Appendix E

Environmental Analysis Supplement

Nashwauk Blackberry Natural Gas Pipeline

Itasca County, Minnesota

PUC Docket No. PL, E280/GP-06-1481
SEH No. A-NASHU0701.00

July 2007

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Nashwauk Blackberry Natural Gas Pipeline

Prepared for Nashwauk Public Utilities Commission

1.0 INTRODUCTION

This Environmental Analysis Supplement was prepared to support Nashwauk Public Utilities Commission's (Nashwauk's) Permit Application to the Minnesota Public Utilities Commission (Commission) for a Pipeline Routing Permit (Application). This document provides a comparison of the environmental factors along the various alternative routes considered for the proposed pipeline, 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 Commission's Pipeline Routing rules (Chapter 4415) and expands on information provided in the following five sections of the Application:

- 4.0 Land Requirements of Pipeline Route
- 6.0 Right of Way Preparation and Description of Construction Activity
- 7.0 Location of Preferred Route and Description of Environment
- 12.0 Evidence of Consideration of Alternative Routes
- 8.0 Environmental Impacts of Preferred and Alternative Routes

1.1 Project Description And Need

Nashwauk is proposing to construct and operate a natural gas pipeline in portions of Itasca County Minnesota. This project is referred to as the Nashwauk Blackberry Project. It will interconnect with existing Great Lakes Gas (GLG) 36-inch pipeline in Blackberry Township. Nashwauk is proposing to install a 23.5 mile, 24 inch diameter high-pressure natural gas pipeline originating in the northwest ¼ of the southwest ¼ of Section 10, Township 54 North, Range 24 West, Itasca County (Latitude 47.172070, Longitude -93.383398). A tap will be installed so that a new 24-inch pipeline will run north for approximately 13 miles to an area near the City of Taconite. The proposed pipeline will then turn northeast for approximately 9 miles until it reaches the city of Nashwauk. The pipeline will terminate in the northeast ¼ of the northeast ¼ of Section 36 in Township 57 North Range 23 West, Itasca County (Latitude 47.39019, Longitude -93.16886,).

The pipeline expansion will provide gas supplies adequate to fuel all planned phases of the Minnesota Steel facility all related or resetting growth in the region, potential electric generation capacity, and other industrial customers near the City of Nashwauk.

1.2 Land Requirements: Construction Right-Of-Way

Nashwauk's proposed pipeline project 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 to allow for temporary storage of topsoil and spoil and to accommodate safe operation of construction equipment. After construction, a 50-foot-wide permanent right-of-way will be retained for operation and maintenance of the new pipeline.

1.2.1 Temporary Extra Workspaces

Additional temporary workspaces are anticipated to be needed at other locations where the project will cross features such as water bodies, roads, railroads, side slopes, and other special circumstances. These temporary extra workspaces are construction areas outside of the typical construction right-of-way to stage equipment and stockpile spoil material.

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 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. 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.

1.3.1 Survey and Staking

Before construction, Nashwauk 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.

1.3.2 Clearing and Grading

Nashwauk 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 water body crossings until immediately before the pipeline is installed across the water body.

Following clearing and grading, temporary bridges will be installed at water bodies 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 Nashwauk's Erosion Control Plan in Appendix B of the Application.

1.3.3 Topsoil Stripping

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

1.3.4 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.

1.3.5 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. Nashwauk 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. Nashwauk will apply coating at welded joints and will electronically inspect the pipeline coating before the pipe is lowered in the trench.

1.3.6 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 water bodies.

1.3.7 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.

1.3.8 Hydrostatic Testing

After backfilling, Nashwauk 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 Nashwauk will obtain hydrostatic test water from major water bodies 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 water body. These discharges will be done in accordance with permits issued by state agencies.

1.3.9 Cleanup

After the backfilling is complete, Nashwauk 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 Nashwauk's AIMP (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.

1.3.10 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 Nashwauk's AIMP (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

Nashwauk will use Best management practices (BMPs) and 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 Nashwauk's AIMP (App. B)

Nashwauk will comply with applicable federal, state, and local rules and regulations and take appropriate precautions to protect against pollution of the environment. Nashwauk 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, Nashwauk will continue to take appropriate precautions to prevent pollution after construction is complete during operation and maintenance of the pipeline.

2.0 PIPELINE ROUTE ALTERNATIVES

From 1999 to 2007, Short, Elliott, Hendrickson, Inc., (SEH) participated in a multi-faceted planning process working with Itasca County to obtain funding and plan a regional economic development infrastructure improvement program. The Itasca County Infrastructure planning process combined improvements in roads, railroads, sewer, water, natural gas and power systems to enhance the economy of a historically economically challenged region of Minnesota and attract new business investment to the area. The Itasca County Infrastructure program received partial funding from the Minnesota Legislature in 2005 and again in 2007. The Minnesota Steel facility in Nashwauk had been in planning for many years and was intended to be one of the primary components of the regional infrastructure upgrades.

During the Itasca County Infrastructure planning process and early proposals relating to the Minnesota Steel Industries Plant, numerous gas pipeline route alternatives were considered and evaluated. This document presents tables, and maps that show these alternatives. In addition background information on the planning process is available from the County or the Department of Commerce. Since the gas pipeline was a small factor in a large project, the planning documents include supporting information that goes beyond the scope of the pipeline itself. This additional information demonstrates that selecting a primary pipeline route, and eliminating other routes as unsuitable, was based upon significant multi-factorial analysis. Over several years, the larger project routes were reconsidered and modified as new information became available. Since the pipeline permit was originally filed under the partial exemption process, initial route alternative evaluation was done less formally and without as much documentation as would have been done if the original intent was to file the pipeline permit through the full process. Nonetheless, Nashwauk and their technical agents at SEH maintain that the information in the original partial exemption application is relevant to the full pipeline permit process. Supplemental information is provided from other work done by SEH in the course of the Itasca County Infrastructure project.

In developing the preferred route, Nashwauk studied a variety of alternatives for routing the proposed pipeline facilities. These alternatives consisted of system alternatives, route alternatives, and route variations. Nashwauk evaluated and compared several factors when conducting its route analysis, including the impact of the potential route on existing homes, route length, constructability and other route technical and economic feasibility factors, and any potential environmental impact for each particular route alternative.

The following sections describe the alternatives considered by Nashwauk and the process for selecting the preferred route. The tables provide an analysis of the important factors related to each alternative.

2.1 Existing or Proposed Pipeline Facilities

In the early stages of its review, Nashwauk evaluated the feasibility of using and/or upgrading existing pipeline systems as alternatives to creating a new pipeline. After extensive evaluation, Nashwauk concluded that existing systems did not have the capability of providing an adequate supply of gas to meet the projected needs of the Minnesota Steel project and other customers.

Currently, only one existing 8 inch pipeline system, operated by Northern Natural Gas (NNG), supplies natural gas to the Nashwauk area. This system may currently meet the majority of the local gas capacity needs of the area. The amount of required gas projected for the Minnesota Steel project and any related or resulting growth in the region greatly exceeds the capacity of the existing pipeline. The alternative of upgrading the NNG 8-inch pipeline along its current right-of-way was considered and rejected as being unfeasible for technical and operational considerations.

2.2 Route Alternatives

In evaluating the pipeline systems in the area, Nashwauk identified several options for routing its project. These options were qualitatively studied to define a preferred route that achieves project objectives. After eliminating routes that were obviously inferior, SEH narrowed the set of route options to those most likely to be feasible. The ultimate objectives of the project included selecting the route which was both technologically and economically feasible to construct and which had the least significant 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.

2.2.1 Initial Route Selection Process

Early in the planning stages for its project, SEH conducted a preliminary analysis on behalf of Nashwauk of potential routing options as part of the Itasca County Infrastructure Planning process. This initial analysis assumed that the new pipeline would be constructed between MSI's facilities in Itasca County and an interconnection with the Great Lakes Pipeline (GLPL) pipeline system in southeastern Itasca County.

This initial analysis included collecting publicly available environmental data to identify any routing constraints. The sources of this 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. Following a review of this data, SEH contacted and consulted the MDNR to identify other environmental routing constraints which may not have been included in this other data.

After reviewing public data, Nashwauk mapped selected layers of the collected GIS data on 1:100,000 scale, using USGS topographic maps to identify the locations of environmental constraints within the study area. Existing major utility corridors also were identified for potential use. Following completion of constraint mapping, three primary corridors were identified. Within each of these corridors, Nashwauk defined a potential route on the basis of topography and avoidance of sensitive resources. These resources included residential areas, federal and state-managed lands, designated recreational and wildlife management areas, and areas supporting significant, sensitive, or critical habitat. The maps for these routes are mapped in Figure E-1 below.

