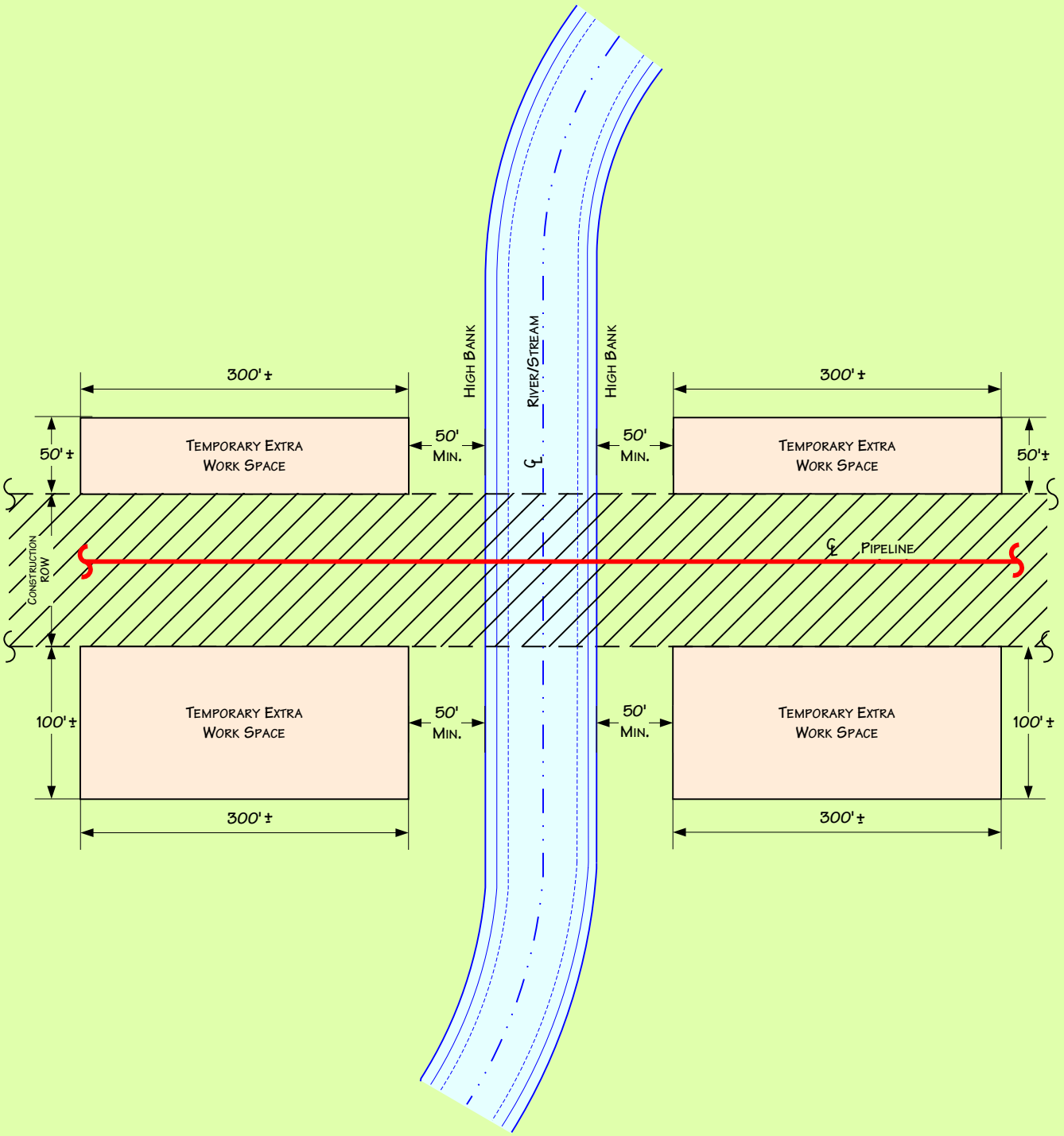
For environmental review purposes only.

MINNCAN PROJECT

Figure A-5
Typical Temporary Extra Workspace at Pipeline Crossover

DATE:	11/2/2005
REVISED:	1/3/2006
SCALE:	NTS
DRAWN BY:	KJA3361

K:\524\2004-558\50\ROW_DRAWINGS2.VSD



NOTE: THE 50' MINIMUM SETBACK MAY BE REDUCED DUE TO SPECIAL CIRCUMSTANCES.

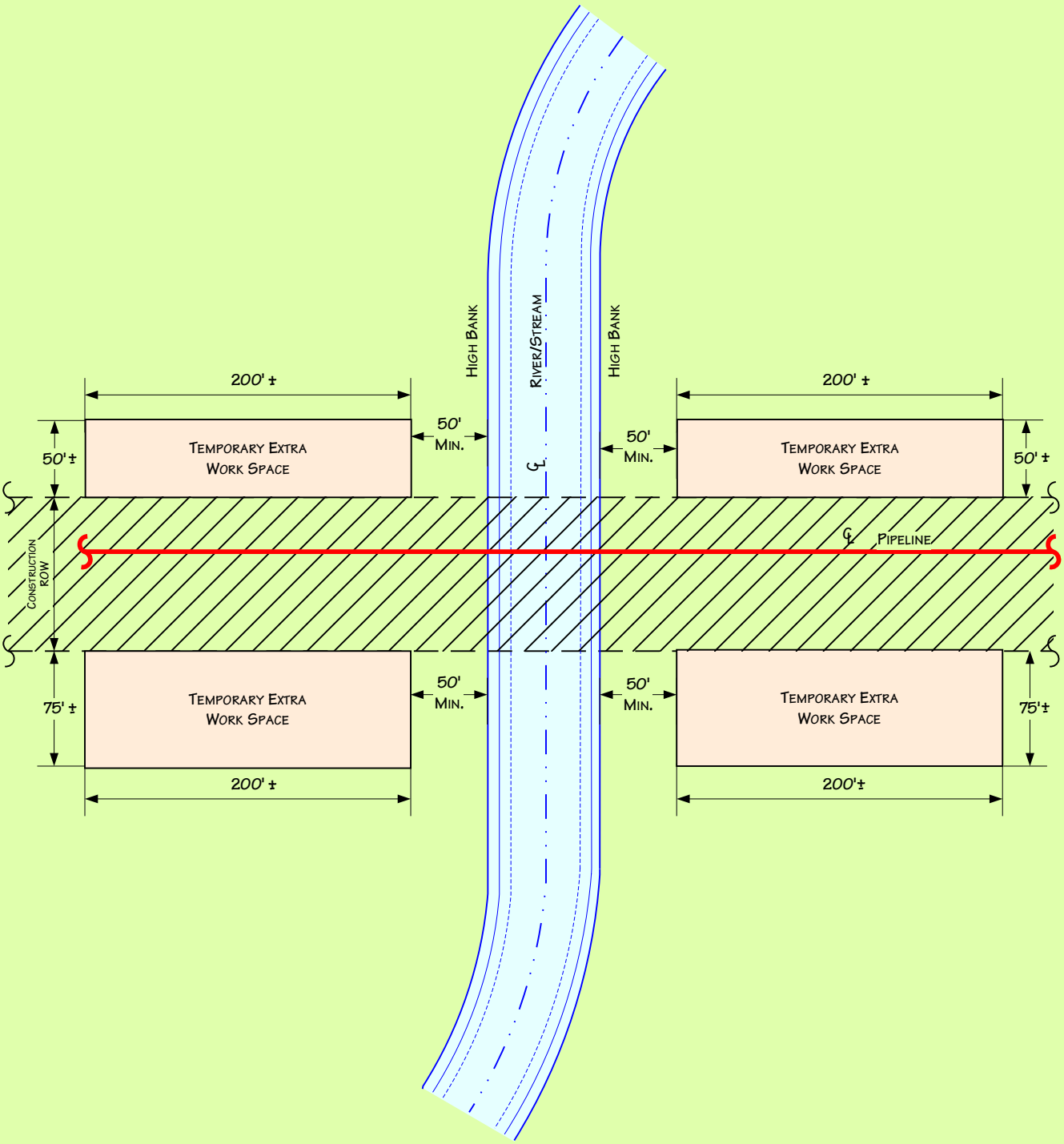
For environmental review purposes only.

MINNCAN PROJECT

Figure A-6
Typical Temporary Extra Workspace at Waterbody Crossings Greater Than 50 Feet Wide

DATE:	11/2/2005
REVISED:	1/3/2006
SCALE:	NTS
DRAWN BY:	KJA3361

K:\524\2004-558\50\ROW_DRAWINGS2.VSD



NOTE: THE 50' MINIMUM SETBACK MAY BE REDUCED DUE TO SPECIAL CIRCUMSTANCES.

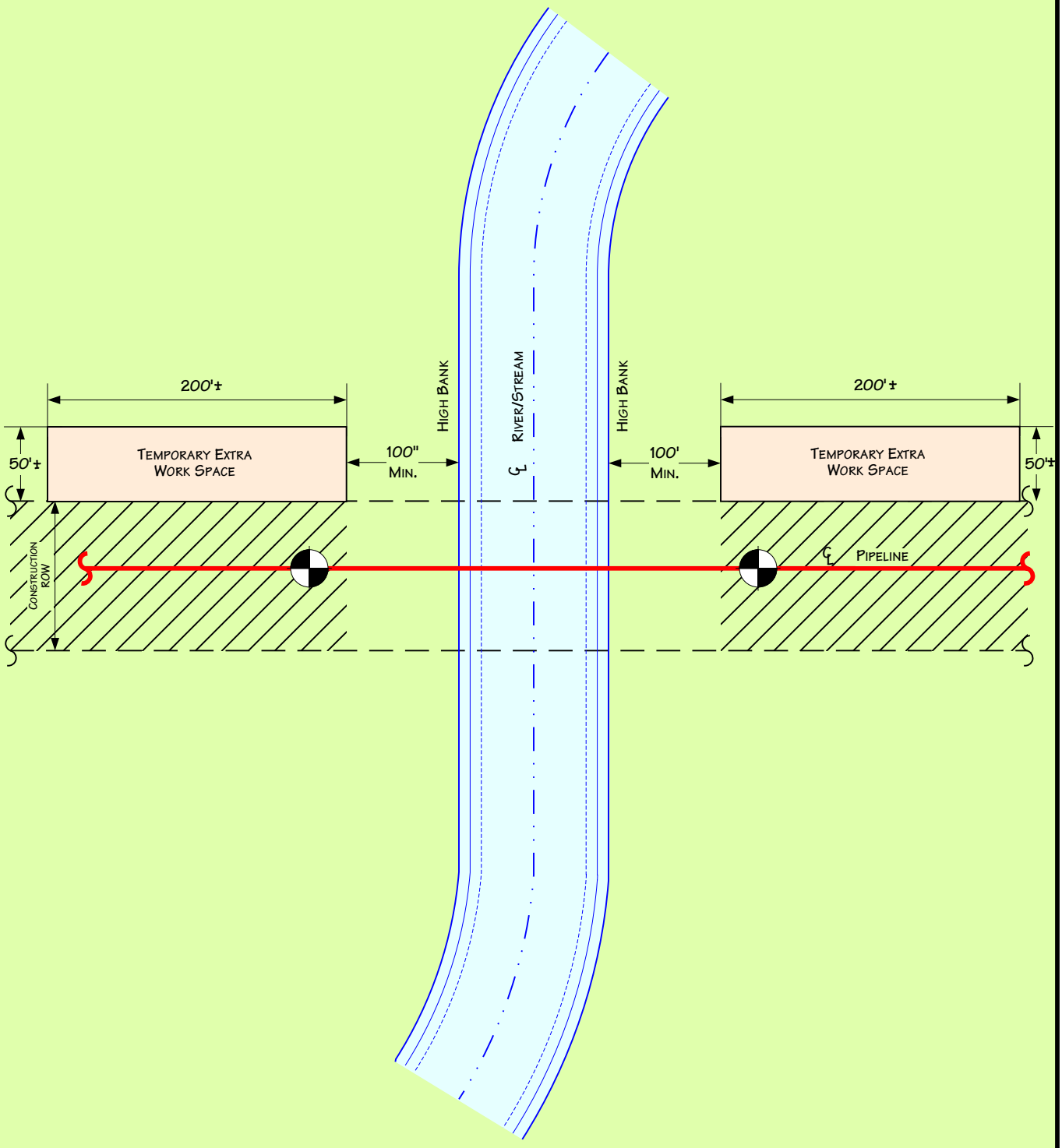
For environmental review purposes only.

MINNCAN PROJECT

Figure A-7
Typical Temporary Extra Workspace at Waterbody Crossings Less Than 50 Feet Wide

DATE:	11/2/2005
REVISED:	1/3/2006
SCALE:	NTS
DRAWN BY:	KJA3361

K:\524\2004-558\50\ROW_DRAWINGS2.VSD



= DRILL ENTRY/EXIT POINT

NOTES: TEMPORARY EXTRA WORKSPACE MAY NEED TO BE EXTENDED FOR HDD PIPESTRING OR OTHER SPECIAL CIRCUMSTANCES. HDD POINT OF ENTRANCE AND EXIT WILL BE 35' FROM THE CLOSEST EXISTING PIPELINE.

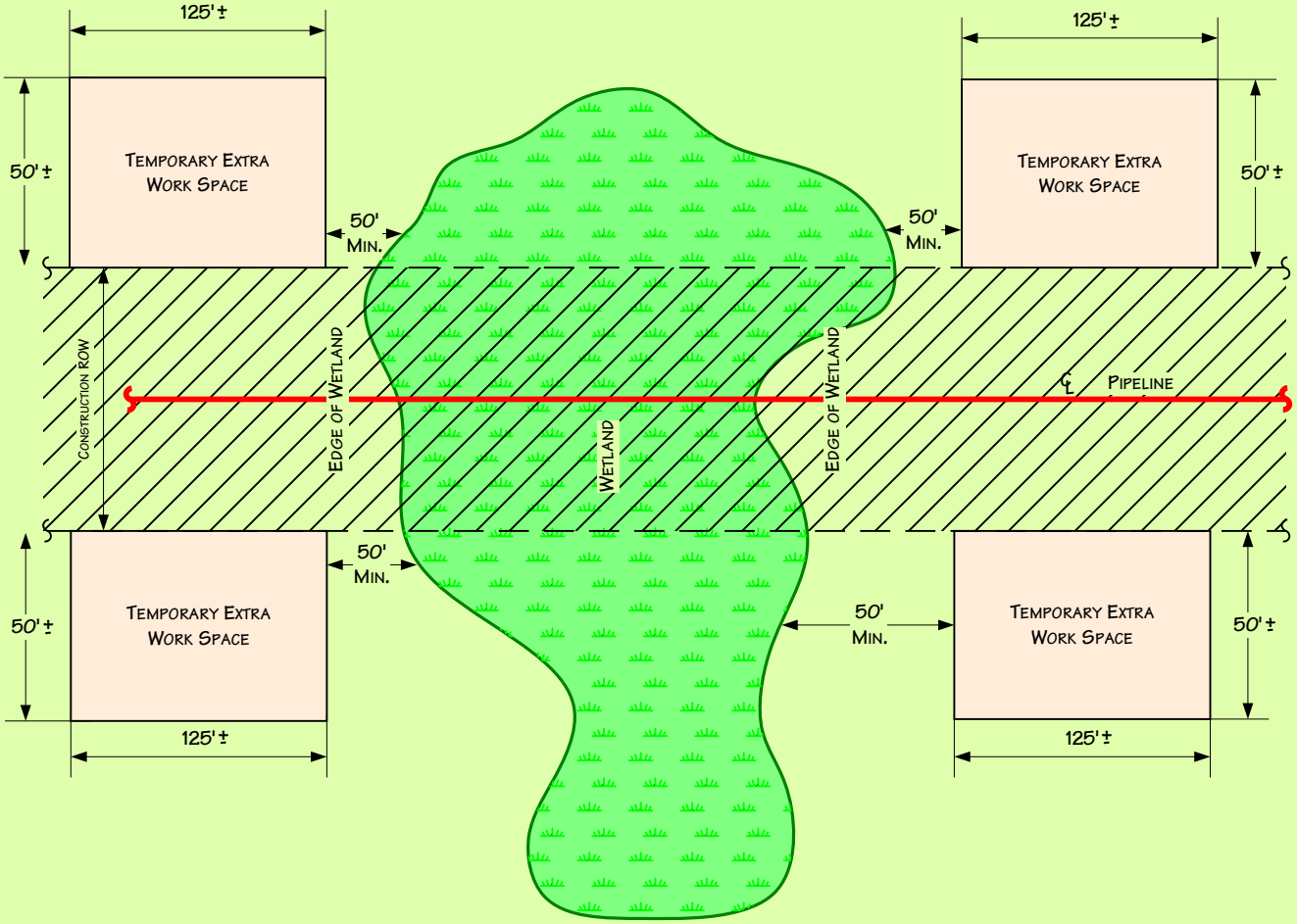
For environmental review purposes only.

MINNCAN PROJECT

Figure A-8
Typical Temporary Extra Workspace at Directionally Drilled Waterbody Crossings

DATE:	11/2/2005
REVISED:	1/3/2006
SCALE:	NTS
DRAWN BY:	KJA3361

K:\524\2004-558\50\ROW_DRAWINGS2.VSD



NOTE: TEMPORARY EXTRA WORKSPACE MAY NEED TO BE EXTENDED IN SPECIAL CIRCUMSTANCES. THE 50' MINIMUM SETBACK MAY BE REDUCED DUE TO SPECIAL CIRCUMSTANCES.

For environmental review purposes only.

MINNCAN PROJECT

Figure A-9
Typical Temporary Extra Workspace for Push/Pull Wetland Crossings

DATE:	11/2/2005
REVISED:	1/3/2006
SCALE:	NTS
DRAWN BY:	KJA3361

K:\524\2004-558\50\ROW_DRAWINGS2.VSD

Appendix B

Upland Erosion Control, Revegetation, and Maintenance Plan

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN

MinnCan Project
Minnesota Pipe Line Company

December 2005

Minnesota Pipe Line Company – MinnCan Project

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN

TABLE OF CONTENTS

FIGURES

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN (EROSION CONTROL PLAN)

I. APPLICABILITY

The intent of this Erosion Control Plan is to assist Minnesota Pipe Line Company (MPL) employees and its contractors in identifying baseline mitigation measures for minimizing erosion and enhancing revegetation within areas disturbed by the MinnCan Project. Where site-specific permit conditions regarding mitigation are more stringent than those discussed in this document, the permit condition shall take presedence.

Project-related impacts and mitigation activities on wetland and waterbody systems are addressed in MPL's Wetland and Waterbody Construction and Mitigation Procedures (WWCMP). Project-related impacts and mitigative measures on agricultural lands are addressed in the Agricultural Impact Mitigation Plan (AIMP).

II. SUPERVISION AND INSPECTION

A. ENVIRONMENTAL INSPECTION

1. At least one Environmental Inspector will be provided for each construction spread during construction and restoration. The number and experience of Environmental Inspectors assigned to each construction spread will be appropriate for the length of the construction spread and the number/significance of resources affected.

2. Environmental Inspectors will have peer status with other activity inspectors.

3. Environmental Inspectors will have the authority to stop activities that violate federal, state, and local permit conditions, or landowner requirements.

B. RESPONSIBILITIES OF ENVIRONMENTAL INSPECTORS

At a minimum, the Environmental Inspector(s) will be responsible for:

1. Verifying compliance with the requirements of this Erosion Control Plan, MPL's WWCMP and AIMP, the conditions of environmental regulatory authorizations, the mitigation measures proposed by MPL, other environmental permits and approvals, and environmental requirements in landowner easement agreements;

2. Identifying, documenting, and overseeing corrective actions, if necessary to ensure compliance;

3. Verifying that the limits of authorized construction work areas and locations of access roads are properly marked before clearing;

4. Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the construction work area;

5. Identifying erosion/sediment control and soil stabilization needs;

6. Verifying that the location of dewatering structures and slope breakers will not direct water into known cultural resources sites or locations of sensitive species;

7. Verifying that trench dewatering activities do not result in the deposition of excessive silt and/or sediment into a wetland or waterbody;

8. Verifying that subsoil and topsoil are tested, as deemed necessary, in agricultural and residential areas to measure compaction and determine the need for corrective action;

9. Advising the Chief Construction Inspector when conditions (such as wet weather) make it advisable to restrict construction activities to avoid excessive rutting;

10. Verifying the restoration of contours and topsoil;

11. Verifying that the soils imported for agricultural or residential use have been approved by the landowner;

12. Determining the need for and verifying that erosion controls are properly installed, as necessary to prevent sediment flow into wetlands, waterbodies, sensitive areas, and onto roads;

13. Inspecting temporary erosion control measures:

    a. on a daily basis in areas of active construction or equipment operation;

    b. on a weekly basis in areas with no construction or equipment operation; and

    c. within 24 hours of each 0.5 inch of rainfall;

14. Verifying the repair of ineffective temporary erosion control measures within 24 hours of identification;

15. Keeping records of compliance with the environmental conditions of environmental regulatory permits and approvals, and the mitigation measures proposed by MPL in the permit applications submitted to the federal or state agencies during active construction and restoration; and

16. Identifying areas that will be given special attention to ensure stabilization and restoration after the construction phase.

III. PRECONSTRUCTION PLANNING

MPL will do the following before construction:

A. CONSTRUCTION WORK AREAS

Identify construction work areas (*e.g.*, construction right-of-way, extra work space areas, pipe storage and contractor yards, borrow and disposal areas, access roads, etc.) that will be needed for safe construction, ensuring that appropriate cultural resources and biological surveys have been conducted for areas to be disturbed.

B. DRAIN TILE AND IRRIGATION SYSTEMS

MPL will attempt to locate existing drain tiles and irrigation systems and develop procedures for constructing through drain tiled areas, maintaining irrigation systems during construction, and repairing drain tiles and irrigation systems after construction, as discussed in theAIMP.

C. ROAD CROSSINGS AND ACCESS POINTS

Plan for safe and accessible conditions at roadway crossings and access points during construction and restoration.

D. DISPOSAL PLANNING

Determine methods and locations for the disposal of construction debris (*e.g.*, timber, slash, mats, garbage, drilling fluids, excess rock, etc). Off-site disposal in other than commercially operated disposal locations is subject to compliance with applicable requirements.

E. STORMWATER POLLUTION PREVENTION PLAN

MPL will make available on each construction spread the Stormwater Pollution Prevention Plan prepared for compliance with the Minnesota Pollution Control Agency General Permit requirements.

IV. INSTALLATION

A. APPROVED AREAS OF DISTURBANCE

1. Project-related ground disturbance will be limited to the construction right-of-way, extra work space areas, pipe storage yards, borrow and disposal areas, access roads, and other areas approved for construction.

2. The construction right-of-way width for the project will typically not exceed 100 feet (see figures 1 and 2). However, this construction right-of-way width may be expanded, as needed, to ensure safe construction in areas required by topographic conditions (such as side-slopes), soil conditions, or special soil handling techniques.

Project use of these additional limited areas is subject to landowner approval and compliance with applicable requirements.

B. TOPSOIL SEGREGATION

1. Unless the landowner or land management agency specifically approves otherwise, topsoil will be stripped and segregated in agricultural and residential areas to prevent the mixing of soil horizons. See the AIMP for additional information on topsoil segregation in agricultural areas.

2. In residential areas, importation of topsoil is an acceptable alternative to topsoil segregation.

C. DRAIN TILES

MPL will mark the locations of drain tiles damaged during construction, and will repair damaged drain tiles as specified in the AIMP.

D. IRRIGATION SYSTEMS

MPL will work with landowners to minimize disruption of irrigation systems as specified in the AIMP.

E. ROAD CROSSINGS AND ACCESS POINTS

1. Maintain safe and accessible conditions at road crossings and access points during construction.

2. If crushed stone access pads are used in residential or active agricultural areas, place the stone on synthetic fabric to facilitate removal.

3. Topsoil stripped from the adjacent construction right-of-way may be used for the construction of temporary ramps at access points, if needed.

F. TEMPORARY EROSION CONTROL

Install temporary erosion controls after initial disturbance of the soil. Temporary erosion controls will be maintained throughout construction (on a daily basis) and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration is complete.

1. Temporary Slope Breakers

a. Temporary slope breakers are intended to reduce runoff velocity and divert water off the construction right-of-way. Temporary slope breakers will be constructed of materials such as soil, silt fence, staked hay or straw bales, or sand bags.

b. Install temporary slope breakers on disturbed areas, as necessary to avoid excessive erosion (see figure 3). Temporary slope breakers will be installed on slopes greater than 5 percent where the base of the slope is less than 50 feet from waterbody, wetland and road crossings at the following spacing:

Slope (%)	Spacing (feet)
5 - 15	300
>15 – 30	200
>30	100

c. Direct the outfall of each temporary slope breaker to a stable, well vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction right-of-way.

d. Position the outfall of each temporary slope breaker to prevent sediment discharge into wetlands, waterbodies, or other sensitive resources.

2. Sediment Barriers

a. Sediment barriers are intended to stop the flow of sediments and to prevent the deposition of sediments into sensitive resources. The barriers will be constructed of materials such as silt fence (see figure 4), staked hay or straw bales (see figure 5), compacted earth (*e.g.*, driveable berms across travelways), sand bags, or other appropriate materials.

b. At a minimum, install and maintain temporary sediment barriers across the entire construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody, wetlands, or road crossing until revegetation is successful as defined in this Erosion Control Plan. Space will be left between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.

c. Where wetlands or waterbodies are adjacent to and downslope of construction work areas, install sediment barriers along the edge of these areas, as necessary to prevent sediment flow into the wetland or waterbody.

