

1.0 INTRODUCTION

This Environmental Assessment Supplement was prepared in support of Enbridge Energy, Limited Partnership's (referred to herein as "Applicant") Application to the Minnesota Public Utilities Commission (PUC) for a Pipeline Routing Permit (Application) to construct and operate the Alberta Clipper Project and the associated Southern Lights Diluent Project (Enbridge Pipelines (Southern Lights) L.L.C., also referred to as "Applicant") in Minnesota. This document provides an assessment of the existing environment along the project route, an analysis of human and environmental impacts that could potentially result from pipeline right-of-way preparation, construction, operation and maintenance of the pipeline facilities, and a summary of the protection and restoration measures to be implemented to avoid and/or minimize environmental impacts. It has been prepared in accordance with the PUC's Pipeline Routing rules (Chapter 4415) and expands on information in the following three sections of the Application:

- Location of Preferred Route and Description of Environment;
- Environmental Impact of Preferred Route; and
- Right-of-Way Protection and Restoration Measures.

1.1 PROJECT DESCRIPTION AND NEED

The Applicants are planning to increase its ability to provide additional supplies of petroleum to markets in the United States and Canada in response to customer requests and marketplace demands. To fulfill this goal, the Applicants have embarked upon an expansion program involving multiple pipeline projects to increase its transportation capacity. The Enbridge Expansion Program is specifically designed to increase petroleum transportation services from the increasingly accessible oil sands supply in the western Canadian basin to refineries in the American Midwest and eastern Canada. As discussed in this Environmental Assessment Supplement, the Applicants propose to construct and operate a petroleum pipeline and related facilities from Hardisty, Alberta, Canada, to Superior, Wisconsin. This project, known as the Alberta Clipper Project, will have the capacity to deliver 450,000 barrels per day (bpd) of petroleum from a supply hub near Hardisty, Alberta to a terminal in Superior, Wisconsin, with a delivery connection at Clearbrook, Minnesota.

Additionally, the Applicants are proposing two other projects within the Alberta Clipper Project footprint. One project, the Southern Lights Reversal Project, involves the reversal of an existing 18-inch-diameter, 135-mile-long liquid petroleum pipeline between Clearbrook, Minnesota and the United States-Canada border near Neche, North Dakota. The common carrier pipeline will remain in liquid petroleum service but will be converted to export service, transporting diluent into Canada. Minimal environmental impact will occur because work associated with this project will entail the reversal of pumping units at one station and also the construction of new pumping units at another station, but all will take place within fenced station facilities. In addition, several mainline valves may also be installed within pipeline right-of-way pending the results of further engineering studies. The Southern Lights Reversal Project is not subject to a State of Minnesota Routing Permit or Certificate of Need. Although this project is not part of the Routing Permit and Certificate of Need requirements, due to the general collocation and co-construction of Alberta Clipper and Southern Lights Reversal in the same project footprint, environmental impacts associated with the Southern Lights Reversal Project are addressed herein.

The other project, the Southern Lights Diluent Project, consists of a new 20-inch-diameter, 189-mile-long pipeline between Superior, Wisconsin and Clearbrook, Minnesota. This project will be co-constructed with the Alberta Clipper Project and will require a separate Pipeline Routing Permit and Certificate of Need. The Southern Lights Diluent Project will connect to the Southern Lights Reversal Project at Enbridge’s terminal at Clearbrook, Minnesota. Although the Alberta Clipper and Southern Lights Diluent Projects will require separate actions by the MN PUC, due to the general collocation and co-construction of Alberta Clipper and Southern Lights Diluent in the same project footprint, environmental impacts associated with both projects are addressed herein.

The two projects subject to Routing Permit requirements (Alberta Clipper Project and Southern Lights Diluent Project) have independent utility, independent commercial in-service dates and different ending points. Table 1.1-2 summarizes the three projects planned within the Alberta Clipper Project footprint. Unless specified, the remainder of this Environmental Assessment Supplement describes and evaluates the Minnesota portion of the Alberta Clipper Project footprint.

| TABLE 1.1-2 | | | | | | |
|---|----------------|----------------------------------|-------------------|--|-----------------|--|
| Projects Planned within the Alberta Clipper Project Footprint | | | | | | |
| Start | End | Project Name | MN Routing Permit | Project Description | In-Service Date | |
| US-Canada Border near Neche, ND | Superior, WI | Alberta Clipper Project | Yes | new 36-inch-diameter petroleum pipeline | December 2009 | |
| US-Canada Border near Neche, ND | Clearbrook, MN | Southern Lights Reversal Project | No | reversing flow of existing 18-inch-diameter pipeline | 2010 | |
| Clearbrook, MN | Superior, WI | Southern Lights Diluent Project | Yes | 20-inch-diameter diluent pipeline | July 2010 | |

The purpose of the Alberta Clipper Project is to transport petroleum from Enbridge facilities in Hardisty, Alberta to meet the growing demand by refineries and markets in the United States and eastern Canada. This new pipeline will provide the capacity needed to transport increasing supplies of crude oil produced in western Canada. To meet this anticipated demand, the Alberta Clipper Project will provide up to 450,000 bpd of crude oil capacity from Alberta’s oil sands. The capacity provided by this new pipeline will provide independent utility to the Applicants and its customers, who will use the pipeline for the transportation of products to Clearbrook, Minnesota and Superior, Wisconsin, and breakout tanks for subsequent delivery to interconnected Enbridge pipeline systems to the south and east of Superior, Wisconsin.

The need for the project is dictated by a number of factors including:

- increasing the petroleum supply capacity on the Enbridge pipeline system by 450,000 bpd;
- increasing crude oil demand in the United States and eastern Canada and decreasing domestic crude oil supply;
- the opportunity to reduce United States dependence on foreign offshore oil through increased access to stable, secure Canadian crude oil supplies; and
- demonstrated shipper interest in an overall Enbridge system expansion, including a delivery connection at Clearbrook, Minnesota.