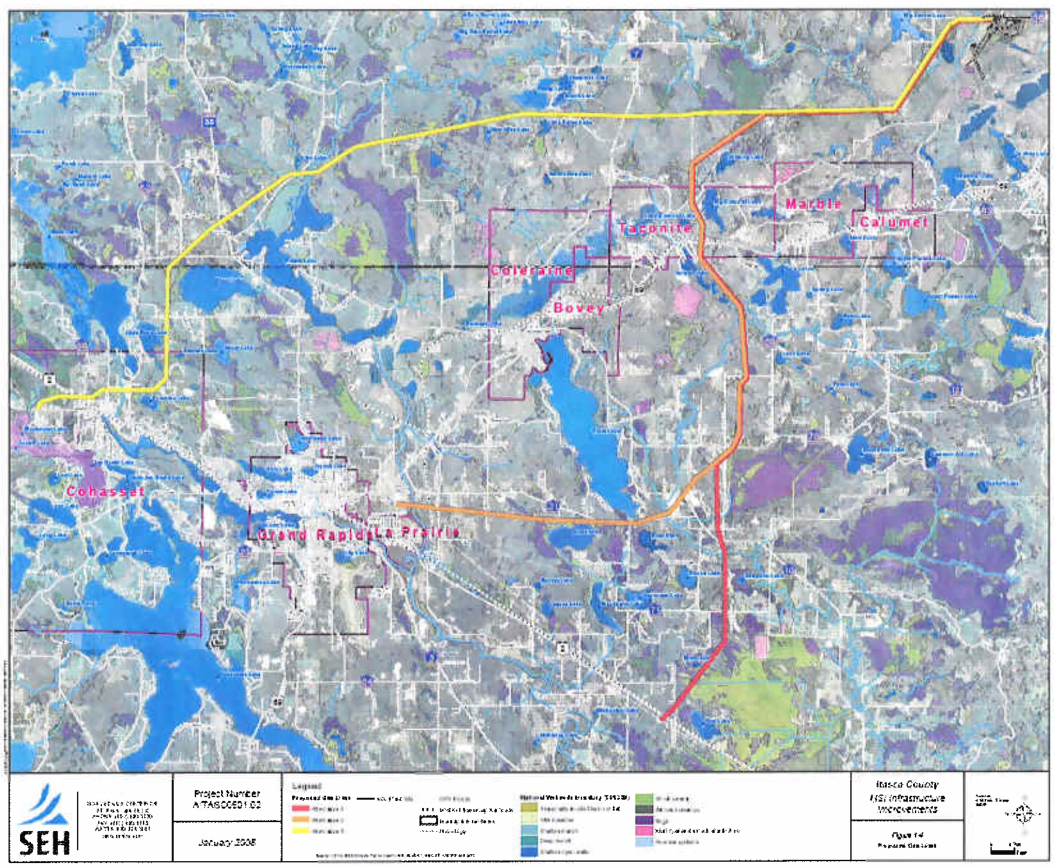

Figure E-1 - Three original pipeline routes considered as part of Itasca County Infrastructure Project (Note that parts of red preferred route are overlaid with the orange East Grand

Rapids route and the yellow West Grand rapids route. All routes end at the same point in the upper right corner of the map.)

Nashwauk then conducted a quantitative analysis of potential environmental impacts associated with constructing each route. The factors utilized in determining impacts on the environment included length of the route, the number of existing homes near the proposed right-of-way needed for the pipeline, location of public lands, unique biological lands, NWI-mapped wetlands, forest and agricultural land, residential and commercial areas, and waterbody and highway crossings.

The analysis of the three original route alternatives identified significant differences in the potential environmental impacts associated with each route. The West Grand Rapids (yellow) route beginning west of Grand Rapids was significantly longer and passed near more homes than the red preferred route. The East Grand Rapids (orange) route beginning east of Grand Rapids was slightly longer, passed near many more homes than the preferred red route, and raised constructability problems. On this basis, the Blackberry (red) route was initially selected to be submitted as the sole choice in the partial exemption permit application submitted in March 2007.

Throughout this Itasca County Infrastructure planning process, a number of Itasca County meetings were held to discuss various aspects of the project. Citizens who attended these meetings seemed to be fully supportive of the proposed Minnesota Steel plant and associated infrastructure. They voiced no major concerns about the infrastructure project and the system upgrades required to enable the construction of the plant. Ultimately the Itasca County Infrastructure report determined that the pipeline route selected for the partial permit process was the most cost-effective solution to the infrastructure needed.

After this initial evaluation, SEH conducted field reviews to compare each route. The initial survey and field reviews were conducted using a helicopter to fly over each route, followed by on-the-ground reconnaissance via public roads and walking over most of the route lengths. 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). Findings from this work verified that the preferred route would likely to have the least impact to existing homeowners or sensitive environmental features and be the most easy to construct. Based on the field review and the existing information collected on each route, Nashwauk narrowed the field of alternatives to one preferred route.

2.2.2 Secondary Route Alternatives

Following the initial determination of a preferred route for this project, as part of a more extensive secondary review, a number of pipeline route alternatives and route segments options for each major alternatives were considered. Many of these were dismissed as less than optimum. Discussions about the infrastructure needs of Minnesota Steel for areas to be mined, environmental protection, roads, railroads, power, gas and water needs, all continued. Public support for the project seemed to be extremely positive with minor criticisms on a few details. After the public comments arising from the information meetings on the pipeline on April 18, 2007 and May 24, 2007, SEH went back to quantify and re-examine all reasonable alternatives for environmental, economic and engineering impacts. It analyzed 11 alternate routes in this secondary review. This analysis included the two routes suggested by citizens at the May 24, 2007 meeting.

For background context, the 11 alternate routes will be generally described in map and summary table format. This supplement will then focus on the 5 major alternative routes, including the environmental and human impacts along each major alternative route. A listing of these 11 alternative routes is provided in Table E-1. A summary table showing the significant characteristics of the five major route alternatives is included as Table E-11.

The 11 routes are listed by the final code number in this document. Several routes, including Route 2 (final) is repeated twice in the table and Route 3 and Route 6 are repeated once each. They are nonetheless included in the summary to reflect a comprehensive analysis.

Table E-1 11 Route Alternatives, Original, Internal and Final Codes, Date and Descriptive Name.

Original Code	Date	Internal Code	Descriptive Name	Final Code
1	2007	07-NPUC-P	Nashwauk PUC Route Permit Centerline	1
2	2005	05-ICMSI-1	Itasca County/MSI Final Report Alternative 1 (West Grand Rapids)	2
3	2005	05-ICMSI-2	Itasca County/MSI Final Report Alternative 2 (East Grand Rapids)	3
4	2005	05-ICMSI-3	Itasca County/MSI Final Report Alternative 3	4
5	11/2004	04-ICMSI-1	Itasca County/MSI Final Report Alternative 1	2
6	11/2004	04-ICMSI-2	Itasca County/MSI Final Report Alternative 2	3
7	11/2004	04-ICMSI-3	Itasca County/MSI Final Report Alternative 3	5
8	05/2004	04-MSI-P	MSI-Preferred	6
9	1999	99-ICMSI-A1	Itasca County/MSI Alternative A1	6
10	1999	99-ICMSI-A2	Itasca County/MSI Alternative A2	7
11	1999	99-ICMSI-B	Itasca County/MSI Alternative B	2
12	1999	99-ICMSI-C1	Itasca County/MSI Alternative C1	8
13	1999	99-ICMSI-C2	Itasca County/MSI Alternative C2	9
14	2007	07-MNPUC-P1	MN PUC/Citizen's Route Alternative P1 (Highway 65)	10
15	2007	07-MNPUC-P2	MN PUC/Citizen's Route Alternative P2 (Abandoned Railroad)	11

This table lists the original route codes, the date the route was first developed, the internal code used for the GIS evaluation of the route, a descriptive name of the route and a final code number that was eventually assigned to the route to eliminate duplicates.

NOTE: For the convenience of the reader the boxes applying to five major route alternatives are highlighted.