3. Mulch

a. Apply mulch on slopes (except in actively cultivated cropland) concurrent with or immediately after seeding, where necessary to stabilize the soil surface and to reduce wind and water erosion. Spread mulch uniformly over the area to cover at least 75 percent of the ground surface at a rate of 2 tons/acre of straw or its equivalent, unless the local soil conservation authority, landowner, or land managing agency approves otherwise in writing.

b. Mulch can consist of weed-free straw or hay, wood fiber hydromulch, erosion control fabric, or some functional equivalent.

c. Mulch before seeding if:

(1) final grading and installation of permanent erosion control measures will not be completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas), as required in section V.A.1; or

(2) construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.

d. If mulching before seeding, increase mulch application on slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.

e. Ensure that mulch is adequately anchored to minimize loss due to wind and water.

f. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of wetlands or waterbodies.

g. Install erosion control fabric on waterbody banks at the time of final bank recontouring. Anchor the erosion control fabric with staples or other appropriate devices.

V. RESTORATION

A. CLEANUP

1. Commence cleanup operations following backfill operations. Complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas). If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls (temporary slope breakers and sediment barriers) until conditions allow completion of cleanup.

2. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed as specified in section IV.F. and inspected and maintained (as specified in sections II.B.12 through 14). When access is no longer required, the travel lane will be removed and the right-of-way restored.

3. Bedrock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. Rock that is not returned to the trench will be

considered construction debris, unless approved for some other use on the construction work areas by the landowner or land managing agency.

4. Remove excess rock in actively cultivated or rotated cropland and pastures, hayfields, and residential areas, as well as other areas at the landowner's request. The size, density, and distribution of rock on the construction work area will be similar to adjacent areas not disturbed by construction

5. Grade the construction right-of-way to restore pre-construction contours and leave the soil in the proper condition for planting.

6. Remove construction debris from construction work areas.

7. Remove temporary sediment barriers when replaced by permanent erosion control measures or when revegetation is successful.

B. PERMANENT EROSION CONTROL DEVICES

1. Trench Breakers

a. Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as sand bags (see figure 6) or polyurethane foam. Topsoil will not be used in trench breakers.

b. Trench breakers will be installed at spacing necessary to ensure protection of the pipeline from erosion due to water movement along the buried pipeline. In general, trench breakers will be installed at the same spacing as permanent slope breakers. Trench breakers should be installed immediately upslope of proposed Permanent Slope Breakers.

c. In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the same spacing as if permanent slope breakers were required.

d. At a minimum, install a trench breaker where needed to avoid draining a waterbody or wetland.

2. Permanent Slope Breakers

a. Permanent slope breakers (see figures 3 and 7) are intended to reduce runoff velocity, divert water off the construction right-of-way, and prevent sediment deposition into sensitive resources. Permanent slope breakers will be constructed of materials such as soil, sand bags, or some functional equivalent.

b. Construct and maintain permanent slope breakers in areas, except cultivated areas and lawns, using the following spacing unless closer spacing is necessary to avoid excessive erosion on the construction right-of-way:

Slope (%)	Spacing (feet)
5 - 15	300
>15 - 30	200
>30	100

c. Construct slope breakers to divert surface flow to a stable area without causing water to pool or erode behind the breaker. In the absence of a stable area, construct appropriate energy-dissipating devices at the end of the breaker.

d. Slope breakers may extend slightly (about 4 feet) beyond the edge of the construction right-of-way to effectively drain water off the disturbed area.

C. SOIL COMPACTION MITIGATION

Test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Plow compacted areas with a paraplow or other deep tillage implement as described in the AIMP.

D. REVEGETATION

1. General

a. MPL is responsible for revegetation of soils disturbed by project-related activities, except in actively cultivated fields.

b. Disturbed areas will be restored in accordance with recommendations from soil conservation agencies or as requested by the landowner or land management agency.

VI. POST-CONSTRUCTION ACTIVITIES

A. MONITORING AND MAINTENANCE

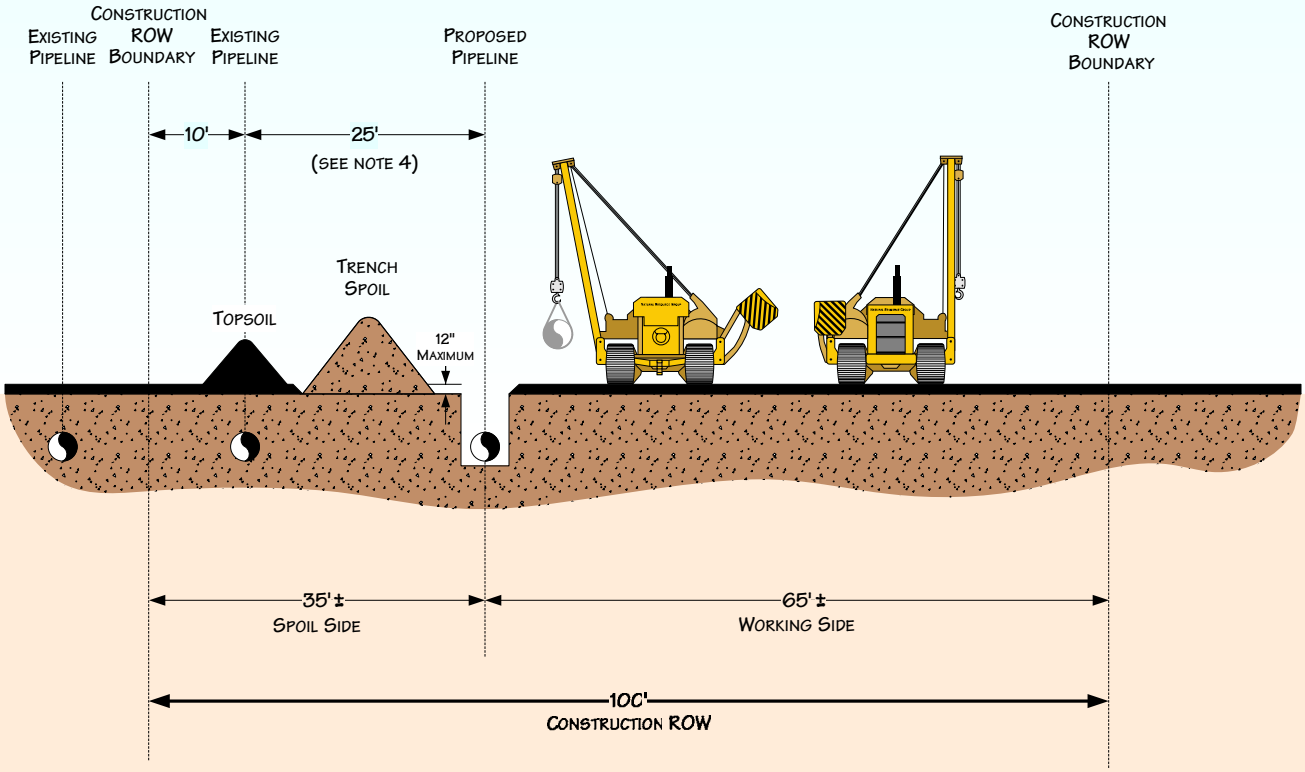
1. Conduct follow-up inspections of disturbed areas until revegetation is successful and meets requirements of environmental permits.

2. Revegetation in non-agricultural areas will be considered successful if upon visual survey the density and cover of non-nuisance vegetation are similar in density (*i.e.*, greater than 70 percent) and cover to adjacent undisturbed lands.

3. Restoration will be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless requested otherwise by the land owner or land managing agency), the area has revegetated, and proper drainage has been restored.

4. Routine vegetation maintenance clearing will be conducted as needed.. In general, a 50-foot-wide corridor centered over the pipeline will be cleared of brush and trees. Where the newly constructed pipeline parallels the existing MPL system, up to a 100-foot-wide corridor centered over the pipelines will be cleared of brush and trees.

FIGURES



PROFILE

Notes:

1. Construction right-of-way will typically not exceed 100' in width. Additional temporary workspace will be necessary at major road, railroad, waterbody crossings, sideslopes, and other special circumstances as required (See Additional Typical Crossing Sketches).
2. This drawing reflects "Trench plus Spoil Side" topsoil procedure, which will be used in active cropland and residential areas and other areas at landowner's request. In pasture land, topsoil will be stripped from the trench area.
3. Topsoil will be stockpiled separately from trench spoil as shown or in other configuration approved by the Environmental Inspector.
4. The offset from active pipeline, where applicable, will be 25' for most locations but may be increased or decreased depending on the site specific construction requirements (e.g., 35' in wetlands).
5. The depth of cover over the pipe will be similar to the adjacent pipelines (approximately 3').
6. No soil stripping or equipment will be allowed over existing pipelines.

For environmental review purposes only.

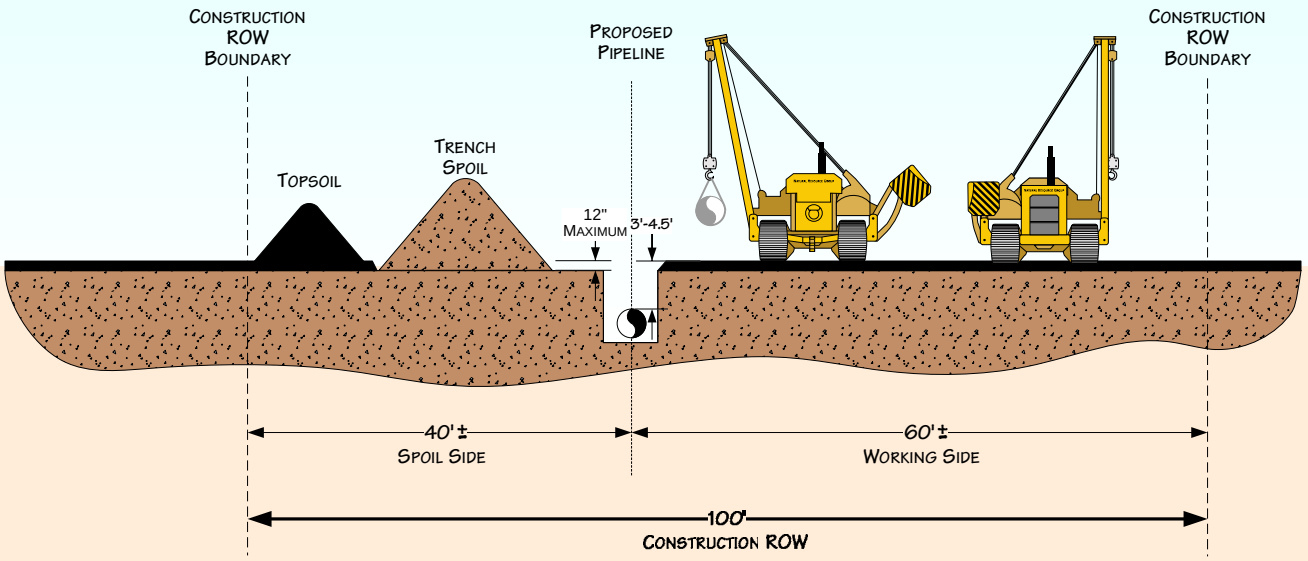
MINNCAN PROJECT

Figure 1
Typical Construction ROW
Adjacent to Existing Pipeline

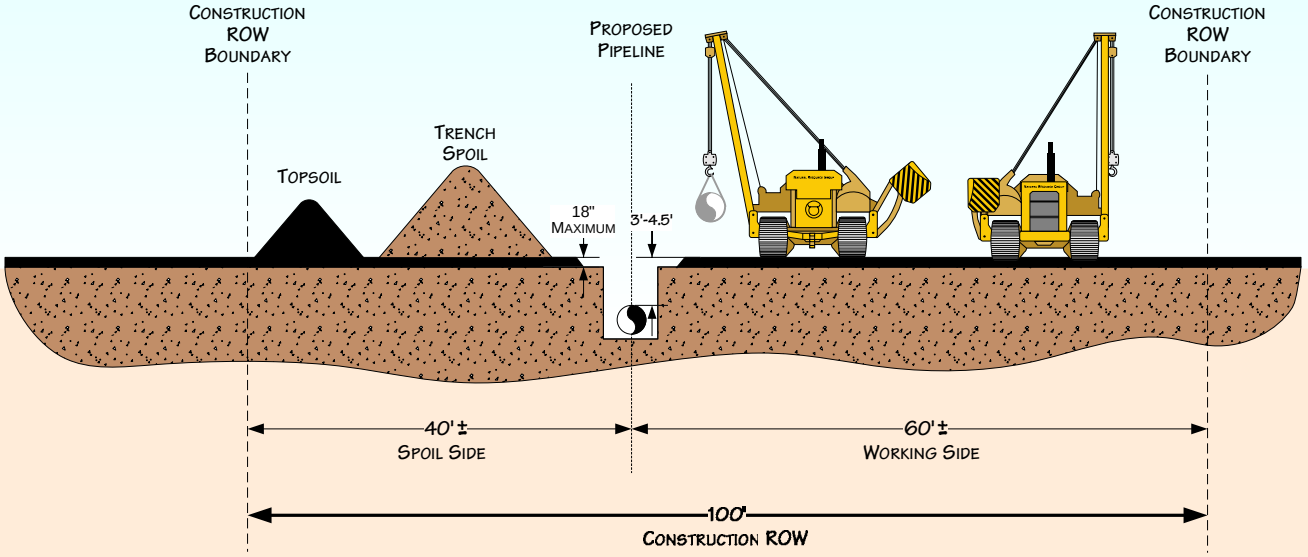
DATE:	11/2/2005
REVISED:	11/21/2005
SCALE:	NTS
DRAWN BY:	KJAnderson

K:\524\2004-558\50\ROW_DRAWINGS.VSD

MP 119 to Approximate Midpoint of Pipeline Route



Approximate Midpoint to End of Pipeline Route



PROFILE

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY NOT EXCEED 100' IN WIDTH, CONSISTING OF 50' OF PERMANENT RIGHT-OF-WAY AND UP TO 50' OF TEMPORARY CONSTRUCTION RIGHT-OF-WAY. ADDITIONAL TEMPORARY WORKSPACE WILL BE NECESSARY AT MAJOR ROAD, RAILROADS, WATERBODY CROSSINGS, SIDESLOPES AND OTHER SPECIAL CIRCUMSTANCES AS REQUIRED (SEE ADDITIONAL TYPICAL CROSSING SKETCHES).
2. THE TOP DRAWING REFLECTS "TRENCH PLUS SPOIL SIDE" TOPSOIL STRIPPING PROCEDURE WITH A MAXIMUM TOPSOIL STRIPPING DEPTH OF 12", WHICH WILL BE USED IN ACTIVE CROPLAND AND OTHER AREAS AT LANDOWNER'S REQUEST FROM ABOUT MP 119 TO THE APPROXIMATE MIDPOINT OF THE PIPELINE ROUTE. ALONG THIS PORTION OF THE ROUTE, TOPSOIL WILL BE STRIPPED TO MAXIMUM DEPTH OF 12" FROM THE "TRENCH ONLY" IN PASTURE LAND.
3. THE BOTTOM DRAWING REFLECTS "TRENCH ONLY" TOPSOIL STRIPPING PROCEDURE WITH A MAXIMUM TOPSOIL STRIPPING DEPTH OF 18", WHICH WILL BE USED IN ACTIVE CROPLAND, PASTURE LAND, AND OTHER AREAS AT LANDOWNER'S REQUEST FROM THE APPROXIMATE MIDPOINT TO THE END OF THE PIPELINE ROUTE.
4. TOPSOIL WILL BE STOCKPILED SEPARATELY FROM TRENCH SPOIL AS SHOWN OR IN OTHER CONFIGURATION APPROVED BY THE ENVIRONMENTAL INSPECTOR.
5. DEPTH OF COVER IS ASSUMED TO BE 4.5' IN AGRICULTURAL LAND AND 3' IN NON-AGRICULTURAL LAND.

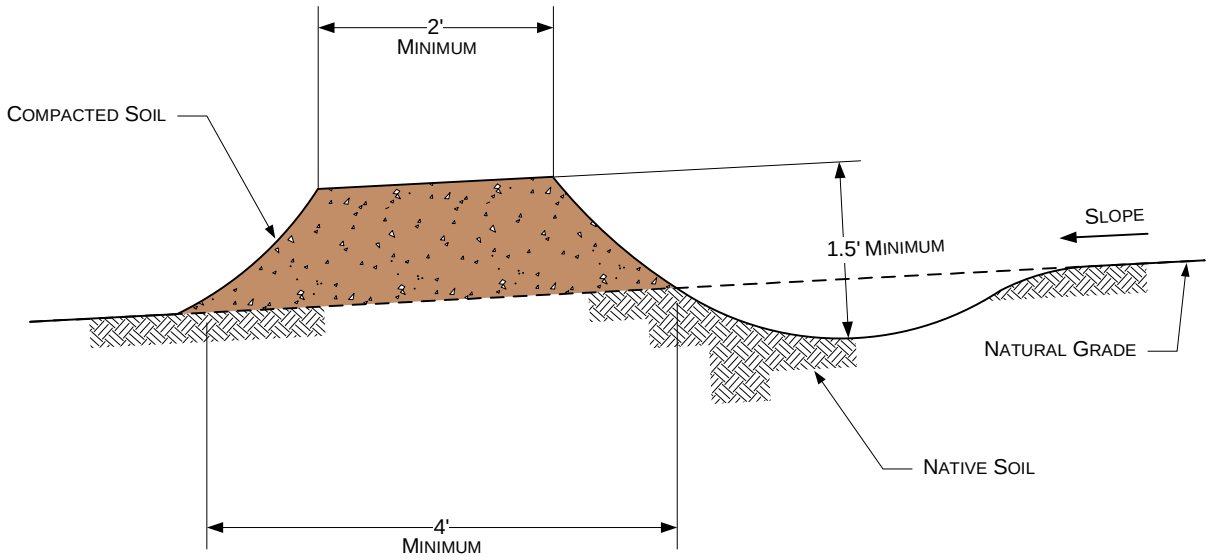
For environmental review purposes only.

MINNCAN PROJECT

Figure 2
Typical Construction ROW
Areas Along Greenfield Route

DATE:	7/21/2004
REVISED:	1/26/2006
SCALE:	NTS
DRAWN BY:	KJA3361

K:\524\ROW\FIGURE 2A_W2.VSD



NOTES

1. BERMS SHALL BE CONSTRUCTED WITH 2 TO 8 PERCENT OUTSLOPE.
2. BERMS SHALL BE OUTLETED TO WELL VEGETATED STABLE AREAS, SILT FENCES, STRAW/HAY BALES, OR ROCK APRONS.
3. BERMS SHALL BE SPACED AS DESCRIBED IN CONSTRUCTION SPECIFICATIONS.
4. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.

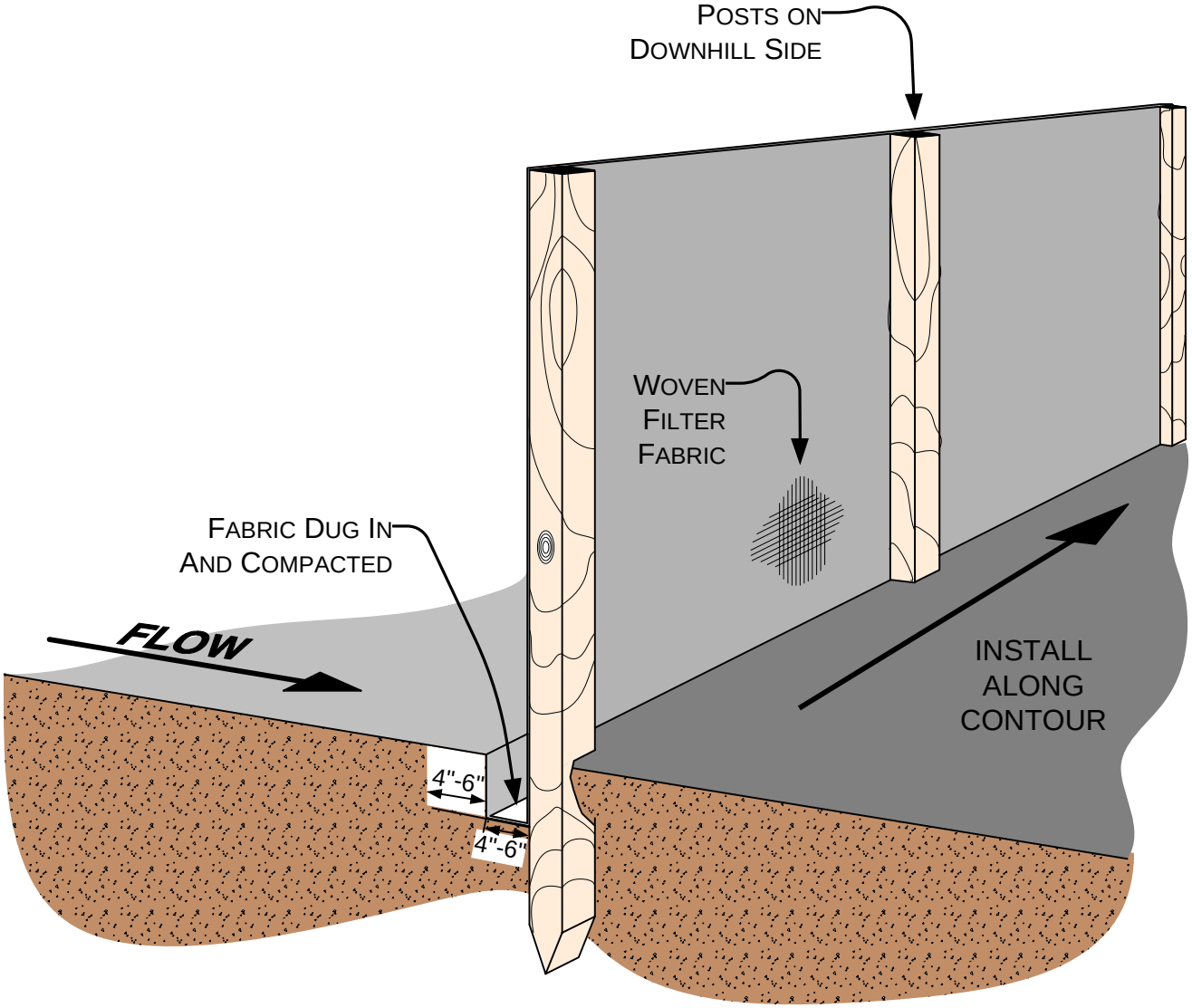
For environmental review purposes only.

MINNCAN PROJECT

Figure 3
Temporary or Permanent Slope Breakers

DATE:	11/29/2005
REVISED:	12/7/2005
SCALE:	NTS
DRAWN BY:	KJA

K:\524\DRAWINGS\TEMP_PERM_BERMS.VSD



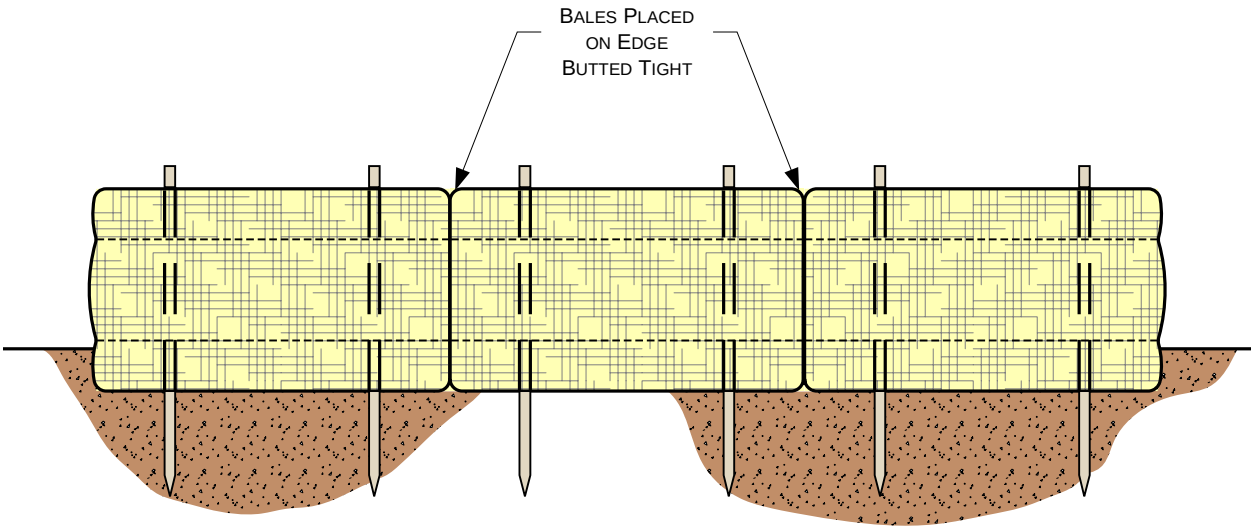
For environmental review purposes only.