The purpose of the Southern Lights Diluent Project from Superior, Wisconsin to Clearbrook, Minnesota is to deliver light petroleum liquids, referred to as “diluent”, from U. S. refineries to the Alberta oil sand producers to dilute the heavy crude oil produced in that region, thereby facilitating pipeline transportation.

The need for the project is dictated by a number of factors including:

- establishing a diluent supply capacity on the Enbridge pipeline system of 180,000 bpd;
- enable recycling of diluent between refinery and production center, helping to satisfy an increasing demand for crude oil supplies in the Midwestern United States and eastern Canada;
- the opportunity to reduce the United States dependence on foreign offshore oil through increased access to stable, secure Canadian crude oil supplies; and
- demonstrated shipper interest in establishing a pipeline from the Midwestern United States to western Canada to supply diluent.

A general location map depicting the project route is included on figure 1.1-1. Detailed route maps of the project may be found in Appendix I to the Pipeline Routing Permit application.

The Alberta Clipper Project will generally be collocated with or adjacent to Enbridge pipelines through North Dakota, Minnesota, and Wisconsin. The Alberta Clipper Project will entail construction and operation of the following:

- approximately 326 miles of new 36-inch-diameter underground petroleum pipeline on or adjacent to Enbridge right-of-way from near Neche, North Dakota at the United States-Canada border in Pembina County, North Dakota (milepost (MP) 773.7) to Enbridge’s Superior terminal in Douglas County, Wisconsin (MP 1098.1). The Minnesota portion of the project would extend from the Minnesota–North Dakota border near MP 801.8 in Kittson County to the Minnesota–Wisconsin border in Carlton County near MP 1084.8 (approximately 285.1 miles);
- new pumping units within the Enbridge pump station sites at Viking, Minnesota (MP 848.2), Clearbrook, Minnesota (MP 909.5) and Deer River, Minnesota (MP D996.0). Note that mileposts denoted in this document are location references only and should not be used as a definitive measurement of the pipeline. Mileposts were originally established in 1949 when the first pipeline was constructed. Pipelines installed adjacent to or within this corridor share the milepost reference system. Mileposts designated with a letter "D" identify locations where the proposed alignment deviates from the original corridor. In these instances, the proposed alignment is adjacent to Enbridge pipeline(s), but on another corridor;
- new piping, manifold, pig receiver, four booster pumps, and five new storage tanks (200,000 barrels (bbls) each) at the Superior, Wisconsin terminal; and
- mainline valves at major waterbody crossings and over the length of the project route.

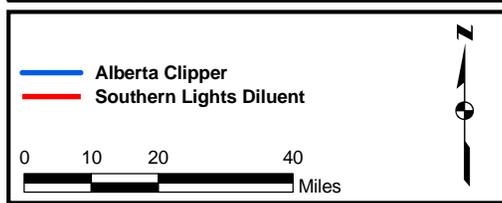
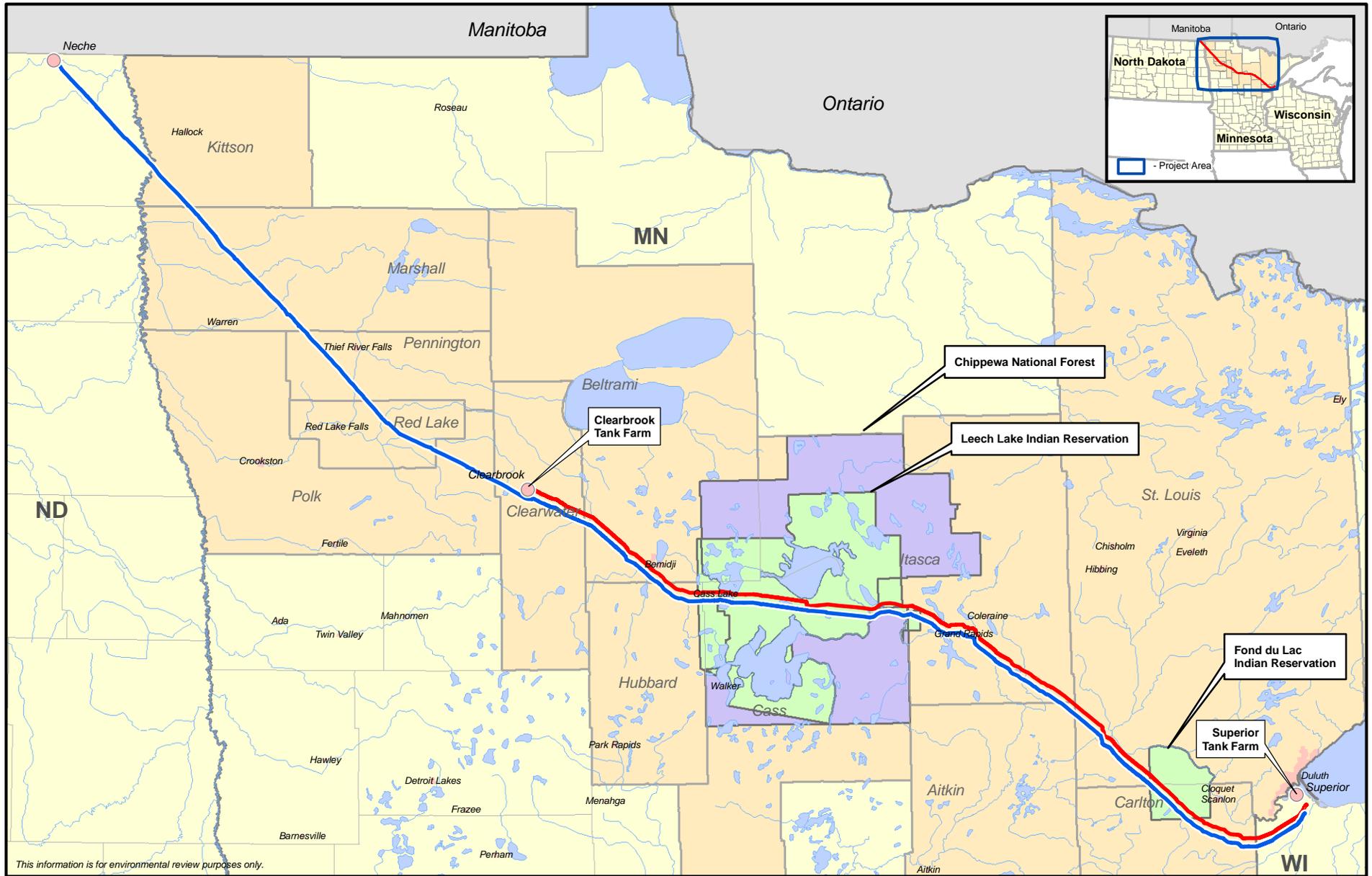