Table E-2
Original Code, Date, Final Code, Modification Notes, Segments Involved

Original Code	Date	Final Code	Modification Notes	Route Segments
1	2007	1	No Modifications (As Submitted)	10, 11, 12, 12b, 13, 14, 15, 16, 16b, 17
2	2005	2	Extended Terminus to CR 58	30, 31, 16, 16b, 17
3	2005	3	Extended Terminus to CR 58	20, 21, 13, 14, 15, 16, 16b, 17
4	2005	4	Extended Terminus to CR 58	10, 11a, 12, 12b, 13, 14, 15, 16, 16b, 17
5	11/2004	2	Extended Terminus to CR 58	30, 31, 16, 16b, 17
6	11/2004	3	Extended Terminus to CR 58	20, 21, 13, 14, 15, 16, 16b, 17
7	11/2004	5	Extended Terminus to CR 58	18, 19, 12b, 13, 14, 15, 16, 16b, 17
8	05/2004	6	Changed Terminus to CR 58 (Remove Segs [43]; Add Segs [32,16b,17])	20, 21, 13, 40, 41, 42, 32, 16b, 17
9	1999	6	Changed Terminus to CR 58 (Remove Segs [43]; Add Segs [32,16b,17])	20, 21, 13, 40, 41, 42, 32, 16b, 17
10	1999	7	Changed Terminus to CR 58 (Remove Segs [43]; Add Segs [32,16b,17])	20, 21, 13, 40, 41b, 52, 42, 32, 16b, 17
11	1999	2	Changed Start to--from Clay Boswell (Remove Segs [30b]; Add Segs [30]) Changed Terminus to CR 58 (Remove Segs [32,43]; Add Segs [16b,17])	30, 31, 16, 16b, 17
12	1999	8	Changed Terminus to CR 58 (Remove Segs [43]; Add Segs [32,16b,17])	18, 50, 51, 41, 42, 32, 16b, 17
13	1999	9	Changed Terminus to CR 58 (Remove Segs [43]; Add Segs [32,16b,17])	18, 50, 51, 41b, 52, 42, 32, 16b, 17
14	2007	10	Terminus at MSI Concentrator/Crusher (Add Segs [17,16b]	70, 71, 72, 17, 16b
15	2007	11	Terminus at MSI Concentrator/Crusher (Add Segs [17,16b]	70, 71a, 72, 17, 16b
Straight Line Distance from Blackberry Tap at Start of Segment [10] to NW Corner of MN Steel Plant Layout = 16.58 Miles.				

A map of the 11 route alternatives is attached as Figure E-2.

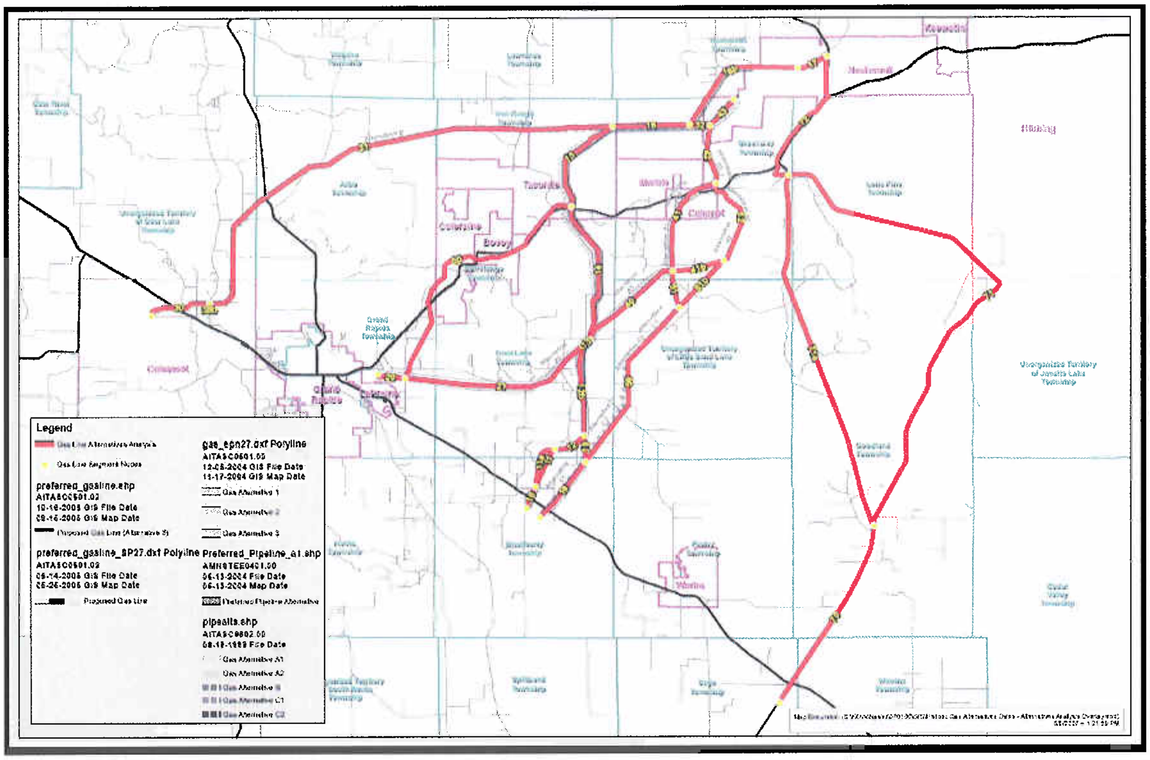

Figure E-2 Map of 11 alternatives reconsidered after public meetings including 2 citizen suggested routes.

Several routes were eliminated because they were significantly longer and did not provide any clear environmental advantage over the preferred route. Several routes were eliminated primarily due to existing and future residential and commercial development constraints west of Grand Rapids as well as waterbody and unique biological area constraints further east south of the Blackberry area.

Table E-2A summarizes, by segments, the length of the variations of the 11 route alternatives.

Table E-2A. Route Segment Lengths in Feet and miles

Segment Number	Segment Length (Ft.)	Segment Length (Miles.)
10	4087.35145	0.77412
11	7524.250881	1.425048
11a	8538.878612	1.617212
12	6130.845015	1.161145
12b	15782.22227	2.989057
13	1958.669842	0.37096
14	25736.29647	4.874299
15	19050.72601	3.608092
16	13731.87481	2.600734
16b	24301.56339	4.602569
17	5725.075134	1.084295
18	12732.63537	2.411484
19	4690.666444	0.888384
20	5186.367278	0.982267
21	34139.01806	6.465723
30	11331.509	2.146119
30b	1554.915798	0.294492
31	88765.96766	16.81174
32	3662.898635	0.693731
40	19652.59397	3.722082
41	19745.45444	3.739669
41b	9309.844428	1.763228
42	10824.2527	2.050048
43	6233.900338	1.180663
50	33454.17817	6.336019
51	6655.128086	1.260441
51b	11444.84198	2.167584
52	17120.83315	3.242582
60	49173.40041	9.313144
70	35740.81258	6.769093
71	94274.16097	17.85495
71a	65100.53623	12.32965
72	27105.16557	5.133554
Grand Total	700466.8352	132.6642

The route segments describe the short lengths of the route between the points where a routing decision point is reached. These segments are listed by the distance in feet as well as in miles. Generally speaking the pipeline cost is a function of length so engineers attempt to design the shortest pipeline which will accomplish their objective. The highlighted segments are included in one or more of the five major route alternatives.

Table E-3 Route Lengths in Feet and Miles of the 11 original route alternatives.

Original Code	Date	Final Code	**Length (ft)**	**Miles**
1	2007	1	124,028.9	23.49
2	2005	2	143,856.0	27.25
3	2005	3	129,829.6	24.59
4	2005	4	125,043.5	23.68
5	11/2004	2	143,856.0	27.25
6	11/2004	3	129,829.6	24.59
7	11/2004	5	123,709.7	23.43
8	05/2004	6	125,195.9	23.71
9	1999	6	125,195.9	23.71
10	1999	7	131,881.1	24.98
11	1999	2	143,856.0	27.25
12	1999	8	117,101.2	22.18
13	1999	9	123,786.4	23.44
14	2007	10	187,146.8	35.44
15	2007	11	157,973.2	29.92

The Straight Line Distance from Blackberry Tap at Start of Segment [10] to NW Corner of MN Steel Plant Layout is 16.58 Miles.

The alternative pipeline lengths range from 22.18 miles (Route 8) to 35.44 miles (Route 10). The length of the preferred alternative (Route 1) is 23.5 miles, which is the 5^{th} shortest out of 11 options. A 24 inch pipeline is estimated to cost approximately $1,000,000.00 per constructed mile.

Table 4 lists the number of existing homes within $1/16^{th}$ of a mile (plus or minus 300 feet) from the proposed centerline of a pipeline corridor. The number of houses within this distance is given, as well as the average distance to homes from the centerline and the standard deviation of the distance to each home in the corridor data set.