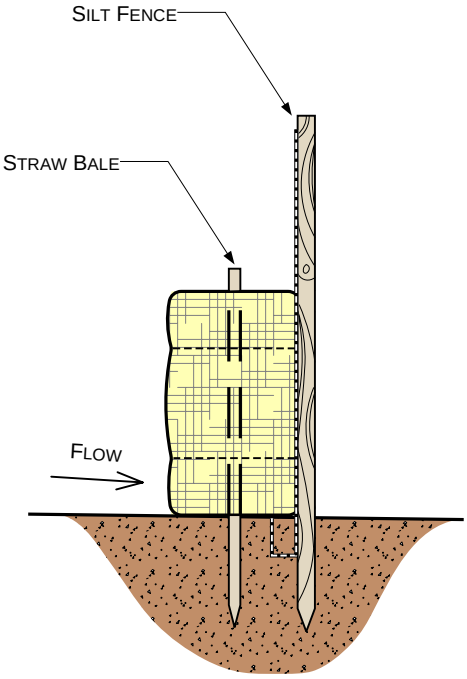
MINNCAN PROJECT

Figure 4
Typical Silt Fence Installation

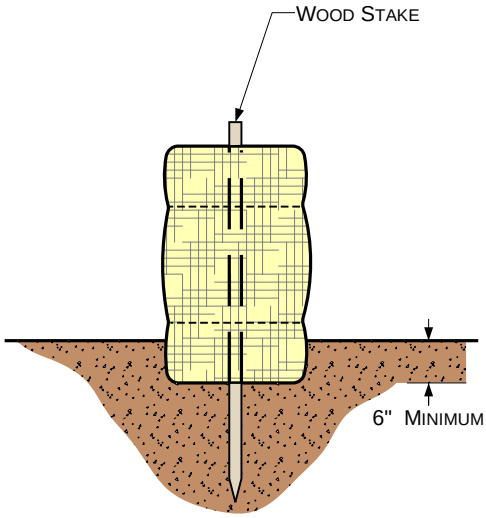
DATE:	11/29/2005
REVISED:	12/12/2005
SCALE:	NTS
DRAWN BY:	KJA

K:\524\DRAWINGS\SILT_FENCE_INSTALL.VSD





STRAW/HAY BALES &
SILT FENCE



STRAW/HAY BALES ONLY

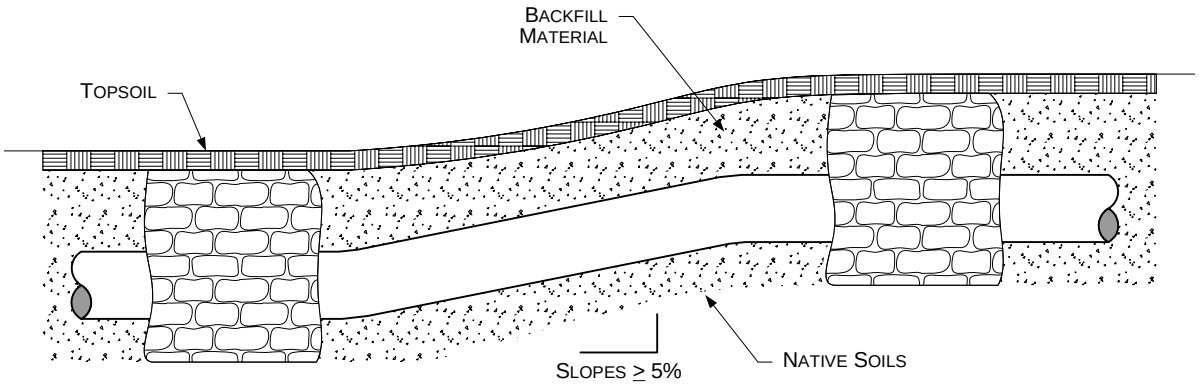
For environmental review purposes only.

MINNCAN PROJECT

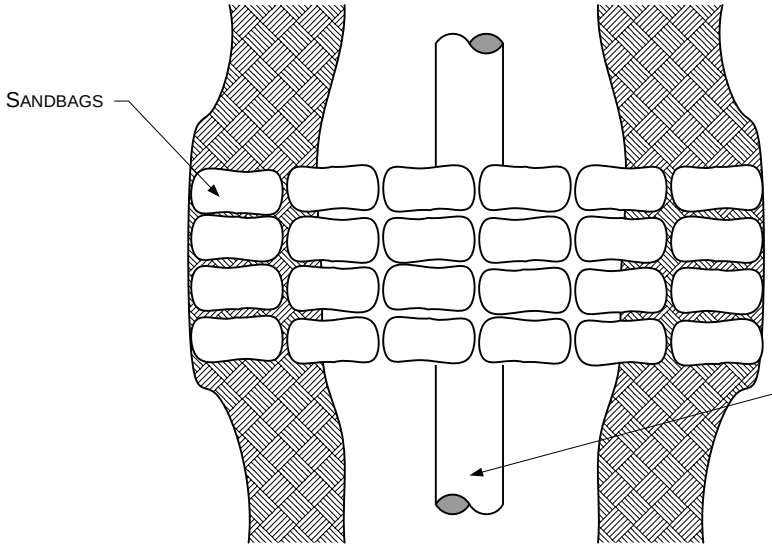
Figure 5
Typical Straw Bale Installation

DATE:	11/29/2005
REVISED:	12/7/2005
SCALE:	NTS
DRAWN BY:	KJA

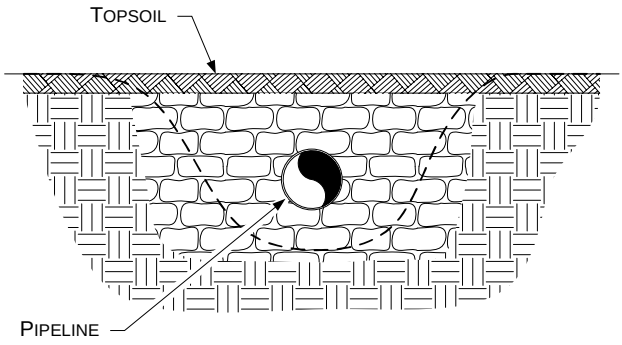
K:\524\DRAWINGS\STRAW_BALE.VSD



PROFILE VIEW



PLAN VIEW



FACE VIEW

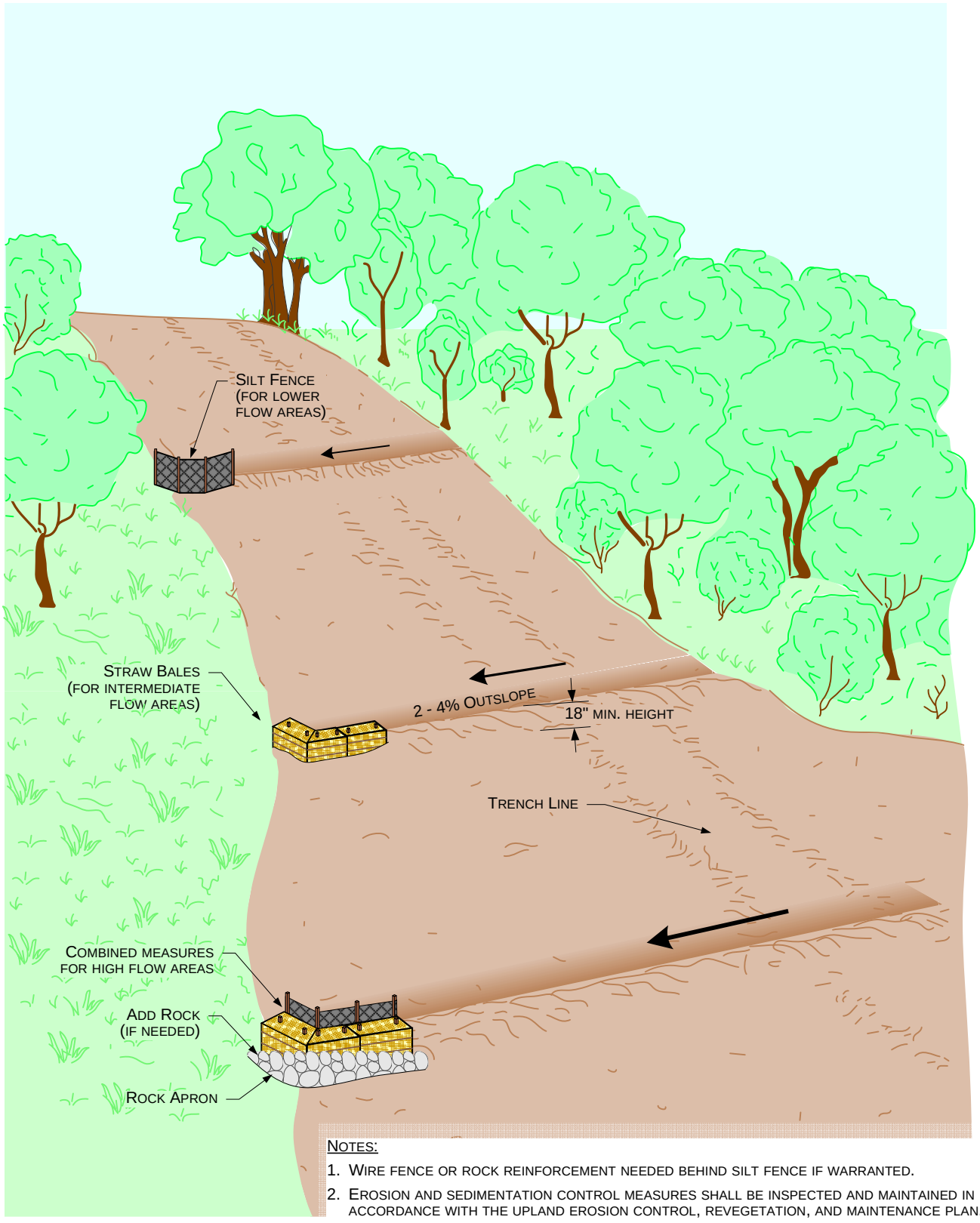
For environmental review purposes only.

MINNCAN PROJECT

Figure 6
Trench Breaker Installation

DATE:	11/29/2005
REVISED:	12/7/2005
SCALE:	NTS
DRAWN BY:	KJA

K:\524\DRAWINGS\TRENCH_BREAKER.VSD



NOTES:

1. WIRE FENCE OR ROCK REINFORCEMENT NEEDED BEHIND SILT FENCE IF WARRANTED.
2. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN.

For environmental review purposes only.

MINNCAN PROJECT

Figure 7
Permanent Slope Breaker

DATE:	11/29/2005
REVISED:	12/7/2005
SCALE:	NTS
DRAWN BY:	KJA

K:\524\DRAWINGS\SLOPE_BREAKERS.VSD

Appendix C

Agricultural Impact Mitigation Plan

AGRICULTURAL IMPACT MITIGATION PLAN

MinnCan Project

Minnesota Pipe Line Company

January 2006

Minnesota Pipe Line Company – MinnCan Project

AGRICULTURAL IMPACT MITIGATION PLAN

Table of Contents

AGRICULTURAL IMPACT MITIGATION PLAN

Purpose and Applicability

This Agricultural Impact Mitigation Plan (AIMP) was developed in consultation with the Minnesota Department of Agriculture (MDA) and in conjunction with Minnesota Pipe Line Company's (MPL) application for a Routing Permit submitted to the Minnesota Public Utilities Commission (PUC). MPL provided this AIMP as part of its application for a Routing Permit to allow for review and comment by agencies (including MDA), local authorities, Landowners, Tenants and other stakeholders. The overall objective of the AIMP is to identify measures that MPL will implement to avoid, mitigate, or provide compensation for, negative agricultural impacts that may result from Pipeline construction. During the Routing Permit process, MPL will continue to consult with MDA regarding provisions of this AIMP. Once finalized, this AIMP will be incorporated into construction specifications and will provide a basis for construction of the Pipeline on Agricultural Land. In the event of a conflict between MPL's Routing Permit application and the AIMP, the provisions of the AIMP will prevail.

The below prescribed construction standards and policies only apply to construction activities occurring partially or wholly on privately owned Agricultural Land. The measures do not apply to construction activities occurring entirely on public rights-of-way, railroad rights-of-way, publicly owned land, or private land that is not Agricultural Land. MPL will, however, adhere to the same construction standards relating to the repair of agricultural Tile (Item No. 3 in the AIMP) when Tiles are encountered on public highway rights-of-way, railroad rights-of-way, or publicly or privately owned land.

Unless the Easement or other agreement, regardless of nature, between MPL and the Landowner or Tenant specifically provides to the contrary, the mitigative actions specified in the construction standards and policies set forth in this AIMP will be implemented in accordance with the conditions listed below:

General Provisions

All mitigative actions are subject to change by Landowners or Tenants, provided such changes are negotiated in advance of construction and acceptable to MPL.

Unless otherwise specified, MPL will retain qualified contractors to execute mitigative actions; however, MPL may negotiate with Landowners or Tenants to carry out the mitigative actions that Landowners or Tenants wish to perform themselves.

Mitigative actions employed by MPL pursuant to this AIMP, unless otherwise specified in this AIMP or in an Easement or other agreement negotiated with an individual Landowner or Tenant will be implemented within 45 days following completion of Final Clean-up on an affected

property, weather permitting or unless otherwise delayed at the request of the Landowner or Tenant. Temporary repairs will be made by MPL during construction as needed to minimize the risk of additional property damage or interference with the Landowner's or Tenant's access to or use of the property that may result from an extended time period to implement mitigative actions.

Except as otherwise provided in this AIMP, or unless otherwise agreed to by Landowners or Tenants, mitigative actions pursuant to this AIMP will extend to associated future maintenance and repair activities by MPL to the extent that these actions are not inconsistent with MPL's operating policies and procedures.

MPL will implement the mitigative actions contained in this AIMP to the extent that they do not conflict with the requirements of any applicable federal and state rules and regulations and other permits and approvals that are obtained by MPL for the project or they are not determined to be unenforceable by reason of other requirements of federal and state permits issued for the project. To the extent a mitigative action required by this agreement is determined to be unenforceable in the future due to requirements of other federal or state permits issued for the project, MPL will so inform the MDA and work with them to develop a reasonable alternative mitigative action.

By no later than 45 days prior to the construction of the Pipeline, MPL will provide each Landowner and Tenant with a telephone number and address which can be used to contact MPL, both during and following the completion of construction, regarding the agricultural impact mitigation work which is performed on their property or other construction-related matter. If the contact information changes after the completion of construction, MPL will provide the Landowner and Tenant with updated contact information. MPL will respond to Landowner and Tenant telephone calls and correspondence within a reasonable time.

Certain provisions of this AIMP require MPL to consult and/or agree with the Landowner and Tenant of a property. MPL will engage in a good faith effort to secure the agreement of both Landowner and Tenant in such cases. In the event of a disagreement between Landowner and Tenant, MPL's obligation will be satisfied by securing the Landowner's written agreement, unless the Tenant has demonstrated in a court of competent jurisdiction that he or she has the superior legal rights in the matter at issue.

This AIMP is incorporated by reference into the Routing Permit issued by the PUC.

MPL will use good faith efforts to obtain an acknowledgement of completion from each Landowner and Tenant upon the completion of Final Clean-up on their respective property.

If any provision of this AIMP is held to be unenforceable, no other provision will be affected by that holding, and the remainder of the AIMP will be interpreted as if it did not contain the unenforceable provision.

Definitions

Agricultural Land	=	Land that is actively managed for cropland, hayland, or pasture, and land in government set-aside programs.
Agricultural Inspector	=	Full-time on-site inspector retained by MPL to verify compliance with requirements of this AIMP during construction of the Pipeline. The Agricultural Inspector will have demonstrated experience with pipeline construction on Agricultural Land.
Agricultural Monitor	=	Full-time, on-site monitor retained and funded by MPL, but reporting directly to MDA and responsible for auditing MPL's compliance with provisions of this AIMP.
MPL	=	Minnesota Pipe Line Company, its successors and assignees.
Cropland	=	Land actively managed for growing row crops, small grains, or hay.
Easement	=	The agreement(s) and/or interest in privately owned Agricultural Land held by MPL by virtue of which it has the right to construct and operate the Pipeline together with such other rights and obligations as may be set forth in such agreement.
Final Clean-up	=	Pipeline construction activity that occurs after backfill and before restoration of fences and required reseeding. Final Clean-up activities include: replacing Topsoil, removal of construction debris, removal of excess rock, decompaction of soil as required, installation of permanent erosion control structures, and final grading.
Landowner	=	Person(s) holding legal title to Agricultural Land on the Pipeline route from whom MPL is seeking, or has obtained, a temporary or permanent Easement including any Person(s) authorized in writing by any such Person to make decisions regarding the mitigation or restoration of agricultural impacts to such Person's property.
Non-Agricultural Land	=	Any land that is not "Agricultural Land" as defined above.
Person	=	an individual or entity, including any partnership, corporation, association, joint stock company, trust, joint venture, limited liability company, unincorporated organization, or governmental entity (or any department, agency or political subdivision thereof).

Pipeline	=	The crude-oil pipeline proposed by MPL (PUC Docket No. PL5/PPL-05-2003)
Planned Tile	=	Locations where the proposed installation of Tile is made known in writing to MPL by the Landowner or Tenant either: 1) within 60 days after the signing of an Easement; or 2) before the issuance of a Routing Permit to MPL by the PUC; whichever is sooner.
Right-of-Way	=	The Agricultural Land included in permanent and temporary Easements which MPL acquires for the purpose of constructing and operating the Pipeline.
Tenant	=	Any Person lawfully residing on or in possession of the land which makes up the "Right-of-Way" as defined in this AIMP.
Tile	=	Artificial subsurface drainage system.
Topsoil	=	The uppermost horizon (layer) of the soil, typically with the darkest color and highest content of organic matter and nutrients.

Mitigative Actions

1. Pipeline Depth of Cover

A. Except for above-ground facilities, such as mainline block valves, and except as otherwise stated in this AIMP, the Pipeline will be buried with the following depths of cover on Agricultural Land:

1. The Pipeline will be constructed with the minimum depth of cover of four and one half (4 1/2) feet as required by Minn. Stat. §116I.06, Subd. 1.

2. Where existing or Planned Tile are present, the Pipeline will be installed at a depth that will achieve at least a 1-foot separation between the Pipeline and overlying Tiles as described in 1.C.

3. Where the Pipeline is adjacent to (within 100 feet) an existing pipeline, the depth of cover will be the same as the adjacent pipeline, subject to approval by the Landowner.

B. Notwithstanding paragraph A of Section 1, unless the Landowner or Tenant determines otherwise in writing, MPL will construct the Pipeline under existing nonabandoned Tile and Planned Tile within eight (8) feet of the surface. MPL may install the Pipeline over Tile buried deeper than eight (8) feet. The Landowner must provide plans for the proposed installation of Planned Tile

drawn by a qualified professional with experience in the design and installation of Tile. In determining the proper depth of the Pipeline, MPL will accommodate the depth and grade needed for both existing and planned Tile to function properly. MPL will not change the grade of existing Tile to accommodate the Pipeline without the Landowner's or Tenant's advance written consent.

C. A minimum of 12 inches of separation will be maintained between the Pipeline and Tile unless the Landowner or Tenant agrees in writing to a lesser separation distance or other physical conditions exist which prevent the minimum distance of separation to be achieved and the Landowner is informed of the physical condition prior to the installation of the Pipeline over the Tile. If the Landowner or Tenant is unavailable, the Agricultural Monitor will be so informed.

D. On lands subject to erosion, MPL will patrol the pipeline Right-of-Way with reasonable frequency to detect erosion of the topcover. MPL will not knowingly allow the amount of topcover to erode more than 12 inches from its original level. MPL will be responsible for maintaining the proper topcover under this section where erosion has occurred despite the Landowner's or Tenant's best effort to employ accepted conservation farming practices. However, MPL will not be responsible for a Landowner or Tenant removing cover either through the use of specialty landscaping methods or any other farming method that would cause the depth of cover to be altered or causing erosion to occur over the Pipeline through means other than accepted conservation farming practices.

2. Topsoil Stripping, Storage, and Replacement

A. MPL will remove Topsoil from the Agricultural Land to be trenched for the Pipeline and for bore pits at road and ditch crossings. The depth of soil to be removed will be the actual depth of the Topsoil or to a specified maximum depth as defined in this AIMP. The maximum depth of Topsoil stripping will be 12 inches on the approximate northern one half of the route and 18 inches (or as otherwise agreed to with MDA) on the approximate southern half of the route. The exact point of demarcation between the north half and the south half of the route will be mutually agreed upon with MDA prior to construction reaching that point. MPL will work with MDA to identify a suitable protocol for communicating the appropriate depth of Topsoil stripping to construction personnel. The Agricultural Inspector or the designated MPL inspector will observe Topsoil operations so that appropriate depths are removed. In areas of active Cropland on the northern portion of the route, the Topsoil will be removed from the area to be excavated above the Pipeline and the adjacent subsoil storage area. On active Cropland on the southern portion of the route, the Topsoil will be removed from the area to be excavated above the Pipeline.

B. Subsoil material which is removed from the trench will be placed in a stockpile that is separate from stored topsoil.

C. In backfilling the trench, stockpiled subsoil material will be placed back into the trench before replacing the Topsoil.

D. The Topsoil will be replaced so that after settling occurs, the Topsoil's original depth and contour (with an allowance for settling) will be achieved. Topsoil materials will not be used for destructive purposes such as padding the pipe. MPL may employ temporary, non-destructive uses of Topsoil such as creating access ramps at road crossings.

3. Repair of Damaged and Adversely Affected Tile

If Tile is damaged by the Pipeline installation or future construction, maintenance, or repair of the Pipeline, the Tile will be repaired in a manner that restores the Tile's operating condition at the point of repair. If Tiles on or adjacent to the Pipeline's construction area are adversely affected by the Pipeline, MPL will take such actions as are necessary to restore the functioning of the Tile, including the relocation, reconfiguration, and replacement of the existing Tile. The affected Landowner or Tenant may elect to negotiate a fair settlement with MPL for the Landowner or Tenant to undertake the responsibility for repair, relocation, reconfiguration, or replacement of the damaged Tile. In the event the Landowner or Tenant chooses to undertake the responsibility for repair, relocation, reconfiguration, or replacement of the damaged Tile, MPL will not be responsible for correcting Tile repairs after completion of the Pipeline (MPL is responsible for correcting Tile repairs after completion of the Pipeline, provided the repairs were made by MPL or its agents or designees.).

Where the damaged Tile is repaired by MPL, the following standards and policies will apply to the Tile repair:

A. MPL will contact affected Landowners or Tenants for their knowledge of Tile locations prior to the Pipeline's installation. Tile that is damaged, cut, removed or otherwise discovered will be distinctly marked by placing a highly visible flag at the edge of the construction Right-of-Way directly opposite such Tiles. This marker will not be removed until the Tile has been permanently repaired and such repairs have been approved and accepted by the Landowner or Tenant or the Agricultural Monitor.

B. Tiles will be repaired with materials of the same or better quality as that which was damaged.

C. If water is flowing through a damaged Tile, temporary repairs will be promptly installed and maintained until such time that permanent repairs can be made.

D. Where Tiles are damaged or severed by the Pipeline trench, repairs will be made according to the following standards:

1. Where Tiles are severed by the Pipeline trench, use of double-walled drain tile pipe, or its equivalent material, will be used to construct Tile repairs.

2. Within the trench, 1 1/2 inch river gravel, 4 inch crushed stone, sandbags, or bags of concrete will be backfilled under Tiles, as needed to provide support to the Tiles and to prevent settling. Concrete blocks are also acceptable forms of support as are protective pads on the Pipeline

3. The support member will be of sufficient strength to support loads expected from normal farming practices (*i.e.*, loads up to a 10-ton point load) on the surface directly above the repaired Tile.

4. The support member will extend a minimum of 2 feet into previously undisturbed soil on both sides of the trench and will be installed in a manner that will prevent it from overturning. If the Tile repairs involve clay Tile, the support member will extend to the first Tile joint beyond the minimum 2 foot distance.

5. There will be a minimum clearance as required by 1.C.

6. The grade of the Tile will not be changed.

E. Before completing permanent Tile repairs, Tiles will be examined by suitable means on both sides of the trench for their entire length within the work area to check for Tile that might have been damaged by construction equipment. If Tiles are found to be damaged, they will be repaired so they operate as well after construction as before construction began.

F. MPL will make reasonable efforts to complete Permanent Tile repairs within 14 days after Final Clean-up, taking into account weather and soil conditions.

G. Following completion of the Final Clean-up, MPL will also be responsible for correcting Tile repairs that fail due to Pipeline construction, provided those repairs were made by MPL. MPL will be responsible for correcting and repairing Tile breaks, or other damages to Tile systems that occur on the Rights-of-Way to the extent that such breaks are the result of Pipeline construction. For the purpose of this paragraph, it is presumed that, during the first 5 years after construction, Tile breaks or other damages to Tile systems within the Rights-of-Way are the result of Pipeline construction unless MPL can

demonstrate otherwise. MPL will not be responsible for Tile repairs which MPL has paid the Landowner or Tenant to perform.

4. Installation of Additional Tiles

MPL will be responsible for installing such additional Tile and other drainage measures as are necessary to properly drain wet areas on the Rights-of-Way caused by the construction and/or existence of the Pipeline. For the purpose of this paragraph, during the first 5 years after construction of the Pipeline, it is presumed that wet areas located in the Rights-of-Way are caused by the construction and/or existence of the Pipeline unless MPL can demonstrate that the construction and/or existence of the Pipeline is not the cause of the wet areas.

5. Rock Removal

The following conditions with respect to rock removal will apply on Agricultural Land:

A. The Pipeline trench, or bore pits, or other excavations will not be backfilled with soil containing rocks of greater concentration or size than existed prior to the Pipeline's construction.

B. If trenching, blasting, or boring operations are required through rocky terrain, suitable precautions will be taken to minimize the potential for oversize rocks to become interspersed with the soil material that is placed back in the trench.

C. Soil removed from the Pipeline trench, bore pits, or other excavations containing unacceptable rock concentrations or sizes (see 5.A. above) will be hauled off the Landowner's premises or disposed of on the Landowner's premises at a location that is mutually acceptable to the Landowner or Tenant and MPL, and at MPL’s expense. MPL may elect to remove excess rock from the soil and use the soil as backfill material.