Figure 1.1-1
Alberta Clipper and Southern Lights Diluent Projects
 General Project Location Map



The Southern Lights Diluent Project will be co-constructed with the Alberta Clipper Project from Superior, Wisconsin to Clearbrook, Minnesota. The Southern Lights Diluent Project will require the construction of the following:

- approximately 188.6 miles of new 20-inch-diameter underground petroleum pipeline generally on or adjacent to Enbridge right-of-way from Enbridge’s Superior terminal in Douglas County, Wisconsin (MP 1098.1) to Enbridge’s Clearbrook terminal in Clearwater County, Minnesota (MP 909.5). The Minnesota portion of the project would extend from the Minnesota – Wisconsin border near MP 1084.8 in Carlton County to the Clearbrook terminal (approximately 175.4 miles);
- new pumping units within the Enbridge Clearbrook terminal;
- new piping and pig receiver at the Clearbrook terminal; and
- mainline valves at major waterbody crossings and over the length of the project route.

The Alberta Clipper and Southern Lights Diluent Projects will generally follow the Enbridge right-of-way along the entire route in Minnesota. The projects will cross portions of the following counties: Kittson, Marshall, Pennington, Red Lake, Polk, Clearwater, Beltrami, Hubbard, Cass, Itasca, Aitkin, St. Louis, and Carlton. Table 1.1-1 summarizes the length of pipelines in each county.

| County, State | Alberta Clipper Project | | Southern Lights Diluent Project | |
|-----------------------|-------------------------|--------------------------------------|---------------------------------|-------------------------|
| | Mileposts | Pipeline Length (miles) ^a | Mileposts | Pipeline Length (miles) |
| Kittson, Minnesota | 801.8 - 817.0 | 15.3 | | |
| Marshall, Minnesota | 817.0 - 851.7 | 34.7 | | |
| Pennington, Minnesota | 851.7 - 871.4 | 19.6 | | |
| Red Lake, Minnesota | 871.4 - 886.9 | 15.6 | | |
| Polk, Minnesota | 886.9 - 900.5 | 13.5 | | |
| Clearwater, Minnesota | 900.5 - 921.1 | 20.9 | 909.5 - 921.1 | 11.6 |
| Beltrami, Minnesota | 921.1 - 943.8 | 22.7 | 921.1 - 943.8 | 22.7 |
| Hubbard, Minnesota | 943.8 - 951.5 | 7.8 | 943.8 - 951.5 | 7.8 |
| Cass, Minnesota | 951.5 - 986.1 | 34.4 | 951.5 - 986.1 | 34.4 |
| Itasca, Minnesota | 986.1 - 1035.4 | 50.4 | 986.1 - 1035.4 | 50.4 |
| Aitkin, Minnesota | 1035.4 - 1036.5 | 1.1 | 1035.4 - 1036.5 | 1.1 |
| St. Louis, Minnesota | 1036.5 - 1061.1 | 24.6 | 1036.5 - 1061.1 | 24.6 |
| Carlton, Minnesota | 1061.1 - 1084.8 | 24.6 | 1061.1 - 1084.8 | 24.6 |
| | Total | 285.1 | Total | 175.4 |

^a Mileposts are used for reference and may not reflect actual distances. The actual length of pipeline will vary because of deviations from the existing milepost-reference pipeline.

The Applicants propose to begin construction of the projects in late 2008. Construction will occur over approximately 14 months, with an in-service date on or before December 31,

2009 for the Alberta Clipper Project and an in-service date on or before July 1, 2010 for the Southern Lights Diluent Project.

The Southern Lights Reversal Project will require construction and operation of the following:

- new pumping units within the Enbridge pump station site at Clearbrook, Minnesota (MP 909.5);
- reversal of station piping for pumping units at the Enbridge pump station site at Viking, Minnesota (MP 848.2); and
- new mainline valves pending continuing hydrologic and other engineering studies.

1.2 LAND REQUIREMENTS

Construction of the Alberta Clipper Project will generally require a 140-foot-wide construction right-of-way. This 140-foot-wide construction right-of-way will allow for temporary storage of topsoil and spoil and to accommodate safe operation of construction equipment. Following construction, the Applicants will retain an easement to maintain 75 feet of right-of-way as measured from the outermost existing pipeline. From the North Dakota – Minnesota border to Clearbrook, Minnesota the spoil side (i.e., topsoil and ditch spoil stockpile area) will typically be approximately 35 to 50 feet wide to allow for topsoil placement over the outermost existing pipeline and will be located within the existing maintained right-of-way (see figure 1.2-1). The working side (i.e., equipment work area and travel lane) will typically be 90 feet wide and generally located outside the existing maintained right-of-way. For environmental review purposes, the additional permanent right-of-way is assumed to be 10 feet wide.