Table E-4 Routes and House Counts, House Distance from Centerline

Date	Final Code	House Count	Average Distance to Home (ft)	Std Dev Distance to Home (ft)
2007	1	5	233	101
2005	2	33	86	277
2005	3	10	196	159
2005	4	5	233	101
11/2004	2	33	86	277
11/2004	3	10	196	159
11/2004	5	9	107	260
05/2004	6	30	164	176
1999	6	30	164	176
1999	7	20	176	135
1999	2	33	86	277
1999	8	31	101	243
1999	9	21	113	201
2007	10	79	103	232
2007	11	156	90	223

Generally speaking when sitting a pipeline, one tries to impact as few homes as possible, to minimize the impact upon humans. The routes with the least number of houses are the preferred pipeline route from the permit application (and a minor variation of that which did not include a modification for the Champlin property) at only 5 houses impacted. The largest number of homes impacted is found along Route 11; which is the route following along Highway 65. There 156 homes would be within 300 feet of the pipeline corridor centerline. Please note that the pipeline corridor crosses many more individual properties but a major effort was made to route the pipeline as far away from private homes as possible.

Table E-5 Summarizes the distance of wetland segments crossed by the 11 route alternatives.

Table E-5 Wetland Segment Length by Type and Total Length

Original Code	Final Code		1	2	3	4	5	6	7	8	90	Linear (ft)	Miles
1	1		333	972	0	0	0	6,819	5,924	3,578	0	17,626	3.34
2	2		0	5,083	599	109	0	9,680	8,024	4,913	320	28,729	5.44
3	3		0	85	99	0	0	11,601	4,509	1,188	289	17,771	3.37
4	4		333	972	0	0	0	7,034	7,585	1,666	0	17,589	3.33
5	2		0	5,083	599	109	0	9,680	8,024	4,913	320	28,729	5.44
6	3		0	85	99	0	0	11,601	4,509	1,188	289	17,771	3.37
7	5		333	972	0	0	0	14,567	4,814	2,793	0	23,478	4.45
8	6		0	0	365	0	0	6,929	1,794	714	289	10,091	1.91
9	6		0	0	365	0	0	6,929	1,794	714	289	10,091	1.91
10	7		0	0	347	0	0	6,710	1,543	1,512	289	10,401	1.97
11	2		0	5,083	599	109	0	9,680	8,024	4,913	320	28,729	5.44
12	8		0	1,965	571	0	0	15,060	1,794	2,572	0	21,961	4.16
13	9		0	1,965	553	0	0	14,841	1,543	3,370	0	22,272	4.22
14	10		0	5,465	955	573	0	8,735	6,810	1,091	0	23,628	4.47
15	11		0	965	0	0	229	3,026	1,423	612	0	6,254	1.18

Table E-5A explains the wetland codes referenced in Table E-5.

Table E-5A Wetland Type Code Explanation

1	Seasonally flooded basin or flat	Soil is covered with water or is waterlogged during variable season
2	Wet meadow	Soil is usually without standing water during most of the growing season but is waterlog
3	Shallow marsh	Soil is usually waterlogged early during the growing season and may often be covered
4	Deep marsh	Soil is usually covered with 6" to 3' or more of water during the growing season. These
5	Shallow open water	Shallow ponds and reservoirs are included in this type. Water is usually less than 6 feet
6	Shrub swamp	Soil is usually waterlogged during the growing season and is often covered with as much
7	Wooded swamps.	Soil is waterlogged at least to within a few inches of the surface during the growing
8	Bogs.	Soil is usually waterlogged. These occur mostly in ancient lake basins, on flat uplands and al
80	Municipal and industrial activities	water regime
90	Riverine systems	

Table E-6 summarizes the length of unique and complex wetlands crossed by each of the 11 alternatives.

Table E-6 Total Length and Number of Unique Wetlands or Complexes Crossed by Route

Original Code	Final Code	Linear (ft)	Miles	Unique Wetlands Crossed	Individual Wetland Crossed
1	1	17,626	3.34	25	31
2	2	28,729	5.44	34	48
3	3	17,771	3.37	22	31
4	4	17,589	3.33	26	32
5	2	28,729	5.44	34	48
6	3	17,771	3.37	22	31
7	5	23,478	4.45	26	34
8	6	10,091	1.91	20	24
9	6	10,091	1.91	20	24
10	7	10,401	1.97	20	24
11	2	28,729	5.44	34	48
12	8	21,961	4.16	23	29
13	9	22,272	4.22	23	29
14	10	23,628	4.47	32	44
15	11	6,254	1.18	17	21

Table E-7 summarizes the water crossings for each of the 11 alternative routes.

Table E-7. Water Crossings Type and Total by Route

Date	Final Code	Centerline (River)	Connector (Lake)	Drainage Ditch (Intermittent)	Drainage Ditch (Perennial)	Stream (Intermittent)	Stream (Perennial)	Grand Total
2007	1	0	0	0	0	1	7	8
2005	2	1	0	0	0	2	7	10
2005	3	1	0	0	0	1	7	9
2005	4	0	0	0	0	1	7	8
11/2004	2	1	0	0	0	2	7	10
11/2004	3	1	0	0	0	1	7	9
11/2004	5	0	0	0	0	1	7	8
05/2004	6	1	0	0	0	2	9	12
1999	6	1	0	0	0	2	9	12
1999	7	1	0	0	0	2	8	11
1999	2	1	0	0	0	2	7	10
1999	8	0	0	0	0	2	8	10
1999	9	0	0	0	0	2	7	9
2007	10	0	0	2	1	2	12	17
2007	11	0	1	2	0	1	6	10

Table E-8 details the number of trout stream crossings for each of the 11 alternative routes.

Table E-8 **DESIGNATED TROUT STREAM CROSSINGS BY ROUTE**

Date	Final Code	Designated trout stream	Not a designated trout stream or tributary	Total Stream Crossings
2007	1	0	8	8
2005	2	0	10	10
2005	3	0	9	9
2005	4	0	8	8
11/2004	2	0	10	10
11/2004	3	0	9	9
11/2004	5	0	8	8
05/2004	6	0	12	12
1999	6	0	12	12
1999	7	0	11	11
1999	2	0	10	10
1999	8	0	10	10
1999	9	0	9	9
2007	10	2	15	17
2007	11	1	9	10

Table E-9 summarizes the number of protected watercourse crossings for each of the 11 alternative routes.

Table E-9 **(PWI) PROTECTED WATERCOURSE CROSSINGS BY ROUTE**

Date	Final Code	Watercourse not indicated on PWI Maps	indicated on PWI Maps	Total Stream Crossings
2007	1	4	4	8
2005	2	4	6	10
2005	3	5	4	9
2005	4	4	4	8
11/2004	2	4	6	10
11/2004	3	5	4	9
11/2004	5	4	4	8
05/2004	6	8	4	12
1999	6	8	4	12
1999	7	6	5	11
1999	2	4	6	10
1999	8	7	3	10
1999	9	5	4	9
2007	10	9	8	17
2007	11	6	4	10

2.2.3 Co-Location and Non-Proliferation of Utility Lines

One important factor in making pipeline routing decisions is the advisability of siting multiple linear features within the same corridor. This practice is particularly well developed in the area of high voltage transmission lines but also is a consideration in almost any kind of utility development. In the pipeline proposed for the Nashwauk, this factor was a design consideration in routing.

A first principle to remember is that not all right-of-ways are equal. Each particular utility or linear use has special characteristics that may limit its use for collocation of other uses within or adjacent to the existing right-of-way.

A second principle is that wherever one can use existing right-of-way, one should to minimize the proliferation of utility lines and the subsequent environmental impacts to undeveloped land, flora and fauna.

In the present case, in the public hearing process, the use of existing rights-of-way was raised as an extremely important consideration for many citizens. A number of comments about routing related to the desire to site the new natural gas pipeline along existing utility rights-of-way. While this practice in general is a good idea, there are a number of circumstances in which it can be impractical for economic, engineering and environmental reasons. In evaluating route options, data was collected and presented on the opportunities and limitations associated with co-locating new gas pipeline within existing right-of-ways. Due to the importance of the topic to this process, SEH analyzed the strengths and weaknesses associated with use of existing right-of-way versus new right-of-way on the Nashwauk project.

Each of the five major route alternatives has route portions that would require the acquisition of new right-of-way, much of which would impact residential properties and occupants. Each alternative includes portions that would utilize various lengths of existing gas pipeline, HVTL, road, railroad right-of-way or mixtures of these features.