D. After completion of the compaction alleviation activities required in Section 7, below, MPL will remove rocks which are three (3) inches in diameter from the surface of disturbed soil on the entire construction area if the off Right-of-Way areas do not contain rocks larger than 3 inches in diameter. Where rock removal is required, the amount of rock on the surface of the Right-of-Way after construction will be similar to that on adjacent off-Right-of-Way areas. Rocks will be hauled off the Landowner's premises or disposed of on the Landowner's premises at a location that is mutually acceptable to the Landowner or Tenant and MPL, and at MPL’s expense.

6. Removal of Construction Debris

Construction-related debris and material which is not an integral part of the Pipeline will be removed from the Landowner's property at MPL's cost. (Note: Such material to be removed would include litter generated by the construction crews.)

7. Compaction, Rutting, Fertilization, Liming, and Soil Restoration

A. Compaction will be alleviated as needed on Cropland traversed by construction equipment. Cropland that has been compacted will be plowed using appropriate deep-tillage and draft equipment. Alleviation of compaction of the Topsoil will be performed during suitable weather conditions, and must not be performed when weather conditions have caused the soil to become so wet that activity to alleviate compaction would damage the future production capacity of the land as determined by the Agricultural Monitor. MPL will continue to work with MDA to evaluate the suitability of methods to alleviate soil compaction (e.g. incorporation of bedding manure).

B. In the case of a claim for damages related to soil compaction, upon written request, MPL will retain a Professional Soil Scientist, who is also licensed by the State of Minnesota, or an appropriately qualified Minnesota licensed professional engineer to perform a soil survey for soil compaction using appropriate field equipment such as a soil penetrometer to investigate such claim. In addition, where there are row crops, samples will be taken in the middle of the row, but not in rows where the drive wheels of farm equipment normally travel. Copies of the results of the above-described survey will be provided to the Landowners and/or Tenants making such claim at MPL's expense within 45 days of completion of the soil survey.

C. MPL will restore rutted land to as near as practical to its pre-construction condition.

D. MPL will reasonably compensate Landowners and/or Tenants, as appropriate, for damages caused by MPL during Pipeline construction, including the cost of soil restoration.

E. If there is a dispute between the Landowner and Tenant and MPL as to what areas need to be ripped or chiseled, the depth at which compacted areas should be ripped or chiseled, or the necessity or rates of lime, fertilizer, and organic material application, the Agricultural Monitor's opinion will be considered by MPL.

8. Land Leveling

Following the completion of the Pipeline construction, MPL will restore the area disturbed by construction to its original pre-construction elevation and contour. If

uneven settling occurs or surface drainage problems develop, as a result of Pipeline construction, MPL will provide additional land leveling services, or compensation, within 45 days of receiving a Landowner's or Tenant's written notice, weather permitting.

9. Prevention of Soil Erosion

MPL will work with Landowners and Tenants to prevent excessive erosion on lands disturbed by construction. MPL will implement reasonable methods as described in MPL's Upland Erosion Control, Revegetation and Maintenance Plan.

10. Repair of Damaged Soil Conservation Practices

Soil conservation practices (such as terraces, grassed waterways, etc.) which are damaged by the Pipeline's construction will be restored to their pre-construction condition.

11. Interference with Irrigation Systems

A. If the Pipeline and/or temporary work areas intersect an operational (or soon to be operational) spray irrigation system, MPL will establish with the Landowner or the Tenant, an acceptable amount of time the irrigation system may be out of service.

B. If, as a result of Pipeline construction activities or future construction, maintenance, or repair of the Pipeline, an irrigation system interruption results in crop damages, either on the Right-of-Way or off the Right-of-Way, compensation of Landowners and/or Tenants, as appropriate, will be determined as described in section 18 of this AIMP.

C. If it is feasible and mutually acceptable to MPL and the Landowner or the Tenant, temporary measures will be implemented to allow an irrigation system to continue to operate across land on which the Pipeline is also being constructed.

12. Mitigation for Other Natural Resource Impacts

Unless otherwise required by a state or federal agency or other governmental body, MPL will not mitigate for impacts to other natural resources (wetlands, woodlands, etc.) utilizing Agricultural Land as mitigation lands. If Agricultural Land is used for woodland/wetland impact mitigation, MPL will attempt to negotiate a mitigation ratio not to exceed a 1:1 ratio.

13. Ingress and Egress

Prior to the Pipeline's installation, MPL and the Landowner and the Tenant will reach a mutually acceptable agreement on the means of entering and leaving the Right-of-Way

should access to the Right-of-Way not be practical or feasible from adjacent segments of the Right-of-Way or from public highway or railroad right-of-way. Temporary access ramps may be constructed using locally obtained Topsoil as needed to facilitate the movement of equipment between public highways and the Right-of-Way.

14. Temporary Roads

A. The location of temporary roads to be used for construction purposes will be negotiated with the Landowner or the Tenant.

B. The temporary roads will be designed so as to not impede proper drainage and will be built to minimize soil erosion on or near the temporary roads.

C. Upon abandonment, temporary roads may be left intact through mutual agreement of the Landowner and the Tenant and MPL unless otherwise restricted by federal, state or local regulations.

D. If the temporary roads are to be removed, the Agricultural Land upon which the temporary roads are constructed will be returned to its previous use and restored to equivalent condition as existed prior to their construction. Restoration techniques for temporary roads will be similar to those employed in restoring the Pipeline Right-of-Way, e.g. decompaction.

15. Weed Control

On land over which MPL has above-ground facilities (i.e., valve sites, pump stations, etc.), MPL will provide for weed control in a manner that does not allow for the spread of weeds onto adjacent Agricultural Land during operation of the Pipeline. Weed control spraying will be in accordance with State of Minnesota regulations.

16. Pumping of Water from Open Trenches

A. In the event it becomes necessary to pump water from open trenches, MPL will pump the water in a manner that will avoid damaging adjacent Agricultural Land, crops, and/or pasture. Such damages include, but are not limited to: inundation of crops for more than 24 hours and deposition of sediment in ditches and other water courses.

B. If water-related damage during pumping of water from open trenches results in a loss of yield, compensation of Landowners and/or Tenants, will be determined as described in section 18 of this AIMP.

C. Standards for pumping of water will apply to the extent that they do not conflict with federal, state, and local regulations.

17. Construction in Wet Conditions

A. Should the Agricultural Monitor determine that, due to wet conditions, continued construction activity would result in damage to the future production capacity of the land included in the construction area, the Agricultural Monitor may request MPL's Agricultural Inspector to temporarily halt the construction activity on that Landowner's property (not on the entire construction spread) until the Agricultural Monitor consults with supervisory personnel of MPL.

B. If construction is continued over the Agricultural Monitor's objection, and damage results,unless MPL can demonstrate otherwise, the Landowner or Tenant may seek a determination of damages. Compensation for Landowners and/or Tenants, as appropriate, will be determined as described in section 18 of this AIMP.

18. Procedures for Determining Construction-Related Damages and Providing Compensation

A. MPL will develop and put into place a procedure for the processing of anticipated Landowners' or Tenants' claims for construction-related damages. The procedure will be intended to standardize and minimize Landowner and Tenant concerns in the recovery of damages, to provide a degree of certainty and predictability for Landowners, Tenants and MPL, and to foster good relationships among MPL, Landowners and their Tenants over the long term.

B. Negotiations between MPL and any affected Landowner or Tenant will be voluntary in nature and no party is obligated to follow any particular procedure or method for computing the amount of loss for which compensation is sought or paid. In the event a Landowner or a Tenant decide not to accept compensation offered by MPL, the compensation offered is only an offer to settle, and the offer shall not be introduced in any proceeding brought by the Landowner or a Tenant to establish the amount of damages MPL must pay. In the event that MPL and a Landowner Tenant are unable to reach an agreement on the amount of compensation, any such Landowner or Tenant may seek recourse through the court system of the State of Minnesota.

19. Advance Notice of Access to Private Property

A. MPL will provide the Landowner and/or Tenant with a minimum of 24 hours prior notice before accessing his/her property for the purpose of constructing the Pipeline.

B. Prior notice will consist of a personal contact or a telephone contact, whereby the Landowner and the Tenant is informed of MPL's intent to access the land. If the Landowner and/or Tenant cannot be reached in person or by telephone, MPL will mail or hand-deliver to the Landowner and the Tenant's home a dated,

written notice of MPL's intent. The Landowner and Tenant need not acknowledge receipt of the written notice before MPL can enter the Landowner's property.

20. Indemnification

For any Pipeline installation covered by this AIMP, MPL will indemnify the respective Landowners and Tenants, their heirs, successors, legal representatives, and assigns from and against all claims, injuries, suits, damages, (including, but not limited to, crop loss, repairs to irrigation systems and Tile, real and personal property damages) costs, losses, and reasonable expenses resulting from or arising out of the construction of such Pipeline, including damage to such Pipeline or any of its appurtenances and the leaking of its contents, to the extent arising from the violation by MPL or its contractors of the construction standards required by this AIMP except where such claims, injuries, suits, damages, costs, losses, and expenses are caused by the negligence or intentional acts, or willful omissions of such Landowners and Tenants, their contractors, heirs, successors, legal representatives, and assigns.

21. Excavation after Pipeline Installation

If, after Pipeline installation the Landowner or Tenant must make repairs to a Tile that lies within the Right-of-Way, or is to install new Planned Tile, MPL will, at its own expense:

A. If the Pipeline is below the Tile, MPL will provide a person to be present when the excavation work is being performed but will not perform the excavation work.

B. If the Pipeline is above the Tile, MPL will be responsible for reasonable extra costs incurred by the Landowner or Tenant to excavate and expose the Pipeline, as mutually agreeable to MPL and the Landowner or Tenant.

C. The Landowner or Tenant will be responsible for contacting Gopher State One Call prior to any excavation near the Pipeline.

22. Role and Responsibilities of Agricultural Monitor

The Agricultural Monitor will be retained and funded by MPL, but will report directly to MDA. The primary function of the Agricultural Monitor will be to audit MPL’s compliance with this AIMP. The Agricultural Monitor will not have the authority to direct construction activities and will work through MPL’s Agricultural Inspector if compliance issues are identified. The Agricultural Monitor will have full access to Agricultural Land crossed by the MinnCan Project and will have the option of attending meetings where construction on Agricultural Land is discussed. Specific duties of the Agricultural Monitor will include but are not limited to the following:

1. Participate in preconstruction training activities sponsored by MPL.

2. Monitor construction and restoration activities on Agricultural Land for compliance with provisions of this AIMP.

3. Report instances of noncompliance to MPL's Agricultural Inspector.

4. Prepare regular compliance reports and submit to MDA.

5. Act as liaison between Landowners and Tenants and MDA.

6. Maintain a written log of communications from Landowners and/or Tenants regarding compliance with this AIMP and Easements. Report Landowner complaints to MPL's Agricultural Inspector or right-of-way representative.

23. Qualifications and Selection of Agricultural Monitor

The Agricultural Monitor will have a bachelor's degree in agronomy, soil science or equivalent work experience. In addition, the Agricultural Monitor will have demonstrated practical experience with pipeline construction and restoration on Agricultural Land. MPL will provide resumes of candidates that meet the qualifications listed above for review and final selection by MDA.

24. Role of the Agricultural Inspector

The Agricultural Inspector will:

1. Be full-time member of MPL's environmental inspection team.

2. Be responsible for verifying MPL's compliance with provisions of this AIMP during construction.

3. Work collaboratively with other MPL inspectors, right-of-way agents, and the Agricultural Monitor in achieving compliance with this AIMP.

4. Observe construction activities on Agricultural Land on a continual basis.

5. Have the authority to stop construction activities that are determined to be out of compliance with provisions of this AIMP.

6. Document instances of noncompliance and work with construction personnel to identify and implement appropriate corrective actions as needed.

7. Provide construction personnel with training on provisions of this AIMP before construction begins.

8. Provide construction personnel with field training on specific topics such as protocols for topsoil stripping.

Appendix D

Wetland and Waterbody Construction and Mitigation Procedures

WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES

MinnCan Project
Minnesota Pipe Line Company

December 2005

Minnesota Pipe Line Company – MinnCan Project

WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES

TABLE OF CONTENTS

FIGURES

WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES (WWCMP)

I. APPLICABILITY

The intent of this WWCMP is to assist Minnesota Pipe Line Company (MPL) employees and its contractors in identifying baseline mitigation measures for minimizing the extent and duration of project-related disturbance on wetland and waterbodies. Where site-specific permit conditions regarding mitigation activities are more stringent than those discussed in this document, the permit condition will take precedence.

II. DEFINITIONS

1. "Waterbody" includes any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes:

    a. "minor waterbody" includes waterbodies with intermittant flow, typically less than or equal to 10 feet wide at the time of crossing;

    b. "protected waterbody" includes waterbodies and wetlands designated by the Minnesota Department of Natural Resources (MDNR) as a Minnesota Protected Water.

2. "Wetland" includes areas that are not in actively cultivated or rotated cropland and that satisfy the requirements of the current federal methodology for identifying and delineating wetlands.

III. ENVIRONMENTAL INSPECTORS

A. ASSIGNMENTS

At least one Environmental Inspector, having knowledge of the wetland and waterbody conditions in the project area, will be assigned to each construction spread. The number and experience of Environmental Inspectors assigned to each construction spread will be appropriate for the length of the construction spread and the number/significance of resources affected.

B. RESPONSIBILITIES

The Environmental Inspector's responsibilities are outlined in MPL’s Upland Erosion Control, Revegetation, and Maintenance Plan (Erosion Control Plan).

IV. PRECONSTRUCTION PLANNING

A. STORMWATER POLLUTION PREVENTION PLAN

A copy of the Stormwater Pollution Prevention Plan (SWPPP) prepared for compliance with the Minnesota Pollution Control Agency Stormwater Program General Permit requirements will be available in the field on each construction spread. The SWPPP will contain Spill Prevention and Response Procedures that meet the requirements of Minnesota and the U.S. Environmental Protection Agency and federal agencies.

1. Responsibilities

It will be the responsibility of MPL and its contractors to structure the construction operations in a manner that reduces the potential for spills or the accidental exposure of fuels or hazardous materials to waterbodies or wetlands. MPL and its contractors will verify that:

a. employees handling fuels and other hazardous materials are trained;

b. equipment is in operating order and inspected on a regular basis;

c. fuel trucks transporting fuel to on-site equipment travel only on designated access roads;

d. equipment is parked overnight and/or fueled at least 100 feet from a waterbody or in an upland area at least 100 feet from a wetland boundary. These activities can occur closer only if the Environmental Inspector finds, in advance, no reasonable alternative and MPL and its contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for cleanup in the event of a spill;

e. hazardous materials, including chemicals, fuels, and lubricating oils, are not stored within 100 feet of a wetland, waterbody, or designated municipal watershed area, unless the location is designated for such use by an appropriate governmental authority. This applies to storage of these materials and does not apply to normal operation or use of equipment in these areas; and

f. concrete coating activities are not performed within l00 feet of a wetland or waterbody boundary, unless the location is an existing industrial site designated for such use.

2. Spill Protocol

MPL and its contractors will structure the construction operations in a manner that provides for the cleanup of spills of fuel and other construction-related hazardous materials. At a minimum, MPL and its contractors will:

a. verify that each construction crew (including cleanup crews) has on hand sufficient supplies of absorbent and barrier materials to allow the containment and recovery of spilled materials and knows the procedure for reporting spills;

b. verify that each construction crew has on hand sufficient tools and material to safely eliminate the source of release;

c. know the contact names and telephone numbers for local, state, and federal agencies that will be notified of a spill; and

d. follow the requirements of those agencies in cleaning up the spill, in excavating and disposing of soils or other materials contaminated by a spill, and in collecting and disposing of waste generated during spill cleanup.

V. WATERBODY CROSSINGS

A. INSTALLATION

1. Time Window for Construction

MPL will consult with the MDNR and conduct in-stream work within protected waters, except that required to install or remove equipment bridges, in accordance with time windows specified by the MDNR.

2. Extra Work Areas

a. Extra work areas (such as staging areas and additional spoil storage areas) will be located at least 50 feet away from water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land, or where the Environmental Inspector determines that site conditions require a smaller buffer. In no event will the set back be less than 10 feet.

b. Clearing of vegetation between extra work areas and the edge of the waterbody will be limited to the approved construction right-of-way.

c. The size of extra work areas will be limited to the minimum needed to construct the waterbody crossing.

3. General Crossing Procedures

a. Construction will be in accordance with the MDNR, Minnesota Polluction Control Agency (MPCA), or federal permit terms and conditions.

b. Crossings will be constructed as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit.

c. If the pipeline parallels a waterbody, MPL will attempt to maintain at least 15 feet of undisturbed vegetation between the waterbody (and adjacent wetland) and the construction right-of-way.

d. A 10-foot buffer of undistrubed herbaceous vegetation will be maintained on stream banks until the trenching begins at the stream crossing.

e. Flow rates will be maintained to protect aquatic life, and prevent the interruption of existing downstream uses.

f. Waterbody buffers (extra work area setbacks, refueling restrictions, etc.) will be marked in the field with signs and/or visible flagging until construction-related ground disturbing activities are complete.

4. Spoil Pile Placement and Control

a. Spoil from waterbody crossings, will be placed in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas.

b. Sediment barriers will be used to prevent the flow of spoil or heavily silt-laden water into any waterbody.

5. Equipment Bridges

a. Only clearing equipment and equipment necessary for installation of equipment bridges will cross waterbodies prior to bridge installation. The number of such crossings of each waterbody will be limited to one per piece of clearing equipment.

b. Equipment bridges will be constructed to maintain unrestricted flow and to prevent soil from entering the waterbody. Examples of such bridges include:

(1) Prefabricated timber-mats and culverts (see figure 1);
(2) Prefabricated timber mats or railroad car bridges without culverts;
(3) clean rock fill and culverts (see figure 2); and
(4) flexi-float or portable bridges.

Additional options for equipment bridges may be utilized that achieve the performance objectives noted above. Bridges over protected waters must be built and maintained in accordance with the MDNR permit requirements.

c. Each equipment bridge will be designed and maintained to withstand and pass the highest flow expected to occur while the bridge is in place. Culverts will be aligned to prevent bank erosion or streambed scour.

d. Equipment bridges will be designed and maintained to prevent soil from entering the waterbody. Soil will be removed from the bridges on a regular basis.

e. Equipment bridges will be removed as soon as possible after permanent seeding .

f. If there will be more than one month between final cleanup and the beginning of permanent seeding and reasonable alternative access to the right-of-way is available, equipment bridges will be removed as soon as practicable after final cleanup.

6. Dry-Ditch Crossing Methods

a. Dam and Pump

(1) The dam-and-pump method (see figure 3) may be used for crossings of waterbodies where pumps can transfer streamflow volumes around the work area, and there are no concerns about sensitive species passage.

(2) Implementation of the dam-and-pump crossing method will meet the following performance criteria:

(i) use sufficient pumps, including on-site backup pumps, to maintain downstream flows;
(ii) construct dams with materials that prevent sediment and other pollutants from entering the waterbody (*e.g.*, sandbags or clean gravel with plastic liner);
(iii) screen pump intakes;
(iv) prevent streambed scour at pump discharge; and
(v) monitor the dam and pumps to ensure proper operation throughout the waterbody crossing.

b. Flume Crossing

If the flume crossing method (see figure 4) is used for crossings of waterbodies the following steps will be taken:

(1) install flume pipe after blasting (if necessary), but before any trenching;

(2) use sand bag or sand bag and plastic sheeting diversion structure or equivalent to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required to achieve an effective seal);

(3) align flume pipe(s) to prevent bank erosion and streambed scour;

(4) do not remove flume pipe during trenching, pipelaying, or backfilling activities, or initial streambed restoration efforts; and

(5) remove flume pipes and dams that are not also part of the equipment bridge as soon as final cleanup of the stream bed and bank is complete.

c. Horizontal Directional Drill (HDD)

For each waterbody or wetland that will be crossed using the HDD method, a site-specific plan will be developed that includes:

(1) site-specific construction diagrams that show the location of mud pits, pipe assembly areas, and areas to be disturbed or cleared for construction;

(2) a description of how an inadvertent release of drilling mud will be contained and cleaned up; and

(3) a contingency plan for crossing the waterbody or wetland in the event the directional drill is unsuccessful and how the abandoned drill hole would be sealed, if necessary.

7. Crossings of Minor Waterbodies

Minor waterbodies will be crossed using the open-cut crossing method (see figure 5), with the following restrictions:

a. except for blasting and other rock breaking measures, attempt to complete instream construction activities (including trenching, pipe installation, backfill, and restoration of the streambed contours) within 24 hours. Streambanks and unconsolidated streambeds may require additional restoration after this period;

b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and

c. equipment bridges are not required at minor waterbodies where there is no flow (*e.g.*, agricultural or intermittent drainage ditches). However, if an equipment bridge is used it will be constructed as described in section V.A.5.

8. Crossings of Protected Waterbodies

Unless a dry-ditch crossing or HDD is required by permit, protected waterbodies will be crossed using the open-cut crossing method, with the following restrictions:

a. attempt to complete instream construction activities (not including blasting and other rock breaking measures) within 48 hours;

b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and

c. other construction equipment will cross on an equipment bridge as specified in section V.A.5.

Before construction, MPL will prepare a site-specific construction plan and scaled drawings identifying areas to be disturbed by construction for each waterbody crossing where required by the MDNR. This plan will include extra work areas, spoil storage areas, sediment control structures, etc., as well as mitigation for navigational issues.

The Environmental Inspector may adjust the final placement of the erosion and sediment control structures in the field to maximize effectiveness.

9. Temporary Erosion and Sediment Control

Sediment barriers (as defined in section IV.F.2.a. of the Erosion Control Plan) will be installed after initial disturbance of the waterbody or adjacent upland. Sediment barriers will be maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. The following specific temporary erosion and sediment control measures will be implemented at stream crossings:

a. sediment barriers will be installed across the entire construction right-of-way at waterbody crossings, where necessary to prevent the flow of sediments into the waterbody. In the travel lane, these may consist of removable sediment barriers or driveable berms. Removable sediment barriers may be removed during the construction day, but will be re-installed after construction has stopped for the day and/or when heavy precipitation is imminent;

b. where waterbodies are adjacent to the construction right-of-way, sediment barriers will be installed along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way; and

c. earthen plugs will be installed or left in place at waterbody crossings, as necessary, to prevent diversion of water into upland portions of the

pipeline trench and to keep any accumulated trench water out of the waterbody.

10. Trench Dewatering

The trench will be dewatered (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in heavily silt laden water flowing into any waterbody. Trench water will be directed to a dewatering structure (*e.g*., strawbale dewatering structure - see figure 6) or filterbag, if there is a potential for silt laden water to enter waterbodies or wetlands. Dewatering devices will be removed as soon as possible after the completion of dewatering activities.

B. RESTORATION

1. Clean gravel or native cobbles will be used for the upper 1 foot of trench backfill in waterbodies that contain coldwater fisheries.

2. For open-cut crossings, waterbody banks will be stabilized and temporary sediment barriers will be installed within 24 hours of completing instream construction activities. For dry-ditch crossings, streambed and bank stabilization will be completed before returning flow to the waterbody channel.

3. Waterbody banks will be returned to preconstruction contours or to a stable angle of repose.

4. Unless otherwise specified by the MDNR, the use of riprap will be limited to areas where flow conditions preclude effective vegetative stabilization techniques such as seeding and erosion control fabric.

5. Disturbed riparian areas will be revegetated with conservation grasses and legumes or native plant species.

6. Sediment barriers will be installed as outlined in section IV.F.2.a of the Erosion Control Plan. In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the waterbody. (see figure 7)

7. Sections V.B.3. through V.B.6. above also apply to those perennial or intermittent streams not flowing at the time of construction.

C. POST-CONSTRUCTION MAINTENANCE

Routine vegetation maintenance clearing will be conducted as needed. In general, a 50-foot-wide corridor centered over the pipeline will be cleared of brush and trees. Where the newly constructed pipeline parallels the existing MPL system, up to 100-foot-wide corridor centered over the pipelines will be cleared of brush and trees.

VI. WETLAND CROSSINGS

A. GENERAL

1. Wetland Delineation

   MPL will conduct a wetland delineation using the current federal methodology and file a wetland delineation report with the applicable regulatory agencies, as required. This report will identify:

   a. by milepost wetlands that will be affected;

   b. the National Wetlands Inventory (NWI) classification for each wetland;

   c. the crossing length of each wetland in feet; and

   d. the acreage of permanent and temporary disturbance that will occur in each wetland by NWI classification type.

   The requirements outlined in this section do not apply to wetlands in actively cultivated or rotated cropland. Standard upland protective measures, including workspace and topsoiling requirements, apply to these agricultural wetlands.

2. MPL will limit the width of the construction right-of-way to 100 feet or less, except for wetlands where it has been determined that existing soils lack adequate unconfined compressive strength and would result in excessively wide ditches and/or spoil piles that are difficult to contain.

3. Wetland boundaries and buffers will be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

4. The measures of sections V and VI will attempt to be implemented in the event a waterbody crossing is located within or adjacent to a wetland crossing.

5. Aboveground facilities will not be located in wetlands except as permitted by appropriate state and federal agencies.

B. INSTALLATION

1. Extra Work Areas and Access Roads

   a. Extra work areas (such as staging areas and additional spoil storage areas) will be located at least 50 feet away from wetland boundaries, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land, or where the Environmental Inspector determines that site conditions require a smaller buffer. In no event will the set back be less than 10 feet.

b. Clearing of vegetation will be limited between extra work areas and the edge of the wetland to the approved construction right-of-way.

c. The construction right-of-way may be used for access when the wetland soil is firm enough to avoid rutting or the construction right-of-way has been stabilized to avoid rutting (*e.g.*, with timber riprap or prefabricated equipment timber-mats - see figure 8).

d. In wetlands that cannot be stabilized, construction equipment other than that needed to install the wetland crossing will use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, other construction equipment will be limited to one pass through the wetland using the construction right-of-way.