Between Clearbrook, Minnesota and the Minnesota - Wisconsin border, the 140-foot-wide construction right-of-way will allow for temporary storage of topsoil and spoil and to accommodate safe operation of construction equipment (see figure 1.2-2). The spoil side will typically be up to 50 feet because the Alberta Clipper and the Southern Lights Diluent Projects will be co-constructed. The working side will typically be 90 feet wide and generally located outside the existing maintained right-of-way. Following construction, the Applicants will maintain an additional permanent right-of-way for operation of the pipeline. For environmental review purposes, the additional permanent right-of-way is assumed to be 50 feet wide.

A portion of the project corridor in eastern Minnesota is characterized by extensive wetlands. In these wetland areas, specialized construction methods will be employed. The construction right-of-way and additional permanent right-of-way configuration in this area is discussed in section 1.3 and in the EMP, found in Appendix B.

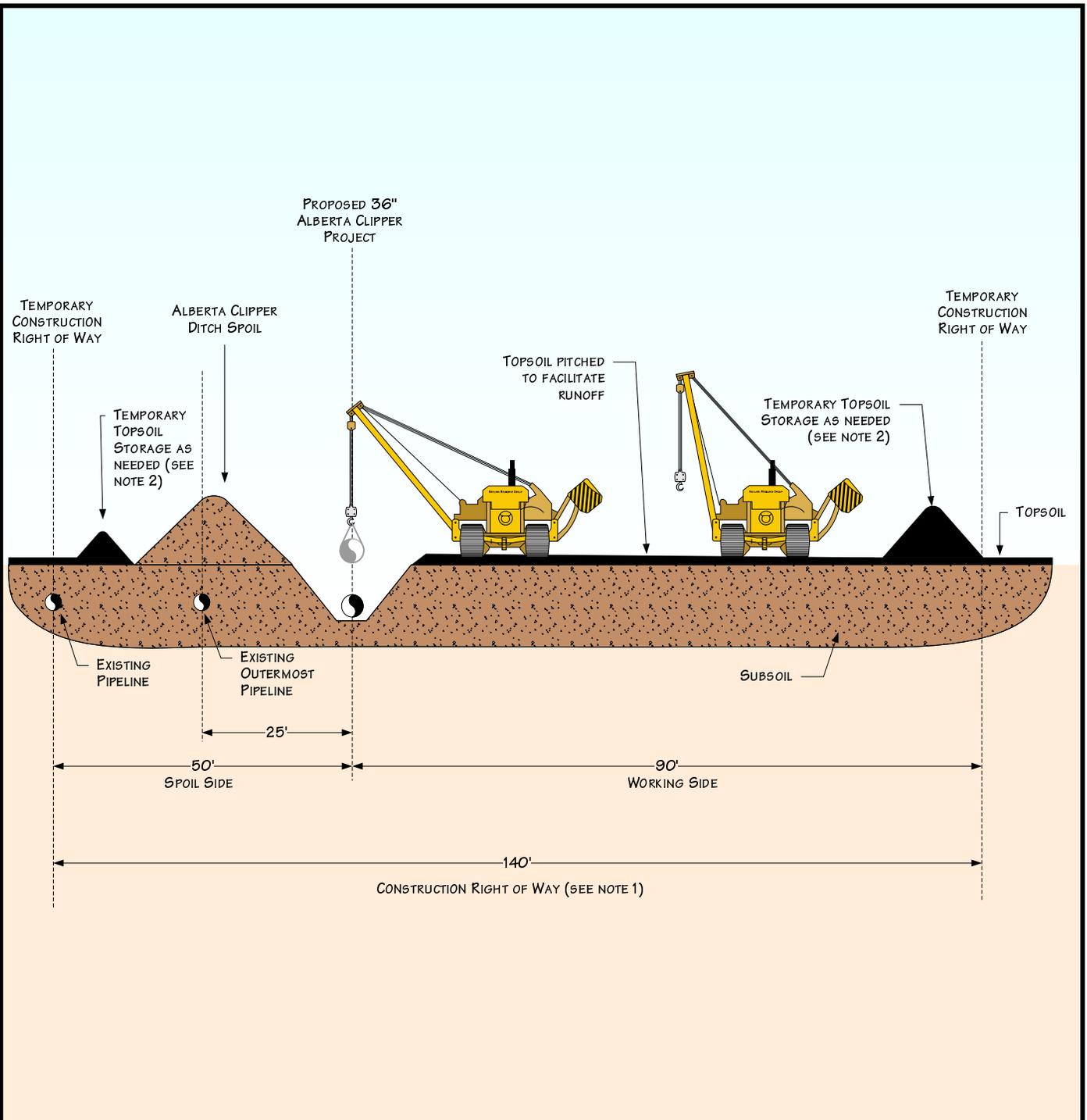
1.2.1 Temporary Extra Workspaces

Additional temporary extra workspaces are anticipated to be needed at other locations where the project will cross features such as waterbodies, roads, railroads, foreign pipelines and utilities, horizontal directional drill (HDD) sites, 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 1.2.1-1 lists the typical dimensions of temporary extra workspaces that will be used for pipeline construction.

| Feature | Dimensions On Each Side of Feature ^a |
|--|---|
| Open-cut Road Crossings | 100 feet X 75 feet and 50 feet X 50 feet |
| Bored Road and Railroad Crossings | 100 feet X 75 feet and 100 feet X 50 feet |
| Foreign Pipeline and Utility Crossings | 100 feet X 75 feet and 100 feet X 50 feet |
| Pipeline Cross-Unders | 100 feet X 75 feet |
| Waterbody Crossings >50 feet wide | 300 feet X 75 feet |
| Waterbody Crossings <50 feet wide | 200 feet X 75 feet |
| Horizontal Directionally Drilled Waterbody Crossings | 200 feet X 75 feet |
| Wetland Crossings | 200 feet X 75 feet |