Table E-10 Alternative Routes Using Existing Right-of-Way Combined Types

ID	Segment Total Length(ft)	Miles	GAS	Gas HVTL	Gas and Hvtl and ROAD	HVTL	HVTL and ROAD	ROAD	Road /RAIL	Rail Aban	Rail EXIST	Route Follows any CORRIDOR	ROUTE LENGTH	Route THRU GREENFIELD
			EXISTING vs. GREENFIELD CORRIDOR ROUTE FOLLOWS EXISTING CORRIDOR (COMBINED TYPE)											
1	124,028.9	23.49	1,959	0	0	21,704	0	12,141	0	0	0	35,803.7	124,028.9	88,225.2
2	143,856.0	27.25	0	0	0	100,353	12,775	12,141	0	0	0	125,269.4	143,856.0	18,586.6
3	129,829.6	24.59	11,215	23,638	6,431	21,704	0	12,141	0	0	0	75,129.1	129,829.6	54,700.5
4	125,043.5	23.68	1,959	0	0	21,704	0	12,141	0	0	0	35,803.7	125,043.5	89,239.8
	117,169.0	22.19	1,077	3,703	406	21,704	0	15,440	1,817	4,257	13,655	62,059.2	117,169.0	55,109.8
2	143,856.0	27.25	0	0	0	100,353	12,775	12,141	0	0	0	125,269.4	143,856.0	18,586.6
3	129,829.6	24.59	11,215	23,638	6,431	21,704	0	12,141	0	0	0	75,129.1	129,829.6	54,700.5
5	123,709.7	23.43	1,959	0	0	34,436	0	12,141	0	0	0	48,536.3	123,709.7	75,173.4
6	125,195.9	23.71	30,867	23,638	6,431	0	0	15,297	0	0	4,347	80,581.1	125,195.9	44,614.8
6	125,195.9	23.71	30,867	23,638	6,431	0	0	15,297	0	0	4,347	80,581.1	125,195.9	44,614.8
7	131,881.1	24.98	45,301	25,809	6,431	0	0	15,336	0	0	0	92,877.7	131,881.1	39,003.4
2	143,856.0	27.25	0	0	0	100,353	12,775	12,141	0	0	0	125,269.4	143,856.0	18,586.6
8	117,101.2	22.18	0	0	0	46,187	0	16,868	0	0	4,347	67,402.6	117,101.2	49,698.5
9	123,786.4	23.44	14,434	2,171	0	46,187	0	16,907	0	0	0	79,699.3	123,786.4	44,087.1
10	187,146.8	35.44	262	0	0	0	0	15,505	68,466	63,950	0	148,183.7	187,146.8	38,963.0
11	157,973.2	29.92	262	0	0	0	0	80,606	35,741	2,401	0	119,010.1	157,973.2	38,963.0

Table E-10A Alternative Routes Following Existing Right-of-Way

ALT Route NAME	Unique ID	SEGMENT Total Length(ft)	Miles	Existing Corridor Gas	Existing Corridor HVTL	Existing Corridor /DOT ROA	Existing Corridor RAIL-ABAn	Existing Corridor RAIL-ACT	Existing CORRIDOR	ROUTE LENGTH	ROUTE THROUGH GREENFIELD	Green ROW Per Cent
				ROUTE FOLLOWS EXISTING CORRIDOR (INDEPENDE					EXISTING vs. GREENFIELD CORRIDOR			
07-NPUC-P	1	124,028.9	23.49	1,959	21,704	12,141	0	0	35,803.7	124,028.9	88,225.2	71.13
05-ICMSI-1	2	143,856.0	27.25	0	113,128	24,917	0	0	125,269.4	143,856.0	18,586.6	12.92
05-ICMSI-2	3	129,829.6	24.59	41,284	51,773	18,572	0	0	75,129.1	129,829.6	54,700.5	42.13
05-ICMSI-3	4	125,043.5	23.68	1,959	21,704	12,141	0	0	35,803.7	125,043.5	89,239.8	71.37
		117,169.0	22.19	5,186	25,813	17,664	6,074	13,655	62,059.2	117,169.0	55,109.8	47.03
04-ICMSI-1	2	143,856.0	27.25	0	113,128	24,917	0	0	125,269.4	143,856.0	18,586.6	12.92
04-ICMSI-2	3	129,829.6	24.59	41,284	51,773	18,572	0	0	75,129.1	129,829.6	54,700.5	42.13
04-ICMSI-3	5	123,709.7	23.43	1,959	34,436	12,141	0	0	48,536.3	123,709.7	75,173.4	60.77
04-MSI-P	6	125,195.9	23.71	70,388	30,069	31,179	0	4,347	90,031.9	125,195.9	35,164.0	28.09
99-ICMSI-A1	6	125,195.9	23.71	70,388	30,069	31,179	0	4,347	90,031.9	125,195.9	35,164.0	28.09
99-ICMSI-A2	7	131,881.1	24.98	77,542	32,241	21,767	0	0	92,877.7	131,881.1	39,003.4	29.57
99-ICMSI-B	2	143,856.0	27.25	0	113,128	24,917	0	0	125,269.4	143,856.0	18,586.6	12.92
99-ICMSI-C1	8	117,101.2	22.18	9,451	46,187	26,319	0	4,347	76,853.5	117,101.2	40,247.7	34.37
99-ICMSI-C2	9	123,786.4	23.44	16,605	48,358	16,907	0	0	79,699.3	123,786.4	44,087.1	35.62
07-MNPUC-P1	10	187,146.8	35.44	17,338	1,306	99,556	132,421	3,479	165,262.7	187,146.8	21,884.0	11.69
07-MNPUC-P2	11	157,973.2	29.92	17,338	1,306	131,931	38,147	3,479	136,089.1	157,973.2	21,884.0	13.85

The route selection process typically gives preference to routes that minimize effects on human settlement and related environmental concerns. Minnesota Rules promote nonproliferation by encouraging rebuilding transmission lines on existing electric transmission rights-of-way instead of creating new rights-of-way. The concept was articulated by the Supreme Court in *PEER v. Minnesota Environmental Quality Board*, 266 N.W. 2d 858 (1978). In that case, a new transmission line was ultimately required to be located on an existing right-of-way instead of the preferred route. Because of procedural errors in the record, including the lack of an analysis of an alternative in the draft EIS, the court found that the MEQC had not satisfied a switched burden addressing the destruction of protected resources. Accordingly, the court adopted a presumption that great harm (and violation of Minnesota Environmental Rights Act) would come to the environment in selecting that route. This case, concerning high voltage transmission lines, is not directly applicable to natural gas pipelines, although it is often referred to in these proceedings.

The Minnesota Supreme Court held that the EQB should attempt to avoid the proliferation of transmission line routes. *People for Environmental Enlightenment and Responsibility (PEER), Inc. v. Minnesota Environmental Quality Council*, 266 N.W.2d 858, 873 (Minn. 1978). The court reasoned:

> We therefore conclude that in order to make the route-selection process comport with Minnesota's commitment to the principle of nonproliferation, the MEQC [predecessor to the EQB] must, as a matter of law, choose a pre-existing route unless there are extremely strong reasons not to do so. We reach this conclusion partly because the utilization of a pre-existing route minimizes the impact of the new intrusion by limiting its effects to those who are already accustomed to living with an existing route. More importantly, however, the establishment of a new route today means that in the future, when the principle of nonproliferation is properly applied, residents living along this newly established route may have to suffer the burden of additional power line easements. *Id.* at 868.

The Supreme Court held in the PEER case, and in the earlier *No Power Line Inc. v. Minnesota Environmental Quality Council*, 262 N.W.2d 312 (Minn. 1977) case, that both the Environmental Rights Act and the Environmental Policy Act apply when making a decision on where to route a proposed high voltage transmission line. The Environmental Policy Act provides that economic factors alone will not justify pollution, impairment or destruction of the environment. Minn. Stat. § 116D.04, subd. 6. That same law also provides that an alternative must be both feasible and prudent.

In the present case, in addition to the proposed preferred route, four major alternate routes were identified. Data is provided in Tables E-10 and E-10A that allows comparison of corridor sharing of the proposed gas line with transmission lines, roads and railroads for each of the five major alternatives submitted to the full permitting process.

The proposed and each major alternative route have several important factors to be evaluated:

- The number, length and type of stream crossings, including environmentally sensitive waters such as trout streams and other fishery resources.
- The number, length and type of wetland crossings. Some temporary and permanent wetland impacts would be unavoidable in all of the major route alternatives and mitigation and replacement will be required for the project.
- The number and type of threatened and endangered species, including environmentally sensitive plants and animals and associated habitat.
- The number of existing housing units on the major route alternatives.
- The number of landowners affected by each route. Pipeline placement affects the development potential of existing and undeveloped parcels.
- Finally, the route length is important, because the longer the route the more material, time and money required to construct in most cases.

Nashwauk has employed a comprehensive line routing process that considers a number of criteria, including potential environmental impacts and public concerns, in an iterative fashion. Nashwauk has adjusted proposed line routes or corridors in response to identified impacts and concerns while increasing the details of the analysis, focusing on the adjusted line routes. It eventually identified a preferred route. This on-going process ensures the fullest consideration of potential impacts and public concerns throughout the siting process beginning early in that process. It also focuses analytical resources on "alternatives" that deserve serious consideration while other alternatives with higher costs, technical feasibility problems and unacceptable potential environmental impacts are winnowed out earlier in the routing process.