2. Crossing Procedures

a. Comply with COE and MDNR permit terms and conditions

b. Assemble the pipeline in an upland area unless the wetland is dry enough to adequately support skids and pipe.

c. Use "push-pull" or "float" techniques to place the pipe in the trench where water and other site conditions allow.

d. Limit construction equipment operating in wetland areas to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way.

e. Cut vegetation just aboveground level, leaving existing root systems in place, and remove vegetative debris from the wetland for disposal.

f. Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the construction right-of-way in wetlands unless the Chief Inspector and Environmental Inspector determine that safety related construction constraints require grading or the removal of tree stumps from under the working side of the construction right-of-way.

g. Segregate up to 1 foot of topsoil from the area disturbed by trenching, except in areas where standing water is present or soils are saturated or frozen. After backfilling is complete, restore the segregated topsoil to its original location.

h. Do not use rock, soil imported from outside the wetlands, or tree stumps, to support equipment on the construction right-of-way.

i. If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands,

use low-ground-weight construction equipment, or operate normal equipment on prefabricated equipment timber-mats.

j. Do not cut trees outside of the approved construction work area to obtain timber for riprap or equipment mats.

k. Attempt to use no more than two layers of prefabricated equipment mats or terra mats to support equipment on the construction right-of-way.

l. Remove project-related material used to support equipment on the construction right-of-way upon completion of construction.

3. Temporary Sediment Control

Install sediment barriers after initial disturbance of the wetland or adjacent upland. Sediment barriers will be maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench). Sediment barriers will be maintained until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Erosion Control Plan.

a. Install sediment barriers across the entire construction right-of-way upslope of the wetland boundary where necessary to prevent sediment flow into the wetlands

b. Where wetlands are adjacent to the construction right-of-way and the right-of-way slopes toward the wetlands install sediment barriers along the edge of the construction right-of-way as necessary to prevent sediment flow into the wetlands

c. Install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way through wetlands. Remove these sediment barriers during right-of-way cleanup.

4. Trench Dewatering

The trench will be dewatered (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in heavily silt laden water flowing into any waterbody. Trench water will be directed to a dewatering structure (*e.g.*, strawbale dewatering structure - see figure 6) or filterbag, if there is a potential for silt laden water to enter waterbodies or wetlands. Dewatering devices will be removed as soon as possible after the completion of dewatering activities.

C. RESTORATION

1. Where the pipeline trench may drain a wetland, construct trench breakers as necessary to maintain the original wetland hydrology.

2. Do not use fertilizer, lime, or mulch unless required in writing by the appropriate land management agency.

3. Unless specified by project permits or land management agency, temporarily revegetate the construction right-of-way with annual ryegrass at a rate of 40 pounds/acre (unless standing water is present).

4. Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after upland revegetation and stabilization of adjacent upland areas are judged to be successful as specified in section VII.A. of the Erosion Control Plan.

VII. HYDROSTATIC TESTING

A. NOTIFICATION PROCEDURES AND PERMITS

1. Apply for state permits, as required.

2. Notify appropriate state agencies of intent to use specific sources in accordance with permit requirements.

B. GENERAL

1. Perform radiographic inspection of pipeline section welds or hydrotest the pipeline sections, before installation under waterbodies or wetlands.

2. If pumps used for hydrostatic testing are within 50 feet of any waterbody or wetlands address the operation and refueling of these pumps in the project's SWPPP.

C. INTAKE SOURCE AND RATE

1. Screen the intake hose to prevent entrainment of fish.

2. Do not use state-designated outstanding resource value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate state, and/or local permitting agencies grant written permission.

3. Maintain adequate flow rates to protect aquatic life and to provide for downstream withdrawals of water by existing users.

4. Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable.

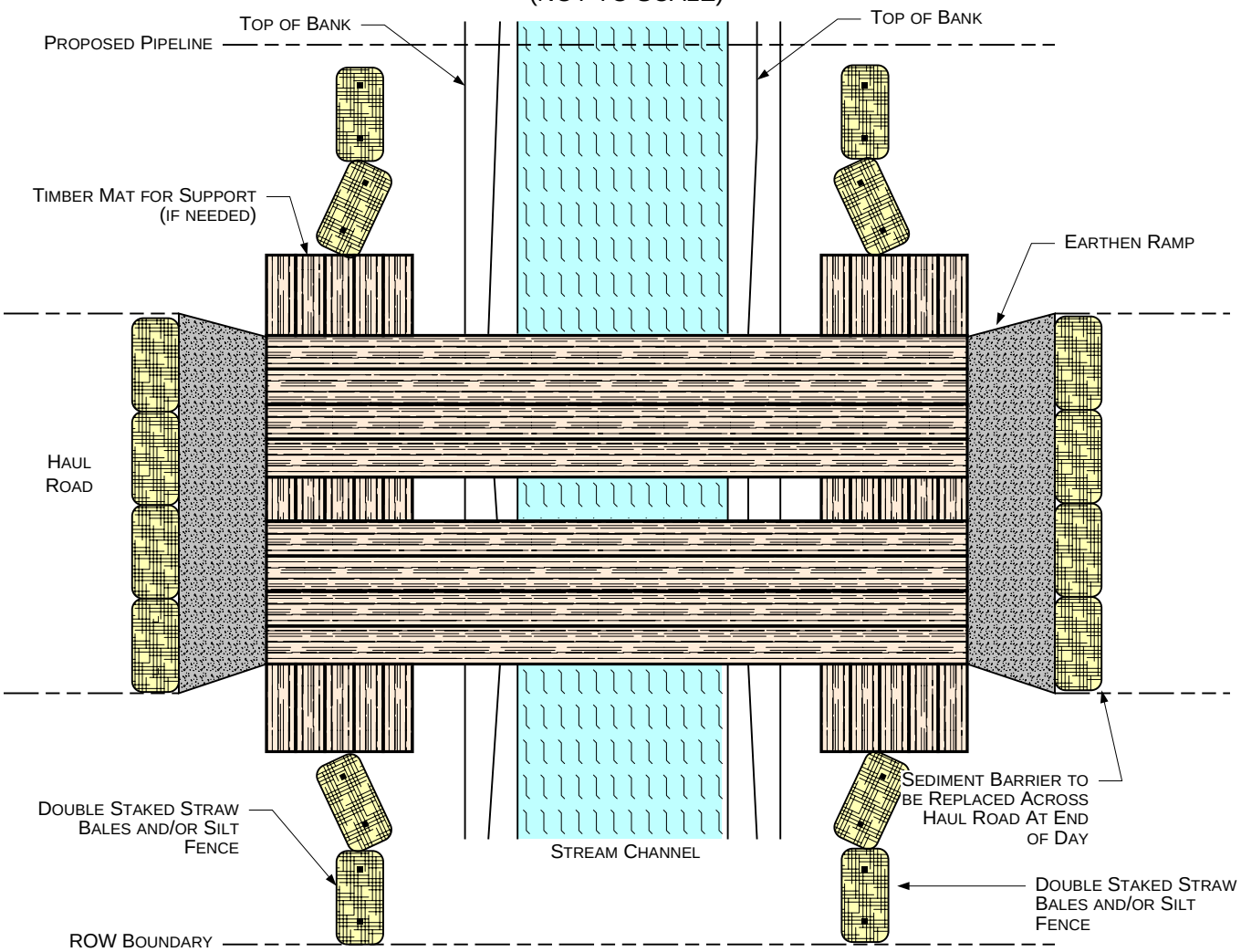
D. DISCHARGE LOCATION, METHOD, AND RATE

1. Regulate discharge rate, use energy dissipation devices (*e.g.*, a splash pup - see figure 9), and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive streamflow.

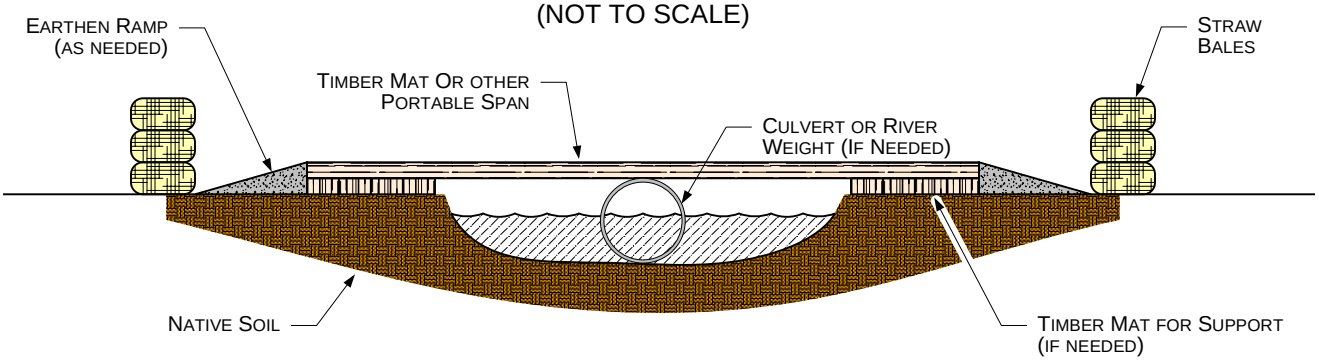
2. Do not discharge into state-designated outstanding resource value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless state and local permitting agencies grant written permission.

FIGURES

PLAN VIEW
(NOT TO SCALE)



PROFILE VIEW
(NOT TO SCALE)



NOTE:
Staw bales shall be placed across bridge entrance every night.

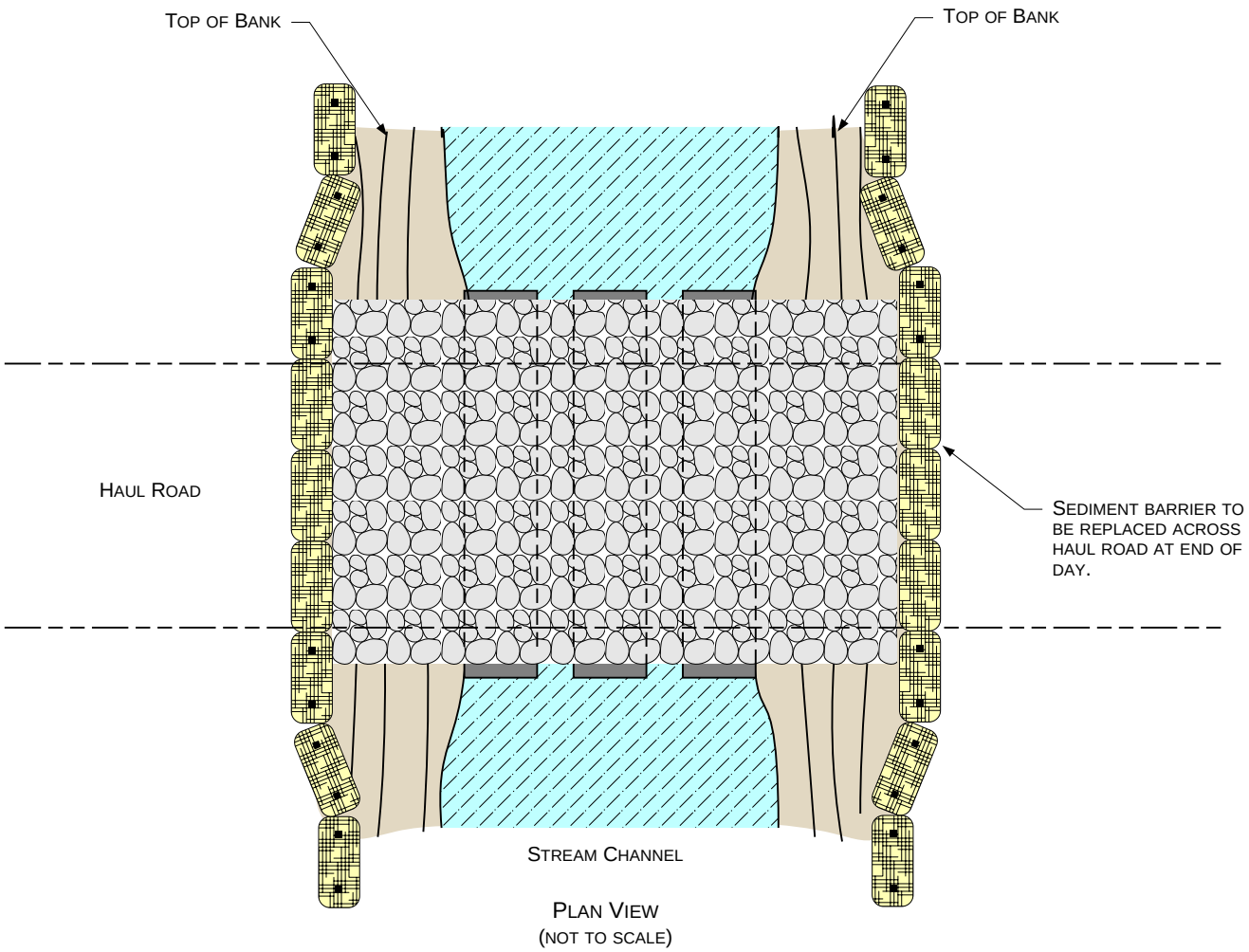
For environmental review purposes only.

MINNCAN PROJECT

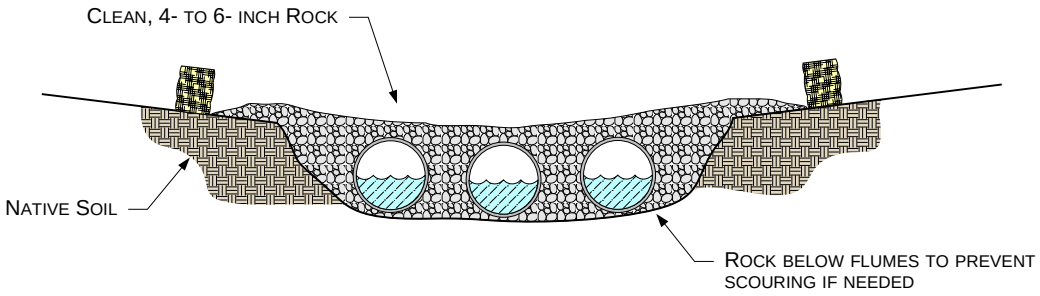
Figure 1
Timber Mat Bridge

DATE:	11/29/2005
REVISED:	11/29/2005
SCALE:	NTS
DRAWN BY:	KJA

K:\524\DRAWINGS\TIMBER_MAT.VSD



PLAN VIEW
(NOT TO SCALE)



NOTES:

1. STEEL FLUME PIPE(S) SIZED TO ALLOW FOR STREAM FLOW AND EQUIPMENT LOAD.
2. STRAW BALES SHALL BE PLACED ACROSS BRIDGE ENTRANCE EVERY NIGHT.
3. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.

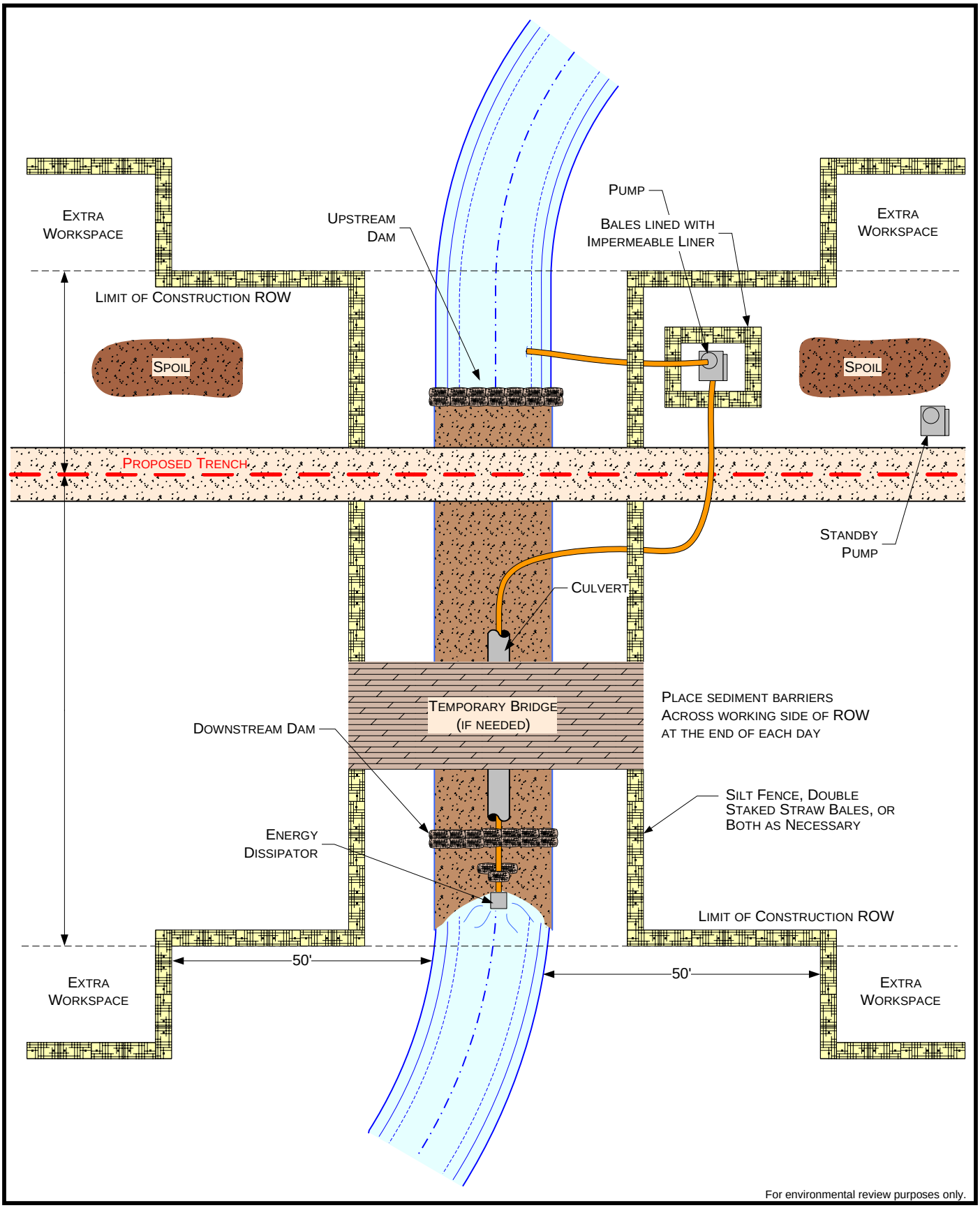
For environmental review purposes only.

MINNCAN PROJECT

Figure 2
Rock Flume Bridge

DATE:	11/29/2005
REVISED:	12/7/2005
SCALE:	NTS
DRAWN BY:	KJA

K:\524\DRAWINGS\ROCK_FLUME_BRIDGE.VSD



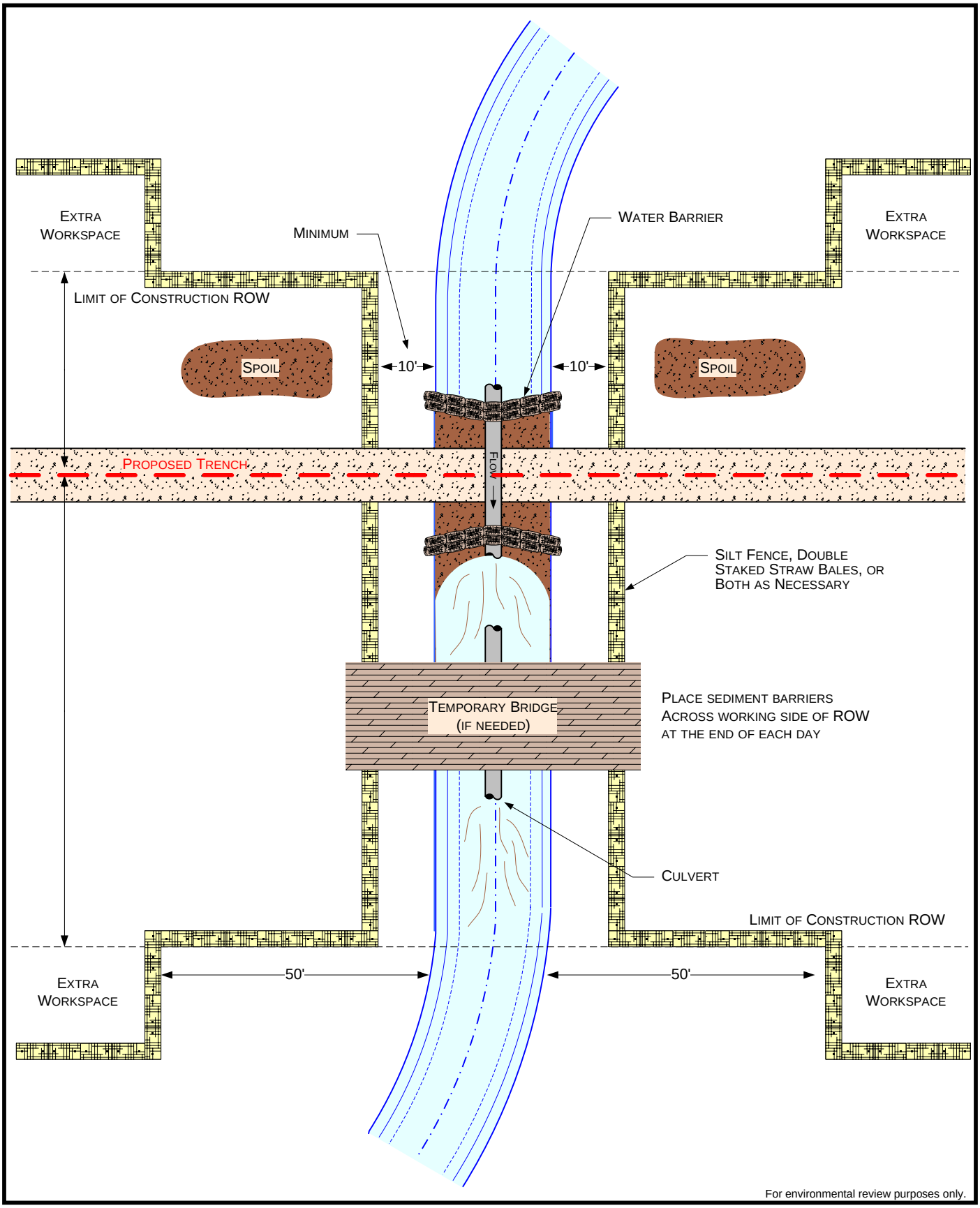
For environmental review purposes only.

MINNCAN PROJECT

Figure 3
Typical Waterbody Crossing
Dam and Pump Method

DATE:	11/29/2005
REVISED:	12/5/2005
SCALE:	NTS
DRAWN BY:	KJA

K:\524\DRAWINGS\DAM_PUMP.VSD



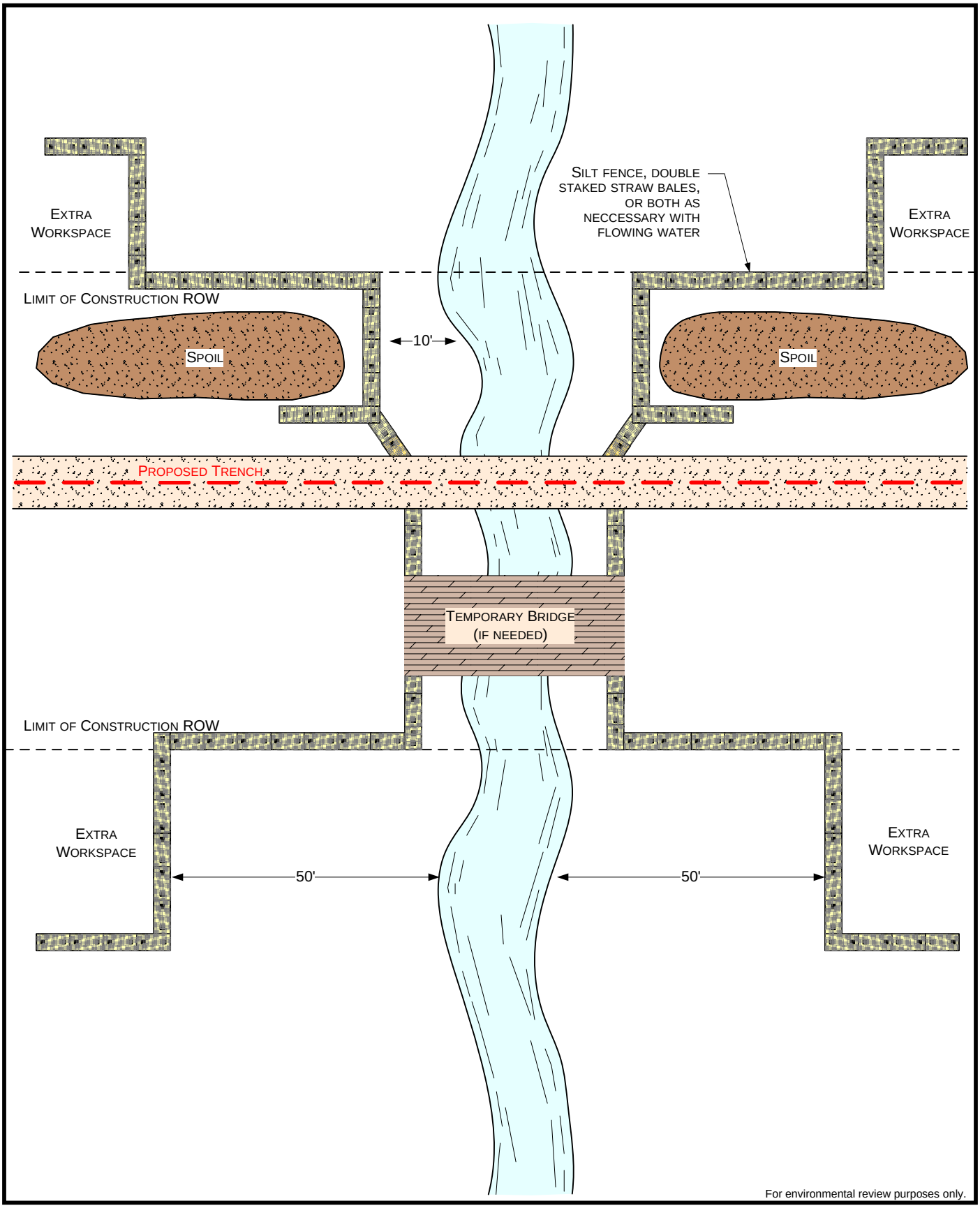
For environmental review purposes only.