^a Areas are in addition to the 140-foot-wide construction right-of-way



PROFILE

NOTES:

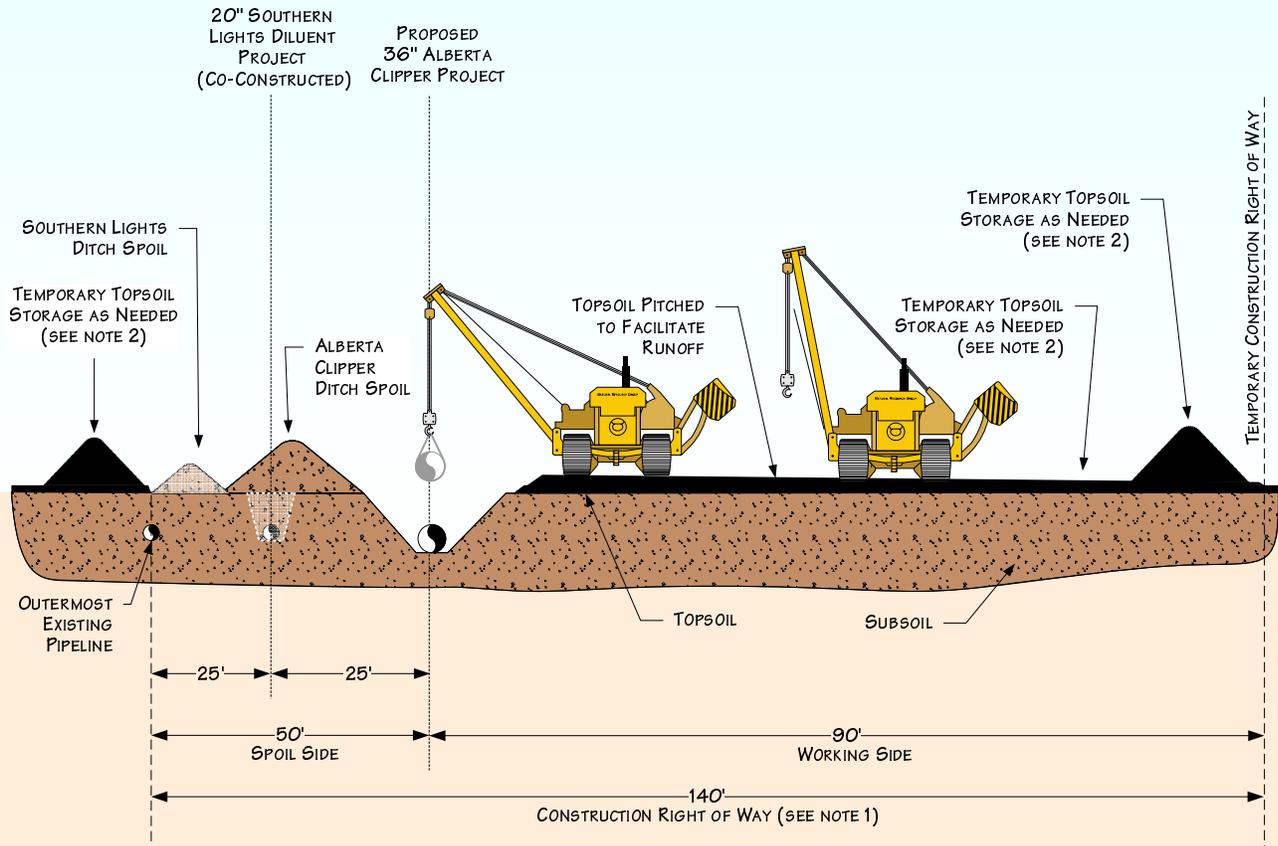
1. CONSTRUCTION RIGHT OF WAY WILL TYPICALLY BE 140' WIDE. SPOIL SIDE WILL BE APPROXIMATELY 50' WIDE.
2. THIS DRAWING REFLECTS "DITCH PLUS SPOIL" SIDE TOPSOIL STRIPPING PROCEDURE. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL SHOWN OR IN OTHER CONFIGURATION APPROVED BY COMPANY.
3. THE OFFSET FROM OUTERMOST EXISTING PIPELINE WILL BE 25' FOR MOST LOCATIONS BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.

For environmental review purposes only.



Figure 1.2-1
Typical Construction Layout
 (North of Clearbrook, MN)

| | |
|---|--|
| DATE: 7/9/2001 | |
| REVISED: 05/21/07 | |
| SCALE: NTS | |
| DRAWN BY: KMKENDALL | |
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PROFILE

NOTES:

1. CONSTRUCTION RIGHT OF WAY WILL TYPICALLY BE 140' WIDE. THE SPOIL SIDE WILL BE APPROXIMATELY 50' WIDE AND GENERALLY WITHIN THE EXISTING MAINTAINED RIGHT-OF-WAY. THE WORKING SIDE WILL BE 90' WIDE.
2. THIS DRAWING REFLECTS "DITCH PLUS SPOIL SIDE" TOPSOIL STRIPPING PROCEDURE. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL AS SHOWN OR IN OTHER CONFIGURATIONS APPROVED BY THE COMPANY.
3. THE OFFSET FROM NORTHERNMOST OR SOUTHERNMOST EXISTING PIPELINE, WHERE APPLICABLE, WILL BE 25' FOR MOST LOCATIONS BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.