In the process of selecting routes within corridors for the five major route alternatives, SEH assumed that co-location of the gas pipeline right-of-way with other compatible utilities will be considered since the loss of "greenfield" habitat or fragmentation of such habitat could be minimized or avoided. However, SEH is aware that co-location is not always advisable, due to minimum distance requirements between linear features. It is unclear, however, if highways would be considered a compatible utility for co-location with a gas pipeline due to Minnesota Department of Transportation (MNDOT) restrictions. The following exceptions must be considered when attempting to co-locate a gas pipeline with any other linear feature.

Disadvantages of Public Road and Railroad Right-of-ways

MNDOT guidelines do not allow pipelines directly within the state right-of-way. However, right-of-way requirements for a proposed pipeline can be minimized as much as possible by paralleling the state highway, where residential and other conflicts do not otherwise prohibit it. The permanent easement width can be reduced to about 60 feet where the route parallels Highways 169 or 65.

Most highways in the project area have a narrow right-of-way. Residential and commercial development is also frequently concentrated along highways, and this factor, as well as the narrow highway right-of-way, would likely increase the number of required house and business relocations and increase right-of-way acquisition costs for the gas pipeline. The presence of the gas pipeline adjacent to the highway would also greatly constrain future development along the highway. The presence of numerous gas pipeline structures close to a highway could result in hazards to both motorists and to the structures.

Road right-of-way include some disadvantages:

- If the pipeline is installed in public right-of-way the pipeline rights are limited to public rather than private easement conditions. If the pipeline were inside the right-of-way it would have to be moved when the roadway is widened or otherwise modified.
- Increased possibility of damage to the line from careless excavations and other activity.
- Adverse effects to traffic along public road right-of-way.
- Increased safety concerns during construction.
- Operation of the pipeline is much more difficult due to the increased number of line locates that would be required due to increased activity along the roadway.
- Cathodic protection of the pipeline is more complicated due to adjacent public installations.
- Construction cost is more expensive in public right-of-way and around populated areas along the route.
- Increased conflict with future use because development is much more likely along a highway corridor.

Railroad right-of-way also include some disadvantages:

- Railroad right-of-way in the area are narrow.
- With narrow right-of-way, some private right-of-way will be necessary in any event (and almost certainly some temporary right-of-way).
- Cuts and fills along the railroad leave no place for the pipeline to be located.
- Material used in the railroad ballast can be detrimental to the pipe line cathodic protection system.
- Borrow areas adjacent to railroads usually contain wetlands and are prime locations for endangered plants.

Because of these and other complications, high-pressure cross-country pipelines similar to the proposed pipeline are not normally installed longitudinally in public right-of-way or railroad right-of-way.

Disadvantage of High Voltage Transmission Lines

The tendency to site electric power lines and pipelines along the same route has become more and more frequent. placing buried metallic pipelines in close proximity of power lines. Therefore, there has been and still is a growing concern about possible hazards resulting from the influence of power lines on metallic pipelines. Underground pipelines that run parallel to or in close proximity to power lines are subjected to induced voltages caused by the time-varying magnetic fields produced by the power line currents, especially under high current fault conditions on the power line. The induced electro-motive force causes currents circulation in the pipeline and voltages between the pipeline and surrounding earth. Design methods and specialty equipment are used to drain away the induced electro-motive force and therefore reduce pipeline damage and improve safety concerns. This equipment must be operational and monitored at all times. If an equipment failure occurs steps must be taken to either shut down the power line until repairs can be made or take the chance of major pipeline and pipeline coatings damages or operator injury. The pipeline induced power issues can be reduced by distance between the power line the pipeline, but this increases the width of the right-of-way corridor.

2.3 Comparison of Major Route Alternatives

Of the 11 route alternatives considered, there emerged 5 major route alternatives. This section will compare the environmental and human impacts along each major route alternative. This analysis is based upon the same sources of publicly available environmental data described in above, supplemented by field data where available. The analysis considered homes, land use issues, wetland and waterbody crossings. A variety of factors were identified and compared for each major route alternative, including total length, intermitted 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 E-11.

Table E-11: Summary Comparison of 5 Major Route Alternatives.

	Units	Route #1 Preferred Route	Alternative Route #2 West Grand Rapids	Alternative Route #3 East Grand Rapids	Alternative Route #10 Railroad	Alternative Route #11 Highway 65
Total Length	Miles	23.49	27.25	24.59	35.44	29.92
Perennial Waterbodies crossed	Number	7	7	7	12	6
Intermittent Waterbodies Crossed	Number	1	2	1	2	1
Total NWI-mapped Wetlands Crossed	Number (miles)	3.34	5.44	3.37	4.47	1.18
NWI-mapped Forested Wetlands Crossed (Type 6 and 7)	Number (feet)	12,743	17,704	16,110	15,545	4449
Center Pivot Irrigation Systems Crossed	Number (miles)	0	0	0	0	0
House Count	Number	5	33	10	79	156
Average Distance to Home	Feet	233	86	196	103	90
Std Dev Distance to Home	Feet	101	277	159	232	223
Total Length of Wetlands Crossed	Miles	3.34	5.44	3.37	4.47	1.18
Unique Wetlands Crossed	Number	25	34	22	32	17
Individual Wetlands Crossed	Number	31	48	31	44	21
Total Water Crossings	Number	8	10	9	17	10
Total Designated Trout Stream Crossings	Number	0	0	0	2	1
Total (PWI) Protected Watercourse Crossing by Route	Number	8	10	9	17	10

A brief description of each of the major alternatives follows. A map of each major route alternative is included in Appendix D.

Route 1: Original Code 1, Final Code 1, Internal Code 07-Nashwauk-P, Date 2007.

Route 1 is the preferred route that was included in the initial Application for partial exemption in March 2007. It begins at Blackberry and extends 23.49 miles to the endpoint. It has 5 homes within 300 feet of the proposed pipeline corridor centerline.

Route 2: Original Code 2, Final Code 2, Internal Code 05-ICMSI-1, Date 2005
Original Code 5, Final Code 2, Internal Code 04-ICMSI-1, Date 2004
Original Code 11, Final Code 2, Internal Code 99-ICMSI-B, Date 1999

Route 2 (West Grand Rapids) was first included in the 1999 Itasca County/MSI Plan as Alternative B. It was reevaluated in the 2004 Itasca County Infrastructure MSI Final Report as Alternative 1 and again as the 2005 Itasca County Infrastructure MSI Final Report, Alternative 1. It begins on the west side of Grand Rapids and travels to the north to the final endpoint.

Route 3: Original Code 3, Final Code 3, Internal Code 05-ICMSI-2, Date 2005 Original Code 6, Final Code 3, Internal Code 04-ICMSI-2, Date 2004

Route 3 (East Grand Rapids) was first included in the 2004 Itasca County Infrastructure MSI Final Report as Alternative 2 and again as the 2005 Itasca County Infrastructure MSI Final Report, Alternative 2. It begins on the east side of Grand Rapids, travels south of Trout Lake, then joins alternative 1.

Route 10: Original Code 14, Final Code 10, Internal Code 07-MNashwauk-P1, Date 2007

Route 10 (Railroad Route) was first included as the Citizens' Route1 in response to the public request at the May 24, 2007 meeting in Nashwauk Minnesota This route follows an abandoned railroad route from the south and east and extends 35.44 miles to the endpoint.

Route 11: Original Code 15, Final Code 11, Internal Code 07-MNashwauk-P2, Date 2007

Route 11 (Highway 65) was first included as the Citizens' Route 2 in response to the request at the May 2007 meeting in Nashwauk Minnesota. This route generally follows Highway 65 from the south and east to the endpoint.

SEH identified several substantive differences among the five major alternative routes. At 23.5 miles, the preferred route was significantly shorter than the other major alternatives.

The preferred route also crossed no designated trout streams and involved the smallest number of water crossings. It would cross 31 individual wetlands, when the major alternatives ranged from 21 to 48, and it would cross 25 unique wetlands, when the major alternatives ranged from 17 to 34. The preferred route also affected the least number of homes, with only 5 homes within 300 feet.

Route Alternative 11 (highway 65) would cross the smallest number of individual wetlands (21), unique wetlands (17), and forested wetlands (17,704 feet), but would be the second-closest alternative in terms of average distance to homes (90 feet). Route Alternative 11 would also affect the greatest number of homes, with 156 homes within 300 feet of the pipeline. Route 11 would cross 1 designated trout stream crossing and would involve 10 protected watercourse crossings. Route alternative 11 would be the second-longest alternative, at 29.92 miles.