MINNCAN PROJECT

Figure 4
Typical Waterbody Crossing
Flume Method

DATE:	11/29/2005
REVISED:	12/5/2005
SCALE:	NTS
DRAWN BY:	KJA

K:\524\DRAWINGS\FLUME.VSD

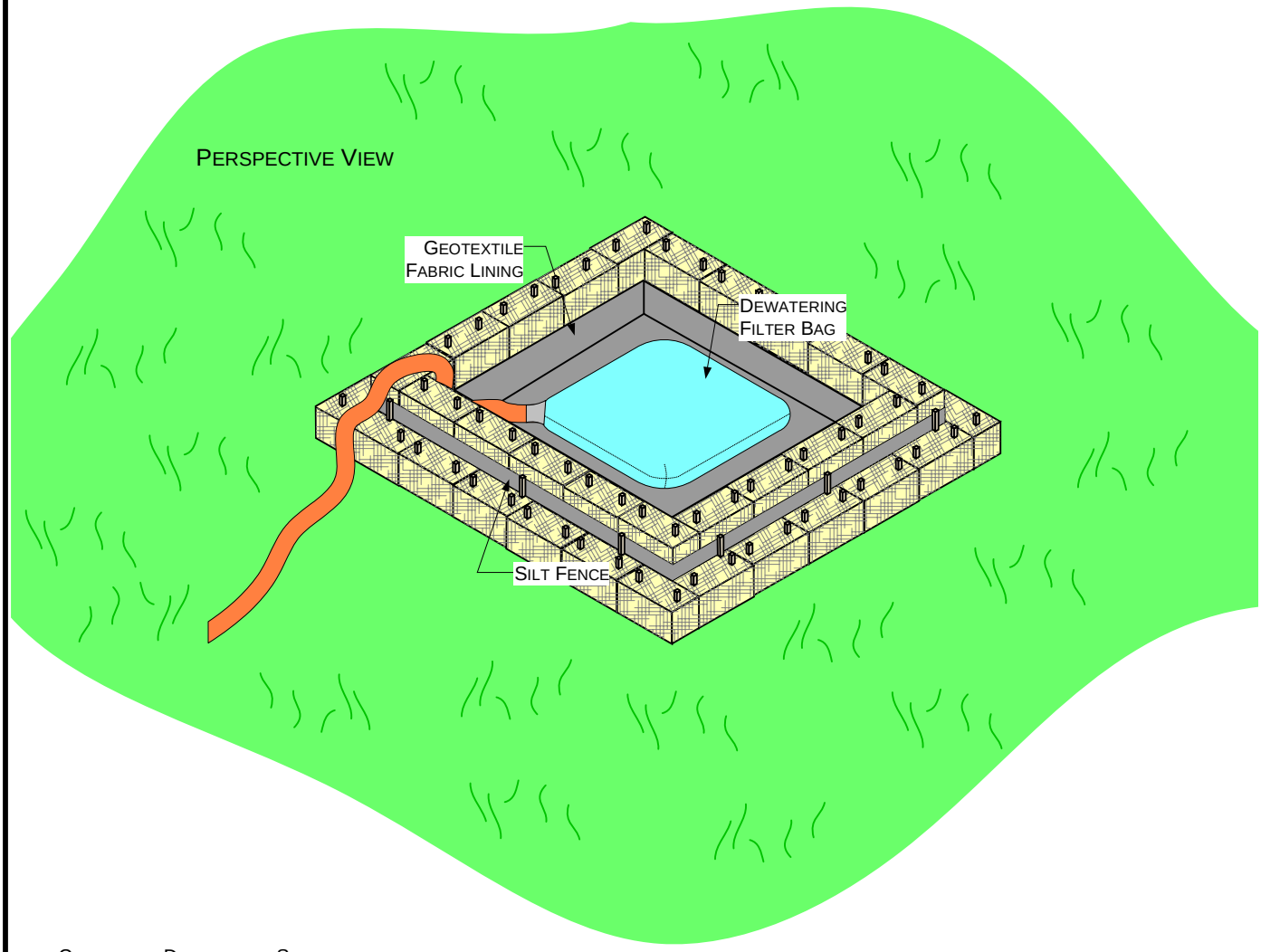


MINNCAN PROJECT

Figure 5
Typical Waterbody Crossing
Open Cut Method

DATE:	11/29/2005
REVISED:	12/5/2005
SCALE:	NTS
DRAWN BY:	KJA

K:\524\DRAWINGS\OPEN_CUT.VSD



CONSTRUCT DEWATERING STRUCTURE TO ACCOMMODATE ANTICIPATED PUMPING RATES. SEE EXAMPLE BELOW.

EXAMPLE PUMPING RATE = 200 G.P.M.
STORAGE VOLUME (C.F.) = 16 X 200 G.P.M. = 3200 C.F.
HEIGHT OF STRAW BALE STRUCTURE = 3 FEET (2 BALES STACKED) (BASED ON HEIGHT OF BALES, NOT SILT FENCE)
INSIDE DIMENSIONS OF STRUCTURE = 33 X 33 FEET SQUARE

NOTES:

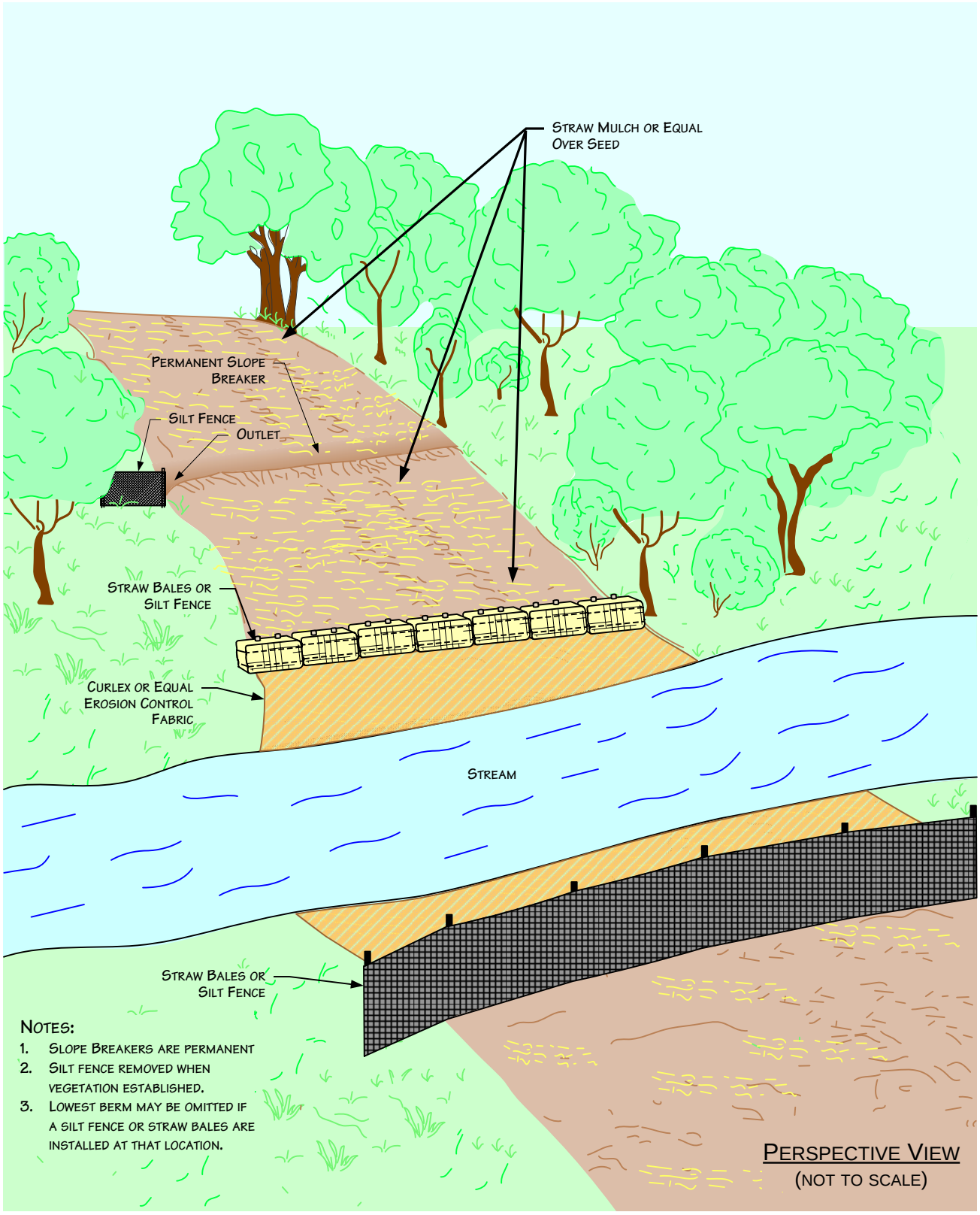
1. SILT FENCE ENDS MUST BE WRAPPED TO JOIN TWO SECTIONS.
2. INSTALL SILT FENCE 2 INCHES ABOVE TOP OF STRAW BALES, AND ANCHOR A MINIMUM OF 8 INCHES STRAIGHT DOWN.
3. SILT FENCE POST STAKING MUST BE 4 FEET OR LESS.
4. DEWATERING INTAKE HOSE SUPPORTED AT LEAST 1 FOOT FROM BOTTOM OF TRENCH BEING DEWATERED.
5. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN.

For environmental review purposes only.

MINNCAN PROJECT

Figure 6
Straw Bale Dewatering Structure

DATE:	11/29/2005
REVISED:	11/29/2005
SCALE:	NTS
DRAWN BY:	KENT ANDERSON
K:\524\DRAWINGS\ DEWATERING_STRUCTURE.VSD	



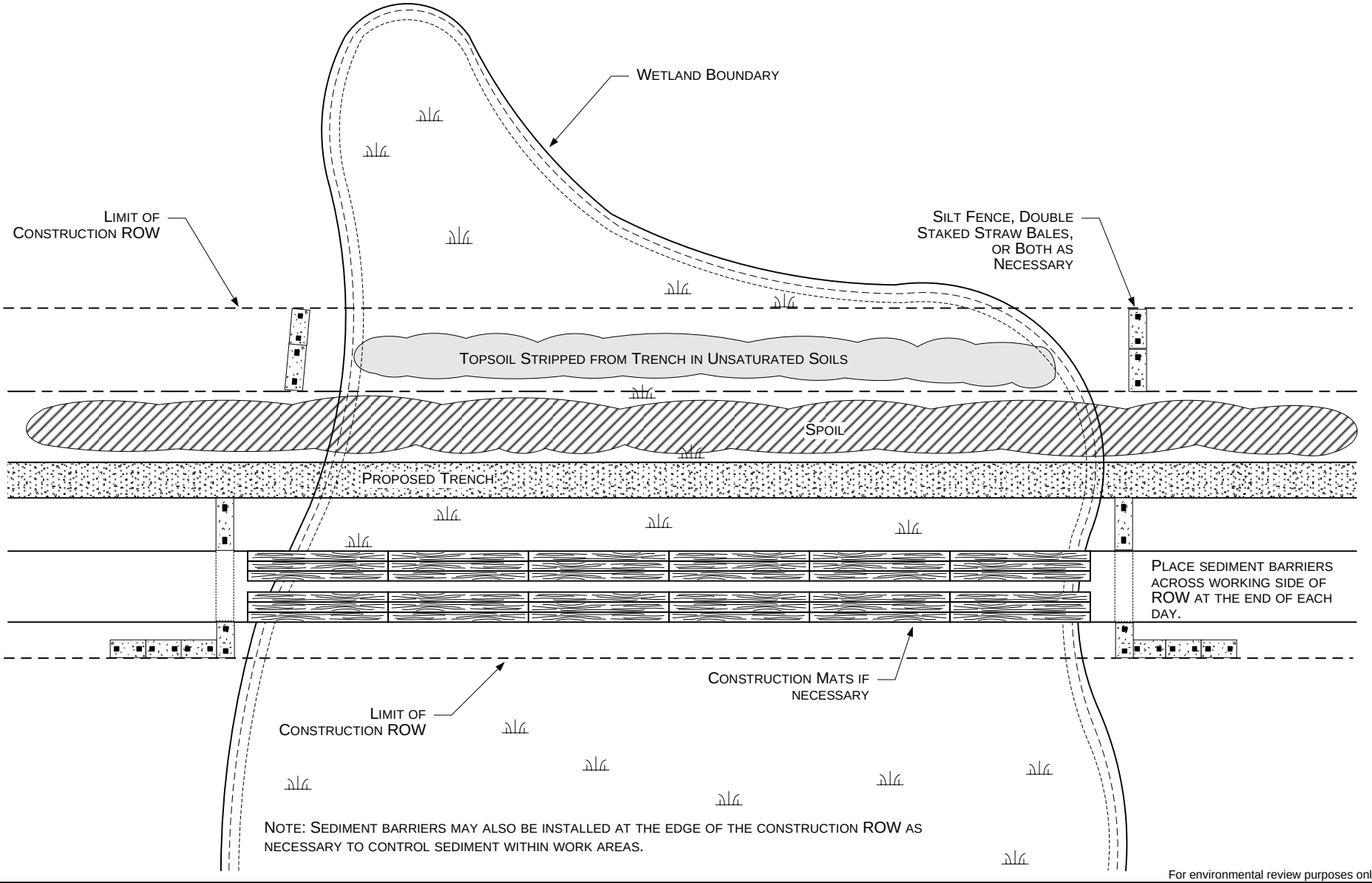
For environmental review purposes only.

MINNCAN PROJECT

Figure 7
Stabilized Stream Crossing

DATE:	12/2/2005
REVISED:	12/7/2005
SCALE:	NTS
DRAWN BY:	MICHAEL H. NHEP

K:\674\TYPICALS\ECM\STABILIZED STREAM CROSSING.VSD



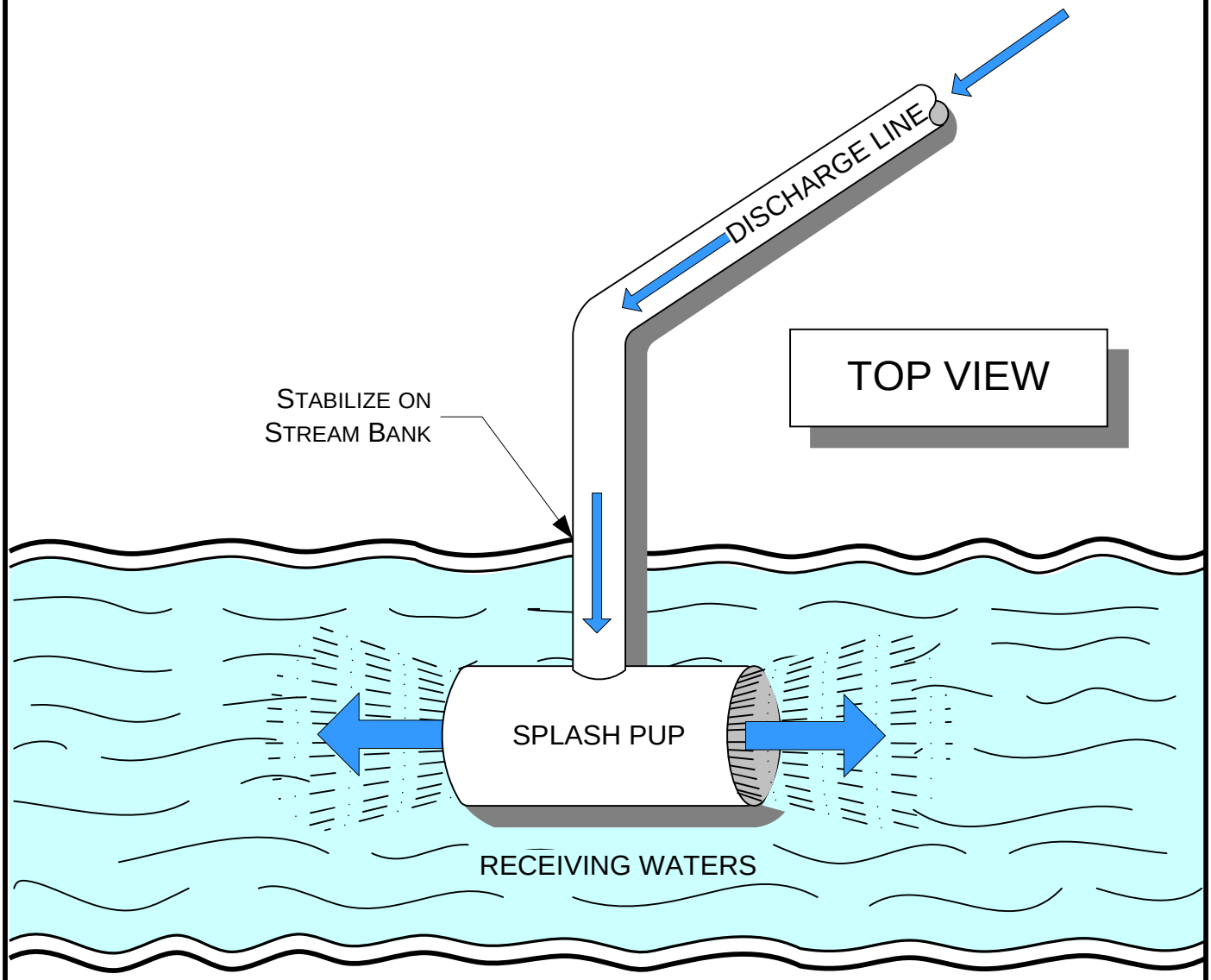
For environmental review purposes only.

MINNCAN PROJECT

Figure 8
Typical Open-Cut Wetland Crossing

DATE:	11/29/2005
REVISED:	11/29/2005
SCALE:	NTS
DRAWN BY:	KJA

K:\524\DRAWINGS\WETLAND_CROSSING.VSD



For environmental review purposes only.

MINNCAN PROJECT

Figure 9
Typical Splash Pup

DATE:	11/29/2005
REVISED:	11/29/2005
SCALE:	NTS
DRAWN BY:	KJA

K:\524\DRAWINGS\SPLASH_PUP.VSD

Appendix E

Roads Crossed by the Pipeline Route

Appendix E
Roads Crossed by the Pipeline Route

County	Approximate Milepost	Descriptions	Four Lane Highway
Clearwater	0.8	County Highway 3	No
	1.8	Township Road 21	No
	2.0	Township Road 105	No
	2.3	Township Road 20	No
	2.8	State Highway 223	No
	5.1	Township Road 6	No
	6.9	County Highway 1	No
	8.9	County Highway 24	No
	11.0	U.S. Highway 2	Yes
	11.1	Township Road 275	No
	12.3	County Highway 19	No
	13.5	County Highway 26	No
	14.9	Township Road 219	No
	15.5	County Highway 30	No
	15.9	County Highway 13	No
	18.1	Township Road 66	No
	19.6	Township Road 5040	No
	20.5	Township Road 5038	No
	21.4	County Road 84	No
	21.6	Township Road 241	No
	23.0	County Highway 36	No
	23.2	Township Road 117	No
	24.1	Township Road 200	No
	24.8	County Highway 2	No
	25.2	Township Road 195	No
	26.3	County Highway 40	No
	27.9	Township Road 138	No
	29.0	Township Road 177	No
	29.6	Township Road 188	No
Hubbard	34.1	400th Street	No
	35.2	390th Street	No
	36.2	County Road 95	No
	37.7	Norway Drive	No
	37.7	U.S. Highway 71	Yes
	42.3	320th Street	No
	43.3	County Road 89	No
	45.3	Jade Rose Drive	No
	46.8	Inland Drive	No
	47.4	Impression Road	No
	47.6	U.S. Highway 71	Yes
	48.3	260th Street	No
	50.9	County Highway 32	No
	53.4	County Highway 48	No
	54.4	200th Street	No
	55.4	190th Street	No
	55.8	109th Avenue	No
	56.4	State Highway 34	No
	57.5	170th Street	No
	58.5	160th Street	No
	59.5	150th Street	No
	60.5	County Highway 14	No

Appendix E
Roads Crossed by the Pipeline Route

County	Approximate Milepost	Descriptions	Four Lane Highway
Hubbard (continued)	61.6	County Road 111	No
	63.0	114th Street	No
	63.5	110th Street	No
Wadena	64.5	Township Road 260	No
	65.0	Township Road 144	No
	65.5	Township Road 143	No
	66.0	Township Road 237	No
	66.0	County Highway 16	No
	67.6	Township Road 119	No
	68.6	State Highway 87	No
	68.6	Township Road 238	No
	69.6	350th Street	No
	70.7	County Road 158	No
	71.9	County Road 146	No
	72.7	U.S. Highway 71	Yes
	73.1	County Highway 13	No
	74.9	Township Road 229	No
	75.8	County Road 143	No
	76.9	Township Road 221	No
	77.9	State Highway 227	No
	79.4	County Road 136	No
	80.2	County Road 132	No
	81.3	County Road 23	No
	81.4	Township Road 60	No
	82.5	County Highway 9	No
	84.8	County Road 164	No
	85.5	County Road 118	No
	86.0	Township Road 46	No
	86.6	Township Road 46	No
	86.8	Township Road 45	No
	88.3	County Highway 7	No
	88.4	County Road 118	No
	89.5	Township Road 69	No
	90.8	170th Street	No
	91.9	County Highway 26	No
	93.1	County Road 123	No
	93.2	County Road 123	No
	93.4	County Road 123	No
	94.8	Township Road 18	No
	95.3	County Road 124	No
	96.8	Township Road 9	No
	96.8	County Highway 29	No
	97.9	Township Road 16	No
	99.0	County Road 160	No
	99.4	County Highway 30	No
	99.9	Township Road 172	No
	100.2	Township Road 6	No
	100.8	Township Road 25	No
	101.4	Township Road 7	No
	101.9	County Highway 34	No

Appendix E
Roads Crossed by the Pipeline Route

County	Approximate Milepost	Descriptions	Four Lane Highway
Todd	102.9	County Road 83	No
	103.4	U.S. Highway 10	Yes
	104.0	Township Road 312	No
	107.6	Township Road 1	No
	108.2	County Highway 28	No
	108.8	Township Road 331	No
	111.1	Township Road 339	No
	111.8	Township Road 3	No
	112.6	Adamak Road	No
	113.9	U.S. Highway 10	Yes
	114.0	Aster Road	No
Morrison	114.5	Holt Road	No
	117.6	Azure Road	No
	117.7	270th Street	No
	119.3	270th Street	No
	120.0	260th Street	No
	120.2	Township 284	No
	123.4	230th Street	No
	125.1	215th Street	No
	126.1	205th Street	No
	126.6	200th Street	No
	127.6	190th Street	No
	128.6	180th Street	No
	129.1	75th Street	No
	130.6	160th Street	No
	131.7	180th Street	No
	132.6	30th Avenue	No
	132.7	140th Street	No
	134.6	Badger Creek Road	No
	135.8	Cable Road	No
	136.8	100th Street	No
	138.8	Balsam Road	No
	139.3	75th Street	No
	141.0	60th Street	No
	142.0	50th Street	No
	142.3	Township Road 774	No
	143.0	4th Avenue West	No
	143.5	1st Avenue West	No
	144.8	Abbey Road	No
	145.3	Aardvark Road	No
Stearns	146.6	445th Street	No
	148.1	430th Street	No
	149.1	County Highway 17	No
	149.6	State Highway 238	No
	151.1	Viewcrest Road	No
	151.6	Universal Road	No
	153.1	State Highway 238	No
	155.1	360th Street	No
	155.9	County Road 157	No
	155.9	U.S. Interstate 94	Yes
	156.1	350th Street	No

Appendix E
Roads Crossed by the Pipeline Route

County	Approximate Milepost	Descriptions	Four Lane Highway
Stearns (continued)	156.9	County Highway 10	No
	157.2	Orchard Road	No
	158.1	320th Street	No
	159.1	320th Street	No
	160.0	County Highway 40	No
	160.5	305th Street	No
	162.0	Kent Circle	No
	162.0	County Highway 41	No
	162.5	Kranz Lake Circle	No
	164.0	County Highway 42	No
	166.0	Hillview Road	No
	167.1	County Highway 12	No
	167.8	Greenfield Road	No
	169.4	State Highway 23	No
	170.1	210th Street	No
	170.9	County Road 123	No
	171.3	Edgeton Road	No
	171.6	233 Road Avenue	No
	172.6	228th Avenue	No
	173.0	228th Avenue	No
	173.3	185th Street	No
	174.0	178th Street	No
	174.8	County Road 162	No
	175.3	165th Street	No
	176.8	County Highway 34	No
Meeker	177.7	County Highway 8	No
	178.1	State Highway 55	No
	178.8	390th Street	No
	179.8	380th Street	No
	180.6	373rd Street	No
	181.8	State Highway 22	No
	182.9	617th Avenue	No
	183.0	355th Street	No
	183.2	620th Avenue	No
	183.5	353rd Street	No
	184.6	628th Avenue	No
	185.1	340th Street	No
	186.3	330th Street	No
	187.1	645th Avenue	No
	187.5	County Highway 2	No
	189.0	State Highway 24	No
	190.3	305th Street	No
	190.5	670th Avenue	No
	190.9	300th Street	No
	192.2	County Highway 14	No
	192.5	County Highway 21	No
	194.3	695th Street	No
	195.2	County Highway 24	No
	195.6	705th Avenue	No
	197.2	State Highway 15	Yes
	198.4	County Highway 4	No