Figure 1.2-2
Typical Construction Layout
 (South of Clearbrook, MN)

| | |
|---|--|
| DATE: 7/9/2001 | |
| REVISED: 5/21/2007 | |
| SCALE: NTS | |
| DRAWN BY: KMKENDALL | |
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1.2.2 Pipe/Material Storage Yards and Contractor Yards

During construction, the Applicants will temporarily 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. These yards have yet to be identified and this information will be filed when available, approximately July 2008.

1.2.3 Access Roads

Public roads will typically 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, the Applicants may need to construct new access roads. Use of private access roads, modifications to existing non-private roads, and construction of any new access roads will require obtaining landowner permission and environmental surveys prior to use. No private or new access roads have been identified at this time. This information will be filed when available, approximately July 2008.

1.2.4 Aboveground Facilities

Aboveground facilities associated with the Alberta Clipper Project will involve modifying existing pump station service to accommodate the new pipeline. New aboveground facilities include additional pumping infrastructure at three existing pump stations, new piping, one launcher, two receivers, booster pumps, and mainline valves. Currently known aboveground facilities and locations are summarized in table 1.2.4-1.

| County, State | Facility | Milepost |
|-----------------------|---|---------------------|
| Kittson, Minnesota | Red River South - Mainline Valve | 805.6 |
| | Donaldson Pump Station – New Pump and Mainline Valve | 814.1 |
| | Tamarack R. – Mainline Valve | 829.4 |
| Marshall, Minnesota | Middle River – Mainline Valve | 834.5 |
| | Snake River – Mainline Valve | 845.7 |
| | Viking Station – New Pumps and Mainline Valve | 848.2 |
| Pennington, Minnesota | Red Lake River North – Mainline Valve | 864.1 |
| | Red Lake River South – Mainline Valve | 865.1 |
| Red Lake, Minnesota | Plummer Pump Station – Mainline Valve | 877.1 |
| | Lost River – Mainline Valve | 885.7 |
| Polk, Minnesota | Gully – Mainline Valve | 896.0 |
| | Polk/Clearwater County Line – Mainline Valve | 899.4 |
| Clearwater, Minnesota | Clearbrook Terminal – Mainline Valve ^a | 909.4 |
| | Clearbrook Terminal – New Pumps and Mainline Valve ^a | 909.5 |
| | W. 4-Legged Lake – Mainline Valve ^a | 916.5 |
| | W. 4-Legged Lake – Mainline Valve ^a | 918.9 |
| | Clearwater River – Mainline Valve ^a | 922.1 |
| Beltrami, Minnesota | Clearwater River – Mainline Valve ^a | 922.5 |
| | Grant Creek – Mainline Valve ^a | D933.4 ^b |
| | Mississippi River – Mainline Valve ^a | 939.6 |
| | Mississippi River – Mainline Valve ^a | 940.0 |
| Cass, Minnesota | Cass Lake – Mainline Valve ^a | D955.4 |

TABLE 1.2.4-1

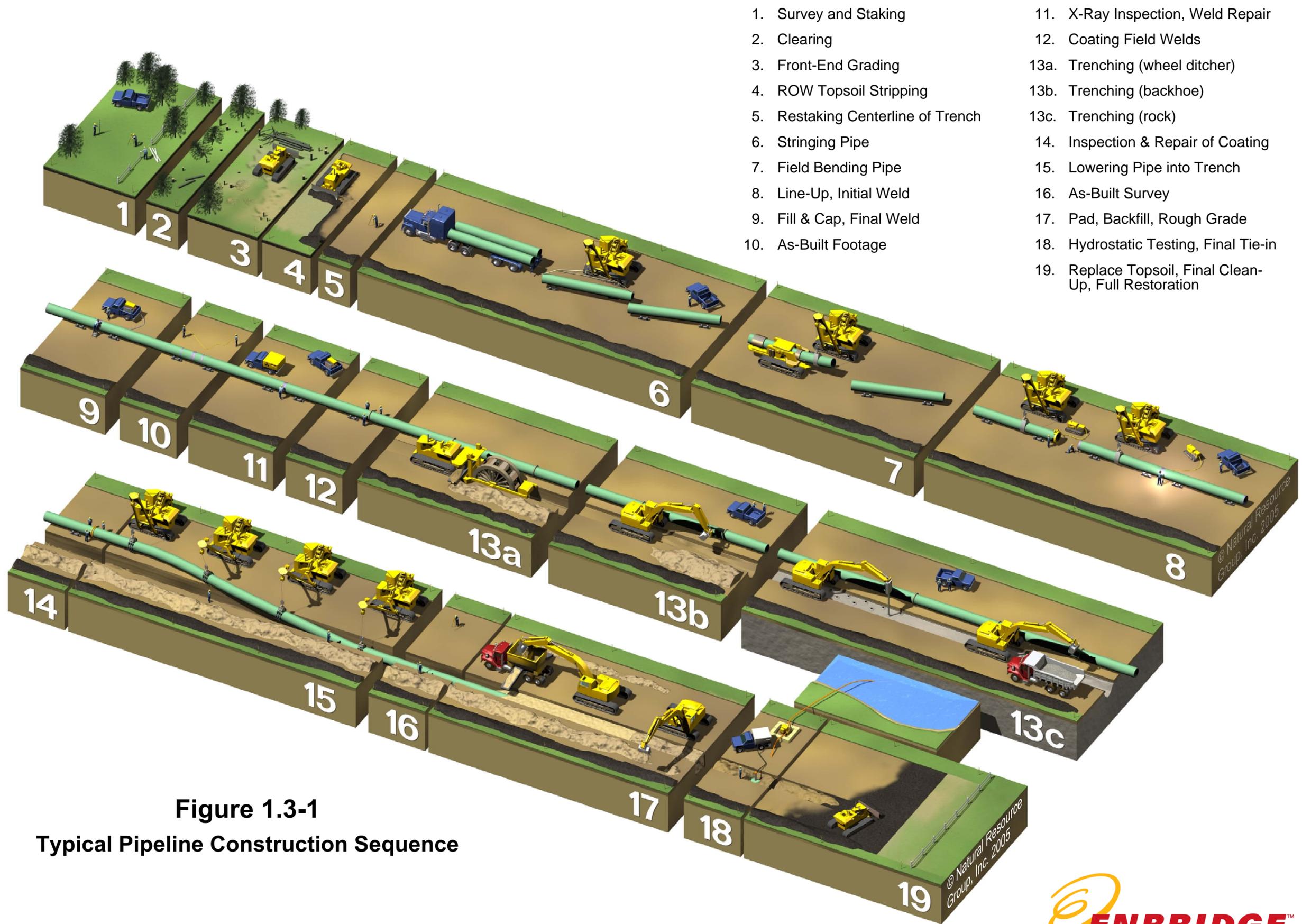
Aboveground Facilities Associated with the Alberta Clipper and Southern Lights Diluent Projects