Route Alternative 10 (abandoned railroad) would be the longest route alternative, at 35.44 miles. It would involve the highest number of total water crossings, including crossing the most perennial waterbodies intermittent waterbodies, and designated trout streams, as well as the highest number of protected watercourse crossings (17). Route Alternative 10 would also cross the second-highest number of individual wetlands (44) and the highest number of unique wetlands (32). Route Alternative 10 would affect the second-highest number of homes, 79, within 300 feet of the pipeline. The average distance from the pipeline to homes would be 103 feet, when the alternatives ranged from 86 to 233 feet.

As for major route alternatives 2 and 3, they fell within the middle of the 5 major alternatives in terms of total length of the pipeline and towards the lower end of homes affected. Only a few relatively minor differences in cumulative environmental impacts were identified between the major route alternatives 2 and 3, except that major route alternative 2 crossed the highest number of individual wetlands (48) and unique wetlands (34). Route alternatives 2 and 3 involved a similar number of total protected watercourse crossings, and perennial and intermittent waterbody crossings, in a mid-range between 5 major alternatives. Route Alternative 2 would involve an average distance from the pipeline of 86 feet to homes, the second-closest alternative.

Based on this analysis, alternatives 2 (West Grand Rapids), 3 (East Grand Rapids), 10 (Abandoned railroad) and 11 (Highway 65) were eliminated as preferable alternatives.

2.4 Identification and Refinement of Preferred Route

Route 1 was determined to have the least overall environmental impact. The basis for this determination is derived from the length, number of homes impacted, and other environmental concerns. This route is the fifth shortest of 11 options at 23.5 miles. The minimum route length of the 11 options is 22.18 miles and the maximum is 35.44 miles. This route option has the least number of homes (5) within 300 feet of the proposed pipeline corridor centerline.

The most significant factors in determining route selection were the number of existing homes likely to be within 300 feet of the proposed pipeline centerline and the overall length. There were some differences in the number of wetlands and the length of wetlands crossed, the number of streams and other surface waters, the number of roads and sensitive environmental species impacted, but these factors were not as significant to the final route decision. Generally speaking, the preferred route was near the least in environmental impact for any factor considered.

Having selected Route 1 as the preferred route, SEH further refined the route to avoid wetlands and forest lands to the extent practicable and to avoid residences and farmsteads. SEH refined this route to further minimize impacts on landowners and the environment. These refinements included minor route variations to reduce the impact on individual land parcels crossed, and to avoid developed land or land that may be developed in the foreseeable future.

3.0 SOCIOECONOMICS

Minnesota Steel proposes to reactivate the former Butler Taconite mine and tailings basin area. The area was initially mined in 1903 and the former Butler Taconite facility was active from 1967 to 1985, and a great deal of viable ore still remains on-site. The Proposed Project would be located near Nashwauk, Minnesota on the Mesabi Iron Range. The Mesabi Iron Range is a major, well-known geologic feature oriented roughly northeast-southwest across more than 120 miles of northeastern Minnesota from near Babbitt to near Grand Rapids. The Mesabi has been the largest source of iron ore produced in Minnesota since the 19th century and Minnesota has been and continues to be the predominant source of iron ore in the United States. The Project requires substantial upgrading of infrastructure in southeastern Itasca County region including, improvements to roads, railroads, power lines, sewer, water and natural gas pipelines.

Minnesota Steel expects to employ about 700 people for production, support, and administration. The local support for the new Steel Plant Project is strong because of its environmental and economic attributes. Minnesota's Governor, federal and state legislators, state development agencies (including the locally-based IRR), and local communities are among the Project's many supporters. The Project would bring renewed economic vitality to the Iron Range by making it a regional production center for high quality iron ore. The Steel Plant Project will also provide economic and employment stimulus in surrounding communities. A new natural gas pipeline is an essential infrastructure component to ensure the success of the proposed Steel Plant.

Construction of the gas pipeline not only provides economic benefits to the surrounding community, but its creation also plays an integral part in a much larger project that is expected to have significant positive socioeconomic impacts, both during and following construction. The community of Nashwauk and the surrounding areas of Itasca County will benefit almost immediately and continually from the creation and construction of the plant. The natural gas pipeline subject to this application will provide the natural gas required for the Minnesota Steel project in Nashwauk and any related or resulting growth within the region. This redevelopment project entails mining an existing taconite mine, adding a direct reduced iron production capacity and steel mill to produce sheet metal for sale.

The entire project is expected to cost up to $1.6 billion and will take 24 to 30 months to complete. Long-term impacts associated with this project include an increase in the area's tax base from property, mining and other taxes generated by the project. Furthermore, this project is expected to create several hundred jobs, both temporary, through the redevelopment of the site and creation of necessary infrastructure, including the gas pipeline, and permanent, through the employment needs of the plant itself as well as any related growth.

Below is a description of the existing socioeconomic conditions of the community of Itasca County, which surrounds this project.

3.1 Existing Socioeconomic Conditions

Nashwauk is a small community in Itasca County, Minnesota. Historically, this area of Minnesota has been known as the Iron Range, and many of the residents of this area work in the mining industry in one capacity or another. A review of the US Census Bureau population estimates for the year 2006 for Itasca County and the City of Nashwauk shows that in 2006, Itasca County had a population of 44,729 people, 59.2% of whom are in the workforce and the City of Nashwauk had a population of 922, 46.3% of whom are in the workforce. The unemployment rate for Itasca County in May, 2007 was 6.7%.

The preferred pipeline route avoids residential areas and population centers. There are 14 incorporated cities within Itasca County. These cities include Bigfork, Bovey, Coleraine, Deer River, Effie, Grand Rapids, Keewatin, Marble, Nashwauk, Squaw Lake, Taconite, Warba, and Zemble. Itasca County has a population density of 17 persons per square mile and consists of a total land area of 2,900 square miles. The proposed route travels through rural areas of the county, passing only through a fairly remote area of the small municipality of Taconite before reaching its destination in Nashwauk. Other bordering municipalities include Bovey, Coleraine and Marble. Table E-12 below shows the populations of municipalities in the vicinity of the proposed pipeline.

Table E-12*

City	Population	1999 Median Household Income	Percent of Residents in Workforce
Nashwauk	935	$26,146	46.3%
Taconite	315	$30,250	63.7%
Bovey	662	$25,662	60.4%
Coleraine	1,110	$38,681	60.4%
Marble	695	$27,361	57.9%

*Source: U.S. Census Bureau, 2000 Census

3.2 Socioeconomic Impacts and Mitigation

The projected pipeline implementation and construction schedule is 18 months. The population centers close to the pipeline route will receive significant short term benefits of the pipeline project. The pipeline construction is projected to cost approximately $25 million dollars and will require employment of highly paid construction workers, including heavy equipment operators, pipe fitters, iron workers and other trades. This workforce will provide substantial additions to area's current economy and will aid in the revitalization of an area which is currently economically depressed.,

3.2.1 Long Term Impacts and Mitigation

Long term benefits of the pipeline's existence include its ability to attract further businesses with the desire to invest in the community. Beyond the impact of creation of the pipeline itself are the associated benefits received from the larger Minnesota Steel project. This project is expected to bring hundreds of jobs and significant further investment into Nashwauk and the surrounding community.

There will be no negative long term impact of this project to the community. No new roads will be constructed. Because the majority of the pipeline will be installed in forested land, which has been modified by long-term mining activities; no long term impacts on the land of community members are anticipated. In addition to forests in the area of the project, there is a small amount of farmland within and adjacent to the pipeline. This farmland is used primarily to cultivate hay and oats. Following the brief construction period, this land will continue to be used for the same purpose after the completion of the project.

3.2.2 Short Term Impacts and Mitigation

Approximately 50% of the workforce employed for pipeline project will be coming from outside the project's surrounding area. This significant group of laborers will bring with it economic activities, such as renting housing, purchasing groceries and fuel, eating in local restaurants, and purchases from other local businesses. This additional money, invested directly into the local economy, will provide substantial economic benefit to Nashwauk and the surrounding communities.

No new roads will be constructed and use of existing roads for construction purposes will be minimal. Following the completion of the pipeline, Nashwauk will repair roads, lands, fences, gates and other disturbed structures in accordance with mitigation plans developed as part of the route permit process and the requests of affected land owners. No significant disruption in crop production or recreational activity of residents and visitors to the area is expected during construction of this pipeline.

4.0 LAND USE AND ZONING OVERVIEW

The current and historic economic uses of land within and adjacent to the Proposed Project area are primarily mining and logging interspersed with recreational and residential land uses. Some of the former mining areas and tailings basins have been reclaimed and are now re-vegetated. The Cities of Nashwauk, Marble and Calumet, Taconite and Grand Rapids are located in the project vicinity to the northeast and southwest.