Appendix E
Roads Crossed by the Pipeline Route

County	Approximate Milepost	Descriptions	Four Lane Highway
Meeker (continued)	198.7	Township Road 634	No
	198.8	255th Street	No
	199.4	738th Avenue	No
	199.9	743rd Avenue	No
Wright	201.2	Rockwood Avenue Southwest	No
	202.0	40th Street Southwest	No
	203.4	US Highway 12	Yes
	204.4	County Highway 31	No
	205.4	70th Street Southwest	No
	206.4	County Highway 30	No
	208.3	98th Street Southwest	No
	208.7	Peyton Avenue Southwest	No
	209.4	108th Street Southwest	No
McLeod	210.6	County Highway 3	No
	211.6	240th Street	No
	213.6	220th Street	No
	214.4	County Highway 2	No
	214.5	Hamlet Avenue	No
	214.7	210th Street	No
	215.5	Grain Avenue	No
	215.9	State Highway 7	No
	216.0	Garden Street	No
	217.1	190th Street	No
	218.3	Falcon Avenue	No
	218.4	180th Street	No
	219.6	170th Street	No
	220.0	Eagle Avenue	No
	221.4	Dairy Avenue	No
	223.2	Bergen Road	No
	224.1	135th Street	No
	225.7	County Highway 9	No
	226.2	122nd Street	No
Carver	227.9	Zebra Avenue	No
	228.6	US Highway 212	Yes
	230.2	State Highway 5	No
	230.5	142nd Street	No
	230.9	Jacob Street	No
	232.1	Vera Avenue	No
	232.2	150th Street	No
Sibley	233.6	County Highway 16	No
	234.9	Township Road 152	No
	235.6	Township Road 137	No
	235.9	County Highway 61	No
	236.8	Township Road 433	No
	237.4	County Highway 5	No
	238.8	Township Road 138	No
	239.3	State Highway 25	No
	239.5	County Road 60	No
	241.1	County Highway 6	No

Appendix E
Roads Crossed by the Pipeline Route

County	Approximate Milepost	Descriptions	Four Lane Highway
Scott	243.0	Union Trail	No
	243.5	Stopperman Boulevard	No
	244.7	Oak Crest Trail	No
	245.0	US Highway 169	Yes
	245.1	BP Trail	No
	246.1	Meridian Circle	No
	246.4	County Highway 3	No
	246.9	250th Street West	No
	247.0	Laredo Avenue	No
	248.7	County Highway 5	No
	250.1	Fabor Avenue	No
	251.1	Delaware Avenue	No
	251.6	Church Avenue	No
	252.6	Aberdeen Avenue	No
	253.6	Delmar Avenue	No
	254.1	Street Benedict Road	No
	255.6	Helena Boulevard	No
	256.9	Drexel Avenue	No
	257.9	260th Street West	No
	258.3	Redwing Avenue	No
	259.3	Baseline Avenue	No
	260.2	Langford Avenue	No
	261.3	Vergus Avenue	No
	261.9	Newport Avenue East	No
	262.4	Fairlawn Avenue	No
	262.9	Xkimo Avenue	No
	263.8	Panama Avenue	No
	264.8	Zachary Avenue	No
	265.8	Jonquil Avenue	No
	266.9	Texas Avenue	No
	268.4	Vernon Avenue	No
	268.9	Natchez Avenue	No
	269.7	Beard Avenue	No
	271.1	U.S. Interstate 35	Yes
	271.6	270th Street East	No
	271.9	Pillsbury Avenue	No
Dakota	272.6	267th Street West	No
	273.3	Ipava Avenue	No
	274.6	Highview Avenue	No
	275.8	Cedar Avenue	No
	275.8	Galaxie Avenue	No
	277.6	245th Street West	No
	277.9	Essex Avenue	No
	279.0	Denmark Avenue	No
	280.2	Chippendale Avenue West	No
	281.3	Biscayne Avenue	No
	281.3	230th Street West	No
	283.8	220th Street East	No
	285.5	Blaine Avenue East	No
	286.4	210th Street East	No
	287.4	200th Street East	No

Roads Crossed by the Pipeline Route

County	Approximate Milepost	Descriptions	Four Lane Highway
Dakota (continued)	290.6	170th Street East	No
	291.2	160th Street West	No
	291.6	160th Street East	No
	293.1	145th Street East	No
	293.8	140th Street East	No

Appendix F

Waterbodies Crossed by the Pipeline Route

Appendix F

Waterbodies Crossed by the Pipeline Route

County	Approximate Milepost	Waterbody Name	Township	Range	Section	Stream Type	MDNR Protected Water
Clearwater	2.6	Unnamed Trib. To Silver Creek	148	37	8	I	No
	5.1	Unnamed Creek	148	37	29	I	No
	5.3	Unnamed Creek	148	37	29	I	No
	5.4	Unnamed Creek	148	37	29	I	No
	5.7	Unnamed Trib. To Blair Lake	148	37	29	I	No
	7.7	Unnamed Trib. To Clearwater River	147	37	5	I	No
	8.3	Unnamed Trib. To Clearwater River	147	37	8	I	No
	9.3	Unnamed Creek	147	37	17	I	No
	10.3	Unnamed Trib. To Clearwater River	147	37	21	I	No
	10.9	Clearwater River	147	37	21	P	Yes
	12.8	Walker Brook	147	37	34	P	Yes
	13.9	Unnamed Trib. To Walker Brook	146	37	2	I	Yes
	15.8	Unnamed Trib. To Walker Brook	146	37	12	I	No
	25.4	Bear Creek	145	36	26	P	Yes
	26.5	Mississippi River	145	36	35	P	Yes
	31.0	Unnamed Trib. To LaSalle Creek	144	36	24	I	No
Hubbard	31.5	La Salle Creek	144	35	19	P	Yes
	46.6	Unnamed Trib. To Island Lake	141	35	5	I	No
	47.4	Unnamed Trib. To Island Lake	141	35	8	P	Yes
	48.8	Hay Creek	141	35	17	P	Yes
	50.3	Unnamed Creek	141	35	20	P	No
	59.1	Straight River	139	35	6	P	Yes
	61.5	Shell River	139	35	19	P	Yes
Wadena	66.8	Blueberry River	138	35	17	P	Yes
	67.4	Kettle Creek	138	35	17	P	Yes
	69.4	Unnamed Creek	138	35	29	I	No
	70.1	Unnamed Creek	138	35	32	I	No
	71.2	Cat River	137	35	4	P	Yes
	72.5	Cat River	137	35	9	P	Yes
	74.2	Kitten Creek	137	35	15	P	Yes
	76.3	Unnamed Creek	137	35	26	I	No
	77.0	Unnamed Trib. To Redeye River	137	35	36	I	No
	77.5	Redeye River	137	35	36	P	Yes
	78.0	Unnamed Trib. To Redeye River	136	35	1	I	No
	83.7	Unnamed Trib. To Hay Creek	136	34	33	I	No
	85.1	Hay Creek	135	34	4	P	Yes
	86.7	Unnamed Trib. To Hay Creek	135	34	10	I	No
	88.5	Unnamed Trib. To Redeye River	135	34	23	I	No
	89.4	Unnamed Trib. To Leaf River	135	34	23	I	No
	89.5	Unnamed Trib. To Leaf River	135	34	23	I	No
	90.1	Leaf River	135	34	25	P	Yes

Appendix F
Waterbodies Crossed by the Pipeline Route

County	Approximate Milepost	Waterbody Name	Township	Range	Section	Stream Type	MDNR Protected Water
Wadena	91.0	Unnamed Trib. To Leaf River	135	34	36	P	No
(continued)	91.1	Unnamed Trib. To Leaf River	135	34	36	P	No
	94.3	Unnamed Trib. To Crow Wing River	134	33	17	P	Yes
	96.0	Partridge River	134	33	21	P	No
	96.0	Unnamed Trib. To Partridge River	134	33	21	I	No
	97.5	Fawn Creek	134	33	27	P	Yes
	100.2	Hayden Creek	134	32	30	P	Yes
Todd	102.7	Unnamed Trib. To Crow Wing River	133	32	5	P	No
	107.3	Unnamed Trib. To Long Prairie River	133	32	28	I	No
	107.6	Unnamed Trib. To Long Prairie River	133	32	34	I	No
	107.8	Long Prairie River	133	32	34	P	Yes
	109.6	Unnamed Trib. To Mud Lake	132	32	2	I	No
	110.0	Unnamed Trib. To Mud Lake	132	32	2	I	No
	112.6	Unnamed Trib. To Fish Trap Creek	132	32	24	I	Yes
	113.6	Fish Trap Creek	132	32	25	P	Yes
Morrison	121.1	Little Elk River	131	31	29	P	Yes
	125.3	Unnamed Creek	130	31	17	I	No
	125.8	South Branch Little Elk River	130	31	20	P	Yes
	132.6	Unnamed Creek	129	31	20	I	No
	134.3	Swan River	129	31	33	P	Yes
	134.9	Unnamed Trib. To Swan River	128	31	4	I	No
	137.5	Unnamed Creek	128	31	16	I	No
	138.2	Unnamed Trib. To Taylor Creek	128	31	21	I	No
	140.6	Unnamed Trib. To Tamarack Lake	128	31	33	I	No
	141.5	Unnamed Creek	127	31	4	I	No
	142.2	Unnamed Creek	127	31	9	I	No
	144.4	North Branch Two Rivers	127	31	20	P	Yes
	144.4	Beautiful Creek	127	31	20	P	Yes
	146.0	Unnamed Trib. To Beautiful Creek	127	31	28	I	No
Stearns	147.0	Unnamed Creek	127	31	32	I	No
	147.1	Unnamed Creek	126	31	5	I	No
	150.3	Unnamed Trib. To Fish Lake	126	31	21	I	No
	152.9	County Ditch No. 22	126	31	32	I	No
	154.1	County Ditch No. 15	125	31	5	P	No
	155.8	Unnamed Creek	125	31	17	I	No
	156.2	Unnamed Creek	125	31	20	I	No
	156.3	Unnamed Creek	125	31	20	I	No
	156.4	Unnamed Creek	125	31	20	I	No
	156.6	Unnamed Creek	125	31	20	I	No
	156.9	Unnamed Creek	125	31	20	I	No
	157.1	Unnamed Creek	125	31	21	I	No

Appendix F
Waterbodies Crossed by the Pipeline Route

County	Approximate Milepost	Waterbody Name	Township	Range	Section	Stream Type	MDNR Protected Water
Stearns (continued)	157.5	Unnamed Creek	125	31	28	I	No
	157.9	Unnamed Creek	125	31	28	I	No
	158.2	Unnamed Creek	125	31	28	I	No
	158.9	County Ditch No. 6	125	31	33	I	No
	159.5	Unnamed Creek	124	31	5	I	No
	161.1	Unnamed Creek	124	31	17	I	No
	162.7	Unnamed Trib. To Bakes Lake	124	31	20	I	No
	163.2	Unnamed Trib. To Sauk River	124	31	29	P	Yes
	163.4	Unnamed Trib. To Sauk River	124	31	29	I	No
	163.5	Unnamed Trib. To Sauk River	124	31	29	I	No
	163.5	Unnamed Trib. To Sauk River	124	31	29	I	No
	164.8	Unnamed Trib. To Sauk River	124	31	32	I	No
	165.6	Unnamed Trib. To Sauk River	123	31	5	I	No
	166.2	Sauk River	123	31	8	P	Yes
	166.8	Unnamed Trib. To Sauk River	123	31	8	I	No
	168.5	Unnamed Creek	123	31	20	I	No
	169.1	Unnamed Trib. To Kolling Creek	123	31	20	P	Yes
	169.7	Unnamed Trib. To Kolling Creek	123	31	29	P	No
	170.8	Unnamed Trib. To Big Lake	123	31	32	P	Yes
	175.3	Unnamed Trib. To Browns Lake	122	31	22	I	No
	176.6	Unnamed Creek	122	31	27		No
Meeker	178.2	Unnamed Trib. To Vails Lake	121	31	3	P	No
	180.3	Unnamed Creek	121	31	15	I	No
	180.9	Unnamed Trib. To Kalkenbrenner Slough	121	31	22	I	Yes
	182.3	Unnamed Trib. To North Fork Crow River	121	31	26	P	Yes
	183.1	Unnamed Trib. To North Fork Crow River	121	31	26	P	No
	183.7	Unnamed Trib. To North Fork Crow River	121	31	25	P	Yes
	187.7	North Fork Crow River	120	30	9	P	Yes
	189.7	Unnamed Trib. To North Fork Crow River	120	30	22	I	No
	193.0	Unnamed Creek	120	30	36	I	No
	193.7	County Ditch No. 36	120	30	36	I	No
	196.8	Washington Creek	119	29	16	P	Yes
	197.7	Unnamed Trib. To Washington Creek	119	29	14	P	Yes
	198.5	Unnamed Trib. To Little Swan Lake	119	29	15	I	No
	200.6	Collinwood Creek	119	29	24	P	Yes
Wright	204.0	Unnamed Creek	119	28	32	I	No
	204.1	Unnamed Creek	119	28	32	I	No
	204.5	Unnamed Creek	118	28	5	I	No
	205.1	Jurisdictional Ditch No. 15	118	28	4	P	Yes
	207.3	Unnamed Creek	118	28	16	I	No

Appendix F

Waterbodies Crossed by the Pipeline Route

County	Approximate Milepost	Waterbody Name	Township	Range	Section	Stream Type	MDNR Protected Water
McLeod	211.0	Unnamed Trib. To Butternut Lake	117	28	3	I	No
	211.8	Unnamed Creek	117	28	10	I	Yes
	215.1	County Ditch No. 10A	117	28	22	I	No
	215.6	Unnamed Creek	117	28	26	I	No
	217.0	Unnamed Creek	117	28	36	I	Yes
	219.9	South Fork Crow River	116	27	18	P	Yes
	221.8	Unnamed Creek	116	27	21	I	No
	221.9	Unnamed Creek	116	27	21	I	Yes
	222.8	County Ditch No. 13	116	27	27	I	Yes
	225.6	Buffalo Creek	115	27	2	P	Yes
	226.7	County Ditch No. 28	115	27	12	I	No
	227.7	Jurisdictional Ditch No. 5	115	27	12	I	No
Carver	228.0	Jurisdictional Ditch No. 5	115	26	18	I	No
	232.4	Unnamed Creek	115	26	34	I	No
Sibley	234.2	Bevens Creek	114	26	2	P	Yes
	236.2	County Ditch No. 57	114	26	13	I	Yes
	237.6	Drainage Ditch	114	25	19	I	No
	239.7	Unnamed Trib. To Minnesota River	114	25	29	I	Yes
	240.4	Unnamed Trib. To Minnesota River	114	25	28	I	No
	242.5	Minnesota River	113	25	3	P	Yes
Scott	243.0	Unnamed Trib. To Minnesota River	113	25	3	I	Yes
	244.1	Robert Creek	113	25	11	P	Yes
	245.5	Unnamed Creek	113	25	13	I	No
	245.6	Unnamed Creek	113	25	13	I	No
	245.7	Unnamed Creek	113	25	13	I	No
	246.8	Unnamed Creek	113	24	19	I	No
	248.2	Unnamed Creek	113	24	19	I	No
	250.2	County Ditch No. 3	113	24	22	P	Yes
	251.8	West Branch Raven Stream	113	24	24	P	Yes
	252.0	West Branch Raven Stream	113	24	24	P	Yes
	252.9	West Branch Raven Stream	113	23	19	P	Yes
	253.9	Unnamed Tributary to West Branch Raven Stream	113	23	20	I	Yes
	254.6	East Branch Raven Stream	113	23	2	P	Yes
	257.2	Sand Creek	113	23	23	P	Yes
	258.0	Unnamed Tributary To Sand Creek	113	23	26	P	Yes
	258.7	Unnamed Trib. To Sand Creek	113	23	25	P	No
	260.0	Unnamed Creek	113	22	30	I	No
	263.3	Unnamed Trib. To Porter Creek	113	22	27	I	No
	264.1	Unnamed Trib. To Porter Creek	113	22	35	I	No
	264.8	Porter Creek	113	22	35	P	Yes
	267.9	Unnamed Trib. to Porter Creek	113	21	33	I	Yes

Appendix F
Waterbodies Crossed by the Pipeline Route

County	Approximate Milepost	Waterbody Name	Township	Range	Section	Stream Type	MDNR Protected Water
Scott (continued)	270.0	Unnamed Trib. to Dutch Creek	113	21	35	I	No
	270.3	Unnamed Trib. to Dutch Creek	113	21	35	I	No
Dakota	275.0	Unnamed Trib. to Vermillion River	113	20	21	I	No
	275.3	Unnamed Trib. to Vermillion River	113	20	21	I	No
	275.4	Unnamed Trib. to Vermillion River	113	20	21	I	No
	276.4	Unnamed Trib. to Vermillion River	113	20	15	I	No
	277.1	Unnamed Trib. to Vermillion River	113	20	14	I	No
	277.5	Unnamed Trib. to Vermillion River	113	20	14	I	No
	277.6	Unnamed Trib. to Vermillion River	113	20	14	I	No
	277.6	Unnamed Trib. to Vermillion River	113	20	14	I	No
	278.3	Unnamed Trib. To South Branch Vermillion River	113	20	13	I	No
	278.8	Unnamed Trib. To South Branch Vermillion River	113	20	13	I	No
	279.5	Unnamed Trib. To South Branch Vermillion River	113	19	7	I	No
	280.0	Unnamed Trib. To South Branch Vermillion River	113	19	7	I	No
	280.3	Unnamed Trib. To South Branch Vermillion River	113	19	8	I	No
	281.2	South Branch Vermillion River	113	19	8	P	Yes
	286.4	Unnamed Trib. To Vermillion River	114	19	25	I	No
	286.7	Unnamed Trib. To Vermillion River	114	19	25	I	No
	286.9	Unnamed Trib. To Vermillion River	114	19	25	I	No
	287.5	Vermillion River	114	19	24	P	Yes
	289.2	Unnamed Tributary to Vermillion River	114	19	13	P	Yes

Trib. = Tributary
P = Perennial
I = Intermittent

Appendix G

National Wetland Inventory Wetlands Crossed by the Pipeline Route

Appendix G

NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Clearwater	PSS/FO1Bg	0.0	0.0	81	0.2	0.1
	PSS/FO1Bg	0.1	0.3	1,187	2.7	1.0
	PEMC	0.4	0.4	65	0.2	0
	PFO1/4B	0.6	0.7	529	1.2	0.4
	PSS1C	1.1	1.1	18	<0.1	0.0
	PSS1B	1.2	1.2	104	0.2	0.1
	PSS1C	1.2	1.2	83	0.2	0.1
	PSS1C	1.4	1.4	58	0.1	<0.1
	PSS1B	1.6	1.6	320	0.7	0.3
	PEMB	1.6	1.6	24	0.1	0
	PSS/FO1B	1.8	1.8	8	<0.1	<0.1
	PSS/FO1C	2.0	2.0	182	0.4	0.1
	PEM/SS1C	2.4	2.5	399	0.9	0.3
	PEM/SS1C	2.5	2.5	216	0.5	0.2
	PEM/SS1C	2.6	2.7	710	1.6	0.6
	PEM/SS1C	2.8	2.9	279	0.6	0.2
	PEMCd	3.2	3.2	105	0.2	0
	PEMCd	3.2	3.3	331	0.8	0
	PSS1C	3.3	3.4	335	0.8	0.3
	PSS1B	3.7	3.9	827	1.9	0.7
	PSS1C	4.1	4.1	100	0.2	0.1
	PSS1/FO2Bg	4.2	4.2	122	0.3	0.1
	PSS1/FO2Bg	4.3	4.5	1,365	3.1	1.1
	PSS1/FO2B	4.8	4.8	148	0.3	0.1
	PFO1B	4.9	5.0	321	0.7	0.3
	PEMC	5.7	5.7	172	0.4	0
	PEM/SS1C	5.8	5.8	36	0.1	<0.1
	PSS1Bgd	10.1	10.2	679	1.6	0.5
	PFO2Bg	10.4	10.4	186	0.4	0.1
	PSS1C	10.4	10.5	395	0.9	0.3
	PSS1Bg	10.7	10.8	39	0.1	<0.1
	PSS1Bg	10.8	10.8	488	1.1	0.4
	PEM/SS1C	10.9	10.9	125	0.3	0.1
	PSS1Bg	11.0	11.0	238	0.6	0.2
	PEMCd	12.1	12.1	191	0.4	0
	PSS1/EMBg	12.7	12.8	587	1.4	0.5
	PSS1/EMC	12.8	12.9	205	0.5	0.2
	PFO1/4Bg	12.9	13.0	981	2.3	0.8
	PSS1C	13.9	13.9	70	0.2	0.1
	PEMCd	14.0	14.0	79	0.2	0
	PSS1C	14.4	14.4	61	0.1	<0.1
	PSS1C	15.3	15.3	61	0.1	<0.1
	PSS1C	15.5	15.5	175	0.4	0.1
	PEMCd	16.1	16.1	81	0.2	0
	PEMB	16.2	16.3	500	1.2	0
	PSS1B	16.4	16.4	37	0.1	<0.1
	PEMB	16.7	16.7	78	0.2	0

Appendix G
NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Clearwater (continued)	PEM/SS1C	17.7	17.7	303	0.7	0.2
	PSS1B	18.0	18.1	468	1.1	0.4
	PEMCd	18.6	18.7	59	0.1	0
	PFO2/SS1Bg	18.7	18.8	234	0.5	0.2
	PEMF	18.8	18.9	573	1.3	0
	PFO2/SS1Bg	18.9	19.3	2,470	5.7	2.0
	PSS1/EMBg	19.5	19.6	184	0.4	0.1
	PSS1/EMBg	19.6	19.7	267	0.6	0.2
	PSS1/EMBg	19.7	19.8	314	0.7	0.3
	PSS1C	19.9	19.9	55	0.1	<0.1
	PSS1/EMBg	19.9	19.9	156	0.4	0.1
	PEM/SS1B	20.2	20.2	232	0.5	0.2
	PEMBd	20.3	20.3	71	0.2	0
	PEMBd	20.3	20.3	78	0.2	0
	PEM/SS1C	20.4	20.5	402	0.9	0.3
	PEMB	20.6	20.6	27	0.1	0
	PEMB	20.7	20.7	95	0.2	0
	PEMB	20.8	20.9	73	0.2	0
	PFO2B	20.9	20.9	196	0.5	0.2
	PEMB	21.0	21.0	85	0.2	0
	PEMC	21.1	21.1	70	0.2	0
	PEMC	21.1	21.2	240	0.6	0
	PEMCd	21.3	21.3	158	0.4	0
	PEMC	21.4	21.5	246	0.6	0
	PEM/SS1C	21.6	21.6	89	0.2	0.1
	PEM/SS1C	21.6	21.7	217	0.5	0.2
	PEMC	21.7	21.7	93	0.2	0
	PSS1C	21.9	21.9	125	0.3	0.1
	PSS1C	22.0	22.1	97	0.2	0.1
	PEMB	22.1	22.2	307	0.7	0
	PSS1B	22.5	22.6	539	1.2	0.4
	PEMC	22.7	22.7	154	0.4	0
	PEMC	22.9	23.0	248	0.6	0
	PSS1/FO2Bg	24.6	24.7	851	2	0.7
	PSS1/FO2Bg	26.3	26.5	675	1.6	0.5
	PEM/SS1C	26.5	26.6	426	1	<0.1
	PEMC	29.5	29.5	247	0.6	0
Total [e/]				24,505	56.3	15.8
Hubbard	PEMC	31.4	31.5	141	0.3	0
	PEMC	31.5	31.5	176	0.4	0
	PSS1/FO2B	34.9	35.0	149	0.3	0.1
	PFO2B	35.1	35.1	150	0.4	0.1
	PSS1C	35.9	35.9	15	<0.1	<0.1
	PSS1/EMB	39.2	39.2	87	0.2	0.1
	PEMC	40.4	40.4	160	0.4	0
	PEMC	40.4	40.4	128	0.3	0