| County, State | Facility | Milepost |
|----------------------|---|----------|
| Itasca, Minnesota | Cass Lake – Mainline Valve ^a | D958.4 |
| | Sucker Lake – Mainline Valve ^a | 964.1 |
| | Portage Lake – Mainline Valve ^a | 967.0 |
| | Bena – Mainline Valve ^a | 973.6 |
| | Mississippi River – Mainline Valve ^a | 985.6 |
| | Mississippi River – Mainline Valve ^a | 987.7 |
| | Ball Club River – Mainline Valve ^a | D989.8 |
| | Deer River Station – New Pumps and Mainline Valve ^a | D995.8 |
| | Bass Brook – Mainline Valve ^a | D1004.0 |
| | Bass Brook – Mainline Valve ^a | D1004.4 |
| | Prairie River – Mainline Valve ^a | D1009.8 |
| | Prairie River – Mainline Valve ^a | D1010.3 |
| St. Louis, Minnesota | Reed Lake – Mainline Valve ^a | 1025.9 |
| | Savanna River – Mainline Valve ^a | 1047.0 |
| | Gowan Station – Mainline Valve ^a | 1052.7 |
| | Headquarter Lake – Mainline Valve ^a | 1055.2 |
| Carlton, Minnesota | Fond Du Lac – Mainline Valve ^a | 1060.1 |
| | I 35 – Mainline Valve ^a | D1073.4 |
| a | Mainline valves associated with the Southern Lights Diluent Project will be constructed at these locations. With the exception of the Clearbrook Terminal, no new pump stations or other modifications will occur at these locations. | |
| b | Mileposts are used for reference and may not reflect actual distances. While the pipeline route starts at MP 773.7 and ends at MP 1098.1, a difference of 324.4 miles, the actual length of pipeline will be 326.2 miles because of deviations from the existing milepost-reference pipeline. | |

1.3 TYPICAL CONSTRUCTION SEQUENCE

A schematic depicting a typical pipeline construction sequence is provided on figure 1.3-1. Specialized construction techniques (e.g., waterbody crossings) are discussed in subsequent sections of this document. Construction associated with aboveground facilities (i.e., mainline valves, station modifications) involves pipe reconfigurations and installation of equipment. The typical pipeline construction sequence is described below.

First, the right-of-way is surveyed, staked, and prepared for clearing. The right-of-way is then cleared and graded to the extent needed to provide construction access and safe movement of equipment and personnel during construction. Appropriate safety measures are implemented before excavation begins, including notification of the One-Call system to ensure foreign utilities are properly marked, and marking of the adjacent pipelines. Pipe, valves, and fittings are transported to the right-of-way by truck and placed along the right-of-way by side boom tractors or mobile cranes.



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 1.3-1
Typical Pipeline Construction Sequence

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After individual pipe sections are strung along the right-of-way, they are bent to conform to the contours of the trench and terrain. The pipe is then lined up, welded, field coated, and inspected. Trenching may occur before or after the pipe has been welded. Trenching is typically conducted using a backhoe or crawler-mounted, wheel-type trenching machine. Where appropriate, topsoil is segregated. Prepared pipe is lowered into the trench and, where applicable, tied into existing facilities. During backfilling, first the subsoil, then the topsoil is replaced. Precautions, such as padding, are taken during backfilling to protect the pipe from rock damage. Prior to the line being filled with petroleum and placed into service, the pipeline is hydrostatically tested to ensure its integrity. Following installation and testing, the right-of-way is cleaned up and restored as nearly as practicable to preconstruction conditions. Restoration includes implementing temporary and permanent stabilization measures such as slope breakers, mulching and seeding.