Appendix G
NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Hubbard (continued)	PEMC	40.5	40.5	51	0.1	0
	PEM/SS1C	40.5	40.5	1	<0.1	<0.1
	PEMC	41.7	41.7	102	0.2	0
	PSS1C	42.5	42.5	74	0.2	0.1
	PEM/SS1C	42.6	42.7	259	0.6	0.2
	PEMC	42.9	42.9	55	0.1	0
	PEMF	44.6	44.7	325	0.8	0
	PSS1/FO2B	46.5	46.6	32	0.1	<0.1
	PSS/FO1C	47.1	47.1	42	0.1	<0.1
	PSS/FO1C	47.2	47.3	537	1.2	0.4
	PFO2/SS1Bg	48.1	48.2	578	1.3	0.5
	PSS1/FO2Bg	48.6	48.7	549	1.3	0.4
	PEMC	48.7	48.7	246	0.6	0
	PSS1/EMC	49.4	49.5	70	0.2	0.1
	PSS1/EMC	49.5	49.5	69	0.2	0.1
	PSS1/EMC	50.3	50.4	630	1.5	0.5
	PEMC	50.7	50.7	232	0.5	0
	PSS1/EMC	51.4	51.5	214	0.5	0.2
	PSS1/EMC	51.5	51.6	417	1	0.3
	PEMC	52.1	52.1	36	0.1	0
	PSS1C	53.2	53.2	95	0.2	0.1
	PUB/EMF	56.6	56.6	95	0.2	0
	PFO6/SS1C	59.0	59.0	3	<0.1	<0.1
	PSS1/EMC	59.0	59.1	501	1.2	0.4
	PSS1/FO6C	59.1	59.2	232	0.5	0.2
	PEM/SS1C	59.8	59.8	38	0.1	<0.1
	PEMC	60.4	60.4	117	0.3	0
	PEMC	60.9	60.9	100	0.2	0
	PSS1C	61.5	61.5	235	0.5	0.2
	PSS1C	61.5	61.6	267	0.6	0.2
	PSS1C	61.7	61.7	120	0.3	0.1
Total [e/]				7,328	16.8	4.3
Wadena	PEM/SS1C	66.7	66.8	509	1.2	0.4
	PSS1/EMC	66.8	67.3	2,694	6.2	2.2
	PSS1/EMC	67.3	67.4	350	0.8	0.3
	PSS1/EMC	67.4	67.4	160	0.4	0.1
	PSS1/EMC	67.5	67.5	170	0.4	0.1
	PFO2/4Bdg	71.0	71.2	1,052	2.4	0.8
	PSS1C	71.3	71.3	55	0.1	<0.1
	PEMCd	71.8	71.9	302	0.7	0
	PEM/SS1Bg	72.4	72.5	367	0.8	0.3
	PFO6/SS1Bg	72.5	72.5	124	0.3	0.1
	PEMB	73.0	73.1	600	1.4	0
	PEMC	73.2	73.2	54	0.1	0
	PFO2/EMBdg	73.5	73.6	155	0.4	0.1
	PFO2/EMBdg	73.7	73.8	625	1.4	0.5

Appendix G
NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Wadena (continued)	PFO6/SS1Bg	73.9	73.9	39	0.1	<0.1
	PEM/SS1C	74.2	74.2	110	0.3	0.1
	PSS1B	74.5	74.5	52	0.1	<0.1
	PEMC	74.8	74.8	301	0.7	0
	PEMC	75.6	75.6	136	0.3	0
	PEMA	75.8	75.8	97	0.2	0
	PEM/SS1Cd	76.1	76.2	115	0.3	0.1
	PEM/SS1Cd	76.2	76.3	891	2.0	0.7
	PEMCd	76.9	77.0	218	0.5	0
	PEMCd	77.0	77.0	225	0.5	0
	PEMCd	77.1	77.1	99	0.2	0
	PEMC	77.5	77.6	563	1.3	0
	PEMC	77.8	77.8	136	0.3	0
	PFO2/EMBg	78.0	78.0	99	0.2	0.1
	PFO2/EMBg	78.1	78.1	424	1.0	0.3
	PFO2/EMBg	78.8	78.9	426	1.0	0.3
	PEM/SS1C	79.5	79.5	33	0.1	<0.1
	PEM/SS1C	79.9	80.1	866	2.0	0.7
	PFO2/EMBg	80.4	80.7	1,808	4.2	1.5
	PSS1/EMC	82.1	82.2	736	1.7	0.6
	PSS1/EMC	82.2	82.3	292	0.7	0.2
	PEMB	82.3	82.5	1,113	2.6	0
	PEMC	82.9	82.9	113	0.3	0
	PFO2/SS1B	82.9	83.0	542	1.2	0.4
	PFO2/4B	83.0	83.2	812	1.9	0.7
	PSS1C	83.2	83.2	236	0.5	0.2
	PEMC	83.6	83.6	289	0.7	0
	PSS1C	83.6	83.7	453	1.0	0.4
	PSS1/2B	83.7	83.8	630	1.4	0.5
	PEM/SS1C	83.8	83.9	93	0.2	0.1
	PSS1/EMC	84.2	84.3	352	0.8	0.3
	PSS1/EMC	84.4	84.4	103	0.2	0.1
	PEMC	84.8	85.0	690	1.6	0
	PSS1C	85.0	85.1	298	0.7	0.2
	PSS1C	85.4	85.4	441	1.0	0.4
	PEMC	85.8	85.9	272	0.6	0
	PSS1C	85.9	85.9	37	0.1	<0.1
	PEMC	85.9	85.9	223	0.5	0
	PSS1C	86.1	86.2	164	0.4	0.1
	PSS1C	86.2	86.2	33	0.1	<0.1
	PSS1Cd	86.6	86.7	296	0.7	0.2
	PSS1C	87.4	87.5	331	0.8	0.3
	PSS1C	87.8	87.8	170	0.4	0.1
	PSS1C	87.9	87.9	196	0.4	0.2
	PFO/SS1C	88.5	88.6	427	1.0	0.3
	PSS1Cd	89.2	89.3	700	1.6	0.6

Appendix G
NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Wadena (continued)	PSS1Cd	89.4	89.5	465	1.1	0.4
	PFO1A	90.0	90.0	85	0.2	0.1
	PFO1A	90.0	90.1	249	0.6	0.2
	PEMCd	91.0	91.0	158	0.4	0
	PSS1C	91.1	91.1	98	0.2	0.1
	PEMC	93.0	93.1	118	0.3	0
	PSS1C	94.3	94.4	688	1.6	0.6
	PEMC	96.3	96.3	72	0.2	0
	PSS1C	96.9	97.0	275	0.6	0.2
	PEMC	97.4	97.5	558	1.3	0
	PEMC	98.8	98.8	151	0.3	0
	PFO2B	99.6	99.6	3	<0.1	<0.1
	PEMC	99.7	99.7	89	0.2	0
	PSS1C	100.2	100.2	323	0.7	0.4
	PSS1C	100.5	100.5	103	0.2	0.1
	PSS1C	101.3	101.4	344	0.8	0.4
	PEMC	101.7	101.8	234	0.5	0
	PSS1C	101.8	101.8	43	0.1	<0.1
	PFO2B	101.8	101.8	217	0.5	0.2
	PSS1C	101.8	101.8	130	0.3	0.1
	PEMC	101.8	101.9	97	0.2	0
	PEMC	101.9	101.9	105	0.2	0
Total [e/]				28,502	65.5	17.7
Todd	PSS1C	103.3	103.4	352	0.8	0.4
	PSS1C	103.5	103.5	276	0.6	0.3
	PSS1Cd	104.2	104.2	220	0.5	0.3
	PEMF	104.2	104.4	800	1.8	0
	PSS1C	104.4	104.4	248	0.6	0.3
	PSS1C	104.5	104.5	180	0.4	0.2
	PSS1Cd	104.7	105.0	1,410	3.2	1.6
	PSS3B	105.0	105.2	1,162	2.7	0.9
	PEMC	105.3	105.3	155	0.4	0
	PSS1C	105.6	105.7	511	1.2	0.4
	PSS1C	106.9	107.0	946	2.2	0.8
	PSS1C	107.1	107.2	322	0.7	0.3
	PEMC	107.2	107.2	105	0.2	0
	PEMCd	107.2	107.4	713	1.6	0
	PEMCd	107.4	107.5	69	0.2	0
	PEMCd	107.6	107.6	130	0.3	0
	PSS1C	109.2	109.2	426	1.0	0.3
	PEMC	109.5	109.6	409	0.9	0
	PSS1C	109.6	109.6	231	0.5	0.2
	PEMC	109.6	109.8	792	1.8	0
	PSS1C	109.8	109.9	538	1.2	0.4
	PEMC	109.9	109.9	148	0.3	0
	PSS1C	109.9	110.4	2,784	6.4	2.2

Appendix G
NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Todd (continued)	PSS1C	112.6	112.6	79	0.2	0.1
	PEMC	112.6	112.7	434	1.0	0
	PSS1C	113.5	113.6	479	1.1	0.4
Total [e/]				13,919	31.8	9.1
Morrison	PSS1C	113.6	113.7	417	1.0	0.3
	PSS1C	114.8	114.8	334	0.8	0.3
	PSS1C	115.0	115.1	658	1.5	0.5
	PSS1C	115.2	115.2	149	0.3	0.1
	PUBGb	116.7	116.7	22	0.1	0
	PSS1C	118.1	118.2	433	1.0	0.3
	PSS1C	118.4	118.4	105	0.2	0.1
	PEMC	118.5	118.6	303	0.7	0
	PEMC	119.4	119.5	721	1.7	0
	PEMC	119.6	119.9	1,665	3.8	0
	PSS1C	120.4	120.5	72	0.2	0.1
	PFO2B	120.5	120.5	274	0.6	0.3
	PEMC	120.5	120.6	278	0.6	0
	PSS1C	120.7	120.8	322	0.7	0.4
	PEMC	120.9	121.3	1,841	4.2	0
	PEMC	121.3	121.3	285	0.7	0
	PEMCd	121.3	121.3	111	0.3	0
	PEMCd	121.4	121.5	426	1.0	0
	PUBGb	121.5	121.5	122	0.3	0
	PEMC	122.4	122.6	1,271	2.9	0
	PSS1C	122.6	122.7	281	0.6	0.3
	PSS1C	123.7	123.8	399	0.9	0.5
	PSS1C	123.8	123.9	160	0.4	0.2
	PEMC	125.4	125.4	214	0.5	0
	PEMC	125.7	125.8	470	1.1	0
	PEMC	126.2	126.4	1,005	2.3	0
	PSS1C	126.5	126.5	163	0.4	0.2
	PSS1C	129.5	129.6	283	0.6	0.3
	PEMC	130.3	130.4	415	1.0	0
	PEMC	130.9	131.0	117	0.3	0
	PEMC	131.1	131.1	37	0.1	0
	PEMAd	132.0	132.0	10	0.0	0
	PEM/SS1C	134.2	134.3	211	0.5	0.2
	PSS1C	134.3	134.3	279	0.6	0.3
	PEMC	134.3	134.4	230	0.5	0
	PEMCd	134.8	134.9	216	0.5	0
	PEMCd	134.9	134.9	235	0.5	0
	PEMC	135.3	135.3	136	0.3	0
	PEMCd	136.1	136.2	572	1.3	0
	PEMF	136.5	136.5	219	0.5	0
	PEMC	137.3	137.3	133	0.3	0
	PEMFd	137.4	137.6	1,192	2.7	0

Appendix G
NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Morrison (continued)	PFO1Cd	137.6	137.7	125	0.3	0.1
	PEMCd	137.7	137.7	396	0.9	0
	PEMCd	137.8	137.8	120	0.3	0
	PEMCd	138.2	138.2	171	0.4	0
	PEMCd	138.3	138.3	223	0.5	0
	PEMCd	138.4	138.5	237	0.5	0
	PFO/SS1Cd	138.5	138.5	121	0.3	0.1
	PEMCd	138.5	138.5	177	0.4	0
	PEMC	139.2	139.2	105	0.2	0
	PEMC	139.2	139.3	199	0.5	0
	PEMC	139.6	139.6	54	0.1	0
	PSS1/EMC	140.2	140.3	820	1.9	0.9
	PEMA	140.4	140.4	91	0.2	0
	PEMAd	140.4	140.5	289	0.7	0
	PEMFd	140.6	140.7	459	1.1	0
	PUBFx	140.7	140.7	82	0.2	0
	PUBF	141.1	141.1	97	0.2	0
	PEMC	141.5	141.5	165	0.4	0
	PEMC	141.9	141.9	144	0.3	0
	PEMC	142.1	142.2	455	1.0	0
	PEMCd	142.3	142.3	174	0.4	0
	PEMAd	142.6	142.6	79	0.2	0
	PEMC	143.5	143.5	173	0.4	0
	PEMC	143.7	143.8	66	0.2	0
	PEMC	143.8	143.8	197	0.5	0
	PEMC	143.9	143.9	102	0.2	0
	PEMC	144.0	144.0	134	0.3	0
	PEMC	144.3	144.4	304	0.7	0
	PSS1C	144.4	144.4	38	0.1	<0.1
	PEMC	144.4	144.4	109	0.2	0
	PEMC	144.4	144.7	1,271	2.9	0
	PEM/SS1C	144.7	144.7	57	0.1	0.1
	PEMC	144.7	144.7	182	0.4	0
	PEMC	144.7	144.8	395	0.9	0
	PSS1C	144.8	144.8	120	0.3	0.1
	PEMC	145.0	145.0	122	0.3	0
	PEMC	145.2	145.3	229	0.5	0
	PEMC	145.4	145.5	249	0.6	0
Total [e/]				35,317	58.1	6.0
Stearns	PEMCd	146.9	146.9	241	0.6	0
	PEMCd	147.0	147.0	68	0.2	0
	PEMCd	147.0	147.1	126	0.3	0
	PEMCd	147.1	147.1	17	<0.1	0
	PEMC	147.1	147.2	181	0.4	0
	PEMC	147.2	147.3	468	1.1	0
	PEMAd	148.0	148.0	175	0.4	0

Appendix G
NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Stearns (continued)	PEMAd	148.1	148.1	105	0.2	0
	PEMCd	148.1	148.2	425	1.0	0
	PEMAd	148.2	148.3	339	0.8	0
	PSS1Cd	148.5	148.5	151	0.3	0.2
	PEMCd	148.6	148.7	825	1.9	0
	PEMCd	149.3	149.4	290	0.7	0
	PEMCd	149.4	149.5	243	0.6	0
	PEMC	150.2	150.2	143	0.3	0
	PEMCd	150.3	150.3	49	0.1	0
	PEMCd	151.2	151.3	258	0.6	0
	PEMC	151.9	152.0	264	0.6	0
	PEMF	152.0	152.1	544	1.2	0
	PEMC	152.1	152.1	173	0.4	0
	PEMAd	152.7	152.7	251	0.6	0
	PEMAd	152.7	153.0	1,394	3.2	0
	PEMCd	153.2	153.2	193	0.4	0
	PSS1/EMCd	153.6	153.8	1,177	2.7	1.4
	PEMCd	153.8	154.2	2,022	4.6	0
	PEMCd	155.0	155.0	36	0.1	0
	PEMCd	155.5	155.5	20	<0.1	0
	PEMAd	155.6	155.7	57	0.1	0
	PEMAd	155.8	155.8	220	0.5	0
	PEMCd	157.0	157.1	122	0.3	0
	PSS1Cd	157.1	157.1	49	0.1	0.1
	PEMCd	157.1	157.1	126	0.3	0
	PSS1Cd	157.1	157.1	15	<0.1	<0.1
	PEMCd	157.1	157.1	236	0.5	0
	PFO1C	157.4	157.4	5	<0.1	<0.1
	PEMCd	157.7	157.9	1,094	2.5	0
	PEMCd	158.0	158.1	165	0.4	0
	PEMCd	158.8	158.8	157	0.4	0
	PEMCd	158.8	158.8	106	0.2	0
	PEMCd	158.9	159.1	1,159	2.7	0
	PEMCd	159.5	159.6	772	1.8	0
	PEMC	160.1	160.1	134	0.3	0
	PEMC	160.3	160.3	210	0.5	0
	PEMC	160.3	160.4	67	0.2	0
	PEMC	161.0	161.0	112	0.3	0
	PEMCd	161.2	161.2	16	<0.1	0
	PEMA	162.0	162.0	65	0.1	0
	PEMA	162.3	162.4	74	0.2	0
	PEMCd	163.2	163.3	169	0.4	0
	PSS1C	166.2	166.2	87	0.2	0.1
	PEMC	166.3	166.5	1,202	2.8	0
	PUBF	166.8	166.8	39	0.1	0
	PEMAd	167.9	167.9	218	0.5	0

Appendix G
NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Stearns (continued)	PEMC	169.0	169.1	127	0.3	0
	PFO1C	169.1	169.1	245	0.6	0.3
	PEMCd	169.6	169.7	556	1.3	0
	PEMCd	170.8	170.9	638	1.5	0
	PEMCd	171.0	171.1	432	1.0	0
	PEMC	173.1	173.1	191	0.4	0
	PEMB	173.9	174.0	93	0.2	0
	PSS1C	174.7	174.7	110	0.3	0.1
	PEMCd	175.3	175.3	96	0.2	0
	PEMC	176.5	176.6	154	0.4	0
	PEMC	177.1	177.2	174	0.4	0
	PEMC	177.4	177.4	261	0.6	0
Total [e/]				19,931	45.9	2.1
Meeker	PEMC	178.4	178.4	141	0.3	0
	PEM/UBF	179.3	179.4	173	0.4	0
	PFO1Cd	180.2	180.3	204	0.5	0.2
	PEMC	180.7	180.7	118	0.3	0
	PEMCd	180.9	180.9	42	0.1	0
	PEMC	181.7	181.7	12	0.0	0
	PEMC	183.0	183.1	132	0.3	0
	PSS1/EMCd	183.6	183.7	423	1.0	0.5
	PEMC	184.3	184.3	435	1.0	0
	PEMC	184.7	184.7	62	0.1	0
	PEMC	185.7	185.7	57	0.1	0
	PEMCd	193.6	193.7	330	0.8	0
	PEMCd	193.7	193.9	1,003	2.3	0
	PEMCd	194.1	194.2	534	1.2	0
	PEMCd	194.3	194.3	89	0.2	0
	PEMA	194.5	194.6	328	0.8	0
	PEMAd	194.9	194.9	193	0.4	0
	PEMAd	195.0	195.1	302	0.7	0
	PEMCd	196.4	196.6	1,431	3.3	0
	PEMCd	196.6	196.7	214	0.5	0
	PEMCd	196.8	196.8	393	0.9	0
	PEMC	197.2	197.2	96	0.2	0
	PSS1/EMCd	197.6	197.8	1,147	2.6	1.3
	PEMF	199.7	199.8	123	0.3	0
	PEMC	200.0	200.0	88	0.2	0
	PEMC	200.3	200.3	28	0.1	0
Total [e/]				8,098	18.6	2.0
Wright	PEMCd	202.6	202.6	107	0.2	0
	PEMCd	202.6	202.7	202	0.5	0
	PEMC	203.4	203.5	284	0.7	0
	PEMCd	203.9	204.0	273	0.6	0
	PEMCd	204.1	204.1	246	0.6	0
	PEMC	206.6	206.9	1,268	2.9	0

Appendix G
NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Wright (continued)	PEMCd	209.9	209.9	150	0.3	0
	PEMAd	210.1	210.1	209	0.5	0
	PEMCd	210.1	210.4	1,261	2.9	0
Total [e/]				4,000	9.2	0
McLeod	PEMCd	212.2	212.2	136	0.3	0
	PEMAd	213.3	213.4	440	1.0	0
	PEMCd	213.8	213.9	767	1.8	0
	PEMC	214.4	214.4	23	0.1	0
	PEMCd	216.5	216.6	648	1.5	0
	PEMCd	216.8	217.1	1,685	3.9	0
	PEMAd	217.7	217.7	83	0.2	0
	PEMCd	217.7	217.7	102	0.2	0
	PEMAd	217.7	217.8	149	0.3	0
	PEMCd	218.0	218.1	569	1.3	0
	PEMCd	221.7	222.1	2,169	5.0	0
	PEMCd	222.7	222.8	313	0.7	0
	PEMCd	222.8	222.9	810	1.9	0
	PEMCd	223.6	223.6	178	0.4	0
	PEMFd	223.6	223.6	107	0.2	0
	PEMCd	223.6	223.8	962	2.2	0
	PEMCd	224.3	224.3	114	0.3	0
	PEMAd	226.3	226.4	606	1.4	0
	PEMCd	226.9	226.9	64	0.1	0
	PEMAd	227.3	227.8	2,350	5.4	0
Total [e/]				12,275	28.2	0
Carver	PEMCd	229.1	229.1	97	0.2	0
	PEMA	232.0	232.1	164	0.4	0
	PEMCd	232.4	232.4	403	0.9	0
	PEMAd	232.7	232.8	350	0.8	0
	PEMC	233.1	233.1	213	0.5	0
	PEMAd	233.4	233.4	256	0.6	0
Total [e/]				1,483	3.4	0
Sibley	PEMAd	235.9	235.9	280	0.6	0
	PEMAd	236.1	236.3	796	1.8	0
	PEM/FO1C	236.3	236.3	65	0.1	0.1
	PEMAd	236.3	236.6	1,504	3.5	0
	PEMAd	237.5	237.6	476	1.1	0
	PEMAd	237.6	237.8	1,216	2.8	0
	PEMCd	237.8	237.8	186	0.4	0
	PEMAd	238.4	238.5	669	1.5	0
	PEMAd	238.7	238.8	332	0.8	0
	PEMC	238.8	238.9	278	0.6	0
	PEMCd	239.6	239.6	332	0.8	0
	PEMF	242.2	242.2	103	0.2	0
	PUBF	242.2	242.2	104	0.2	0
	PEMF	242.2	242.3	127	0.3	0

Appendix G
NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Sibley (continued)	PFO1C	242.4	242.4	296	0.7	0.3
Total [e/]				6,764	15.4	0.4
Scott	PFO1C	242.7	242.7	66	0.2	0.1
	PEMC	242.7	242.8	565	1.3	0
	PEMC	245.5	245.5	20	0.0	0
	PEMAd	246.2	246.4	680	1.6	0
	PEMCd	246.4	246.5	520	1.2	0
	PEMA	248.0	248.1	369	0.8	0
	PEMA	248.5	248.6	294	0.7	0
	PFO1A	248.6	248.6	318	0.7	0.4
	PEMA	249.0	249.1	565	1.3	0
	PEMCd	250.5	250.6	561	1.3	0
	PEMCd	251.7	251.8	265	0.6	0
	PEM/FO1Cd	251.8	251.8	86	0.2	0.1
	PEM/FO1Cd	251.8	251.8	234	0.5	0.3
	PEMCd	252.8	252.9	117	0.3	0
	PEMCd	252.9	252.9	94	0.2	0
	PFO1Cd	254.6	254.6	135	0.3	0.2
	PEMAd	257.7	257.8	729	1.7	0
	PEMAd	257.9	258.0	301	0.7	0
	PEMAd	258.0	258.0	260	0.6	0
	PEMA	259.7	259.7	92	0.2	0
	PEMCd	260.0	260.0	168	0.4	0
	PEMFd	260.0	260.1	80	0.2	0
	PEMCd	260.1	260.1	117	0.3	0
	PEMCd	260.1	260.1	88	0.2	0
	PEMC	260.5	260.6	621	1.4	0
	PEMA	260.6	260.7	145	0.3	0
	PEMCd	261.0	261.1	205	0.5	0
	PEMCd	261.2	261.2	489	1.1	0
	PEMAd	261.5	261.5	144	0.3	0
	PEMC	262.2	262.2	215	0.5	0
	PEMC	262.7	262.8	483	1.1	0
	PEMC	262.8	262.9	344	0.8	0
	PEMC	265.0	265.1	225	0.5	0
	PEMCd	265.7	265.8	511	1.2	0
	PEMAd	266.5	266.9	2,094	4.8	0
	PUB/EMF	267.4	267.4	3	0.0	0
	PEMC	267.4	267.4	243	0.6	0
	PEMCd	267.9	267.9	190	0.4	0
	PEMC	269.9	270.1	1,155	2.7	0
	PEMCd	270.2	270.4	992	2.3	0
	PEMC	271.3	271.3	82	0.2	0
	PUB/EMF	271.4	271.4	109	0.3	0
	PEMC	271.5	271.5	231	0.5	0
	PEMC	271.8	271.8	227	0.5	0

Appendix G
NWI Mapped Wetlands Crossed by the Pipeline Route

County	Cowardin Classification [a/]	Approximate Beginning Milepost	Approximate Ending Milepost	Crossing Length (feet) [b/]	Temporary Impact (acres) [c/]	Permanent Impact (acres) [d/]
Scott (continued)	PEMA	271.8	271.8	73	0.2	0
Total [e/]				15,505	35.7	1.1
Dakota	PEMA	273.6	273.8	1,039	2.4	0
	PEMC	273.8	273.8	11	<0.1	0
	PEMC	273.8	273.8	152	0.3	0
	PEMA	273.8	273.9	335	0.8	0
	PEMC	277.0	277.1	194	0.4	0
	PEMAd	277.6	277.6	52	0.1	0
	PEMC	277.6	277.7	329	0.8	0
	PEMAd	277.7	277.8	417	1.0	0
	PEMAd	279.0	279.0	24	0.1	0
	PEMAd	279.2	279.3	367	0.8	0
	PEMCd	280.7	280.7	112	0.3	0
	PEMCd	281.1	281.2	544	1.2	0
	PEMAd	281.8	281.8	161	0.4	0
	PEMC	282.1	282.2	426	1.0	0
	PEMA	287.5	287.6	422	1.0	0
	PEMC	292.9	292.9	46	0.1	0
Total [e/]				4,631	11.0	0

a/ Cowardin Classification System:

PEM = Emergent
PSS = Scrub/Shrub
PFO = Forested
PUB = Unconsolidated Bottom

Subclass
1 = Broad-Leaved Deciduous
2 = Needle-Leaved Deciduous
3 = Broad-Leaved Evergreen
4 = Needle-Leaved Evergreen
6 = Indeterminate Deciduous

Modifiers
A = Temporarily Flooded
B = Saturated
C = Seasonally Flooded
F = Semi-permanently Flooded
G = Intermittently Exposed

Special Modifiers
b = Beaver
d = Partially Drained/Ditched
g = Organic Soil
x = Excavated

b/ Crossing length measured as proposed pipeline centerline crossing distance

c/ Acreage based on 100-foot construction right-of-way

d/ Acreage based on 35-foot maintained right-of-way where paralleling existing pipeline(s) Acreage based on 50-foot maintained right-of-way where not paralleling existing pipeline(s)

e/ Temporary and permanent impacts values have been rounded to the nearest 10th