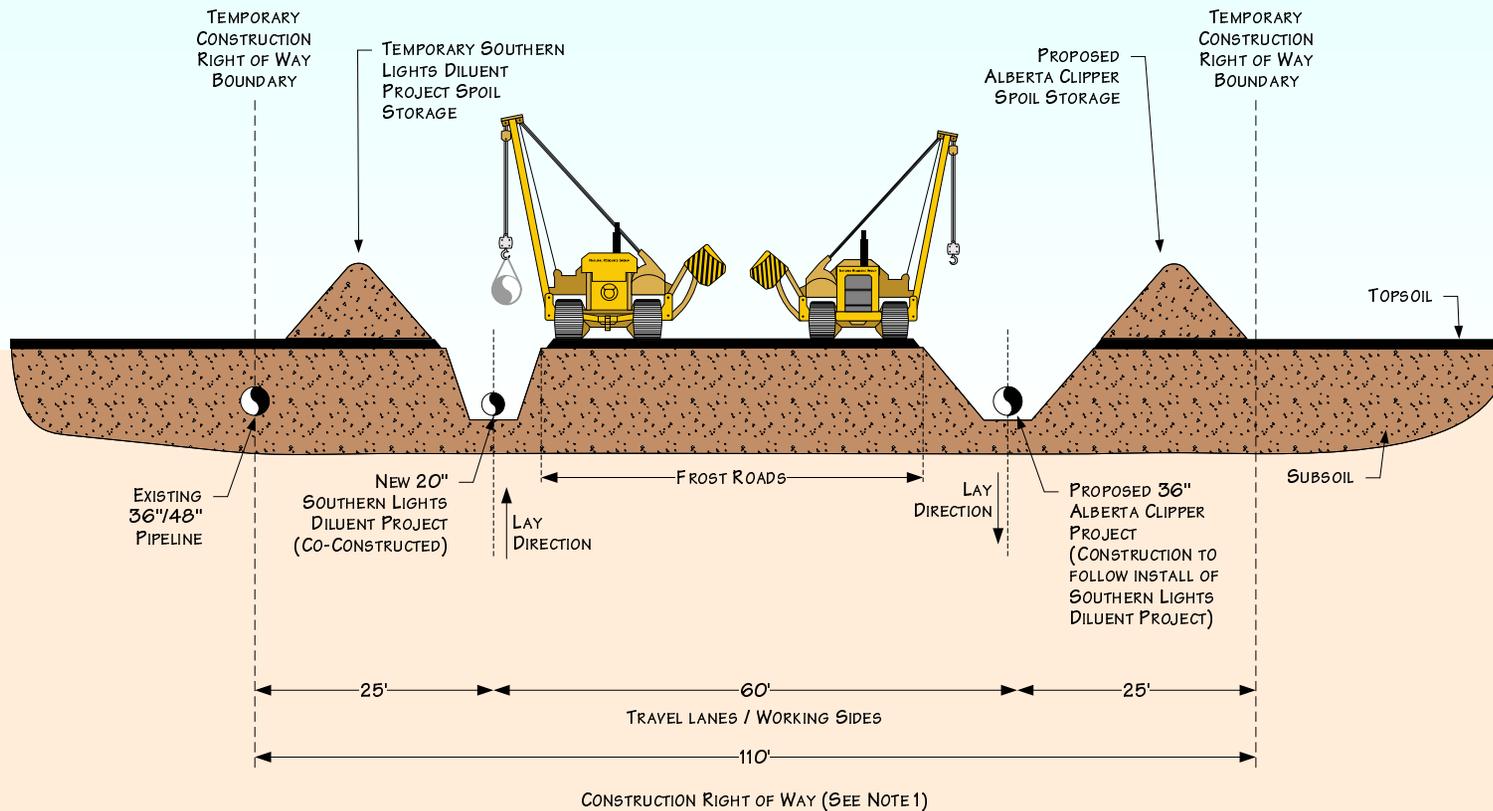
The Applicants may propose a winter construction schedule to address pipeline construction for approximately 60 miles of expansive wetlands south of Clearbrook, Minnesota (from MP 974 to 992; MP 1019 to 1045; and MP 1055 to 1071). Winter construction techniques have been developed to minimize impacts of conventional wetland construction techniques conducted during normal summer conditions. In addition to implementing normal trenching operations during winter similar to those proposed in the summer construction pipeline right-of-way configuration (see the EMP in Appendix B), an alternative winter wetland construction technique may also consist of excavation of the Southern Lights Diluent Project and Alberta Clipper Project ditches in succession with fabrication activities moving in opposite directions approximately 60 feet apart. A frost road (working sides and travel lanes) will be located within the 60 feet to provide a stable winter working platform for pipe fabrication, associated equipment maneuvering and lowering-in activities. The Southern Lights Diluent Project ditch will be excavated first and be offset from the outermost existing Enbridge pipeline by approximately 25 feet.

After the Southern Lights Diluent Project is backfilled, the Alberta Clipper Project ditch would then be excavated offset from the Southern Lights Diluent Project by approximately 60 feet to facilitate the frost road and working space. Use of this winter construction technique provides for a narrower construction right-of-way but requires additional permanent right-of-way within these wetland locations (see figure 1.3-2). For the purpose of calculating impacts within these areas, the larger right-of-way widths consistent with this technique were used. Wetlands will be maintained in a non-forested state in these areas throughout operation of the pipelines.

1.4 ENVIRONMENTAL RESTORATION AND MITIGATION

The Applicants have developed standardized erosion control and restoration measures to minimize potentially adverse environmental effects resulting from right-of-way preparation, construction, and maintenance of the pipeline. These measures are described in the Applicants' Environmental Mitigation Plan (EMP), which is provided in Appendix B. The Applicants have also developed a construction Spill Prevention, Containment, and Control Plan (SPCCP) that describes planning, prevention and control measures to minimize impacts of construction-related spills. The SPCCP is provided in Appendix C of this document.

The Applicants will comply with applicable federal, state, and local rules and regulations and take all appropriate precautions to protect against pollution of the environment. In addition, the Applicants will retain Environmental Inspectors to verify that environmental protection measures, environmental permit conditions, and other environmental specifications are implemented appropriately by the contractor during construction of the facilities.



PROFILE

NOTE:

CONSTRUCTION RIGHT OF WAY WILL TYPICALLY BE 110' WIDE. EACH SPOIL SIDE WILL BE APPROXIMATELY 25 FEET WIDE. THE WORKING SIDE WILL BE 60 FEET WIDE.

For environmental review purposes only.



Figure 1.3-2
Typical Winter Construction-Method 1

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|--|
| DATE: 3/3/2005 |
| REVISED: 5/24/2007 |
| SCALE: RNTS URCE |
| DRAWN BY: MHN6795 |
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