There are six local units of government that have zoning authority within the Proposed Project Area: Itasca County and the Cities of Taconite, Marble, Calumet, Nashwauk and Grand Rapids. Itasca County has zoning authority over the all of the land within the Proposed Project Area. The City of Nashwauk will have primary authority over the gas pipeline through its Public Utilities Commission. The City of Nashwauk recently annexed land on the west side of the city that includes parts of the proposed Minnesota Steel Project Boundary and includes most of the Plant Site Impact Area. The City annexed this land as part of its intent to provide wastewater treatment, water services, and gas services to the Minnesota Steel facility and potentially other industrial expansion areas. The City of Nashwauk maintains zoning authority within its boundaries. Nashwauk is also the designated public utility provider and is currently in the process of updating its comprehensive land use plan to reflect the annexed area.

Itasca County planning and zoning regulations apply to the project Impact Areas located outside the City of Nashwauk. Itasca County requires all land use ordinances to be consistent with the 1999 Itasca County Comprehensive Land Use Plan. A review of the County Land Use Plan showed objectives related to both natural resource management and a strong commercial and industrial economy. The Itasca County Land Use Plan goal is to encourage a diverse economy and support the continuation and expansion of the mining industry. The proposed Nashwauk Blackberry pipeline project would be consistent with this goal.

Under the County ordinance, the Proposed Project area is primarily zoned as industrial land use with a few small areas zoned as farm residential and rural residential. A shore land overlay zoning district is also in place, which regulates the state minimum shore land standards around designated lakes and streams. The standards set forth in the shore land overlay district, which regulates the areas within 1,000 feet around designated lakes and 300 feet along designated streams, prevail over underlying zoning.

About 71% of the acreage in Itasca County is forested and about 20% consists of organic soils (Nyberg, 1987). Approximately nine (9) percent of the County's surface area is water (lakes and streams). Mining, recreation enterprises and forestry contribute significantly to the economy of Itasca County. Before extensive settlement, vegetation in the area was predominantly conifer/hardwood forest (Wright, 1972). Early settlement began in the 1860's with people who came to harvest timber. Mining (iron ore) exploration began in the 1880's. Farming commenced in the late 1800s. By 1920, roughly ten percent of the land was in farming; however, both mining and farming activity have decreased in recent years (Nyberg, 1987.)

4.1 Existing Land Use

The land cover on and adjacent to the ROW corridors is forest lands consisting of coniferous forest, mixed wood forest and regeneration/young forests. This land is used primarily for forestry and mining purposes. There are also some areas that are open water/wetlands and scattered areas of grassland. Regionally, the same land cover and land uses are prevalent with the addition of open iron mines and rural residences as land uses.

The proposed pipeline will be built in a semi-rural area of southeastern Itasca County in northeastern Minnesota. This area of Itasca County is a mix of forested land, mineland, wetlands, pasture and small farms. This area is not considered prime farmland compared to most Minnesota agricultural soils. The proposed pipeline route will cross portions of the Cities of Taconite and Nashwauk. A detailed map of land use and land cover along the proposed route is provided as Figure 3, Appendix D.

The preferred pipeline route is located in the Superior Upland Section of the Laurentian Upland of the Canadian Shield physiographic province. The landscape of the area consists of forests, lakes, and bogs in glacial till over shallow bedrock. Land for this project which surrounds the proposed pipeline was classified as open land, agricultural fields, woodlands, reclaimed minelands and wetlands. The land affected is primarily woodland and reclaimed mineland.

According to county zoning information, approximately 42% of the route is farm-residential, 7% is municipal (cities of Taconite and Nashwauk), and 51% is industrial. In general, the south end of the route is predominantly farm-residential, the middle section is municipal and the north end of the route is predominantly industrial land with a small part of municipal land at the extreme northeast end of the pipeline. Itasca County zoning along the proposed route is shown by the map in Figure 7, Appendix D.

The length of the preferred pipeline route is 23.5 miles. The majority of the route will be located in undeveloped farm-residential and industrial land in an area heavily modified by past iron mining and land reclamation activities. Much of the farm-residential land is in second growth forestry ranging form 10 to 50 or more years in age. The farm residential also has numerous scattered wetlands and small plots of agricultural soils.

The industrial land has been used for mining and mineland reclamation over the last century. This industrial land includes a range of forestry, wetland and agricultural uses. The proposed pipeline will be routed along existing road and utility rights-of-way in an attempt to minimize the number of landowners who will be affected. The project study area shows a substantial area of clustered tailings areas, associated mineland reclamation areas and mine pits. There are many disturbed areas not suitable for agriculture and forestry as shown by the map in Figure 4, Appendix D.

Very few homes or other structures are within 500 feet of the proposed route. The route does pass through the small city of Taconite. There are approximately 200 to 400 parcels of property crossed by the route, depending on whether the route study area is ¼ mile wide or ½ mile wide. Except for public roads, the proposed pipeline passes through private land for most of the route.

The Iron Range is served by two major natural gas pipeline transmission companies (Great Lakes Gas Transmission and Northern Natural Gas). The closest field source delivery point to the Minnesota Steel plant site is the Great Lakes Gas Transmission Company facility located in Blackberry Township near Highway 2, approximately 16 miles southwest of the project site. The Minnesota Steel plant site is proposed to be located about 2 miles west of the City of Nashwauk.

4.2 Infrastructure Study

Itasca County completed a *Public Infrastructure Improvement Study* (Infrastructure Study or Study) and published a report in December 2005 summarizing public infrastructure improvements that would be needed to support the proposed Minnesota Steel project. The public infrastructure improvements considered in the Study included roadways, railroads, natural gas pipeline, and fresh water supply and wastewater treatment. The relevant factors used for development and assessment of infrastructure alignment options included the following:

- Compatibility with the mine plan.
- Attainment of desired design criteria.
- Avoidance of existing environmental features including plant/animal species of concern, lakes, wetlands, mine pits, and overburden piles.
- Avoidance of developed properties and minimization of impacts on private lands.
- Compatibility with other proposed public infrastructure and connections with existing systems.
- Utilization of existing utility and public rights-of-way wherever possible.

Public involvement during the study process included regular meetings of a technical advisory group, presentations and status updates to the Itasca Development Corporation/Jobs 2020 group, and a public open house. The public open house was held on July 19, 2005 at the Nashwauk City Hall and provided an opportunity for interested individuals to review preliminary findings and provide input on the proposed public infrastructure improvement concepts.

4.3 Gas Pipeline Proposed Improvements

The Minnesota Steel facility would be operated with natural gas as its primary fuel source. It is projected that the facility would initially use 80 million cubic feet of natural gas per day with future added capacity of 40 million cubic feet per day. Therefore, the project would require a natural gas delivery capacity of 120 million cubic feet per day at a minimal operating pressure of 450 pounds per square inch gauge (psig). Recent discussions of the

Minnesota Steel facility have indicated that they may wish to begin at a higher production level than originally thought. This larger facility would require more gas. The pipeline was designed to provide all gas needed for the three phases of planned facility development among other customers.

Three different gas pipeline alignments entering from the west were considered and documented in the Infrastructure Study to deliver natural gas to the Minnesota Steel site. The preferred pipeline alignment is 23.5 miles in length and originates from the existing Great Lakes Pipeline at the Blackberry source point located in Blackberry Township near Highway 2. The pipeline would pass through Trout Lake, Iron Range, Greenway, and Blackberry Townships and cross under four main roadways (TH 169, the proposed access road, County Road 10, and County Road 71) and the BNSF mainline railroad adjacent to TH 169. To the maximum extent possible, the pipeline would run adjacent to existing utilities including railroads, natural gas pipelines, electric transmission lines, highways and roads.

The proposed pipeline would have an outside diameter of at least 16 inches and be buried at least 4.5 feet underground. The pipe would be approximately 1/3 inch thick steel delivered in 70-foot sections. The pipe sections are welded together above ground, pressure tested, and then placed in the trench, backfilled, and ground surface restored. The pipeline would require a 70-foot construction easement and a 50-foot permanent right-of-way and would be constructed using standard construction practices. It is anticipated that the gas pipeline would be installed and in service to Minnesota Steel by August 2009.

4.4 Environmental Impacts and Environmental Review

Environmental impacts for the gas pipeline corridor identified by Itasca County were estimated, assuming a construction corridor width of 50 feet. The development of alignment alternatives included efforts to avoid and minimize impacts to developed properties, wetlands, and other sensitive areas. With the exception of trees that would be cleared from wooded areas located along the gas pipeline construction corridor, ground surfaces including wetlands would be temporarily impacted and would be restored to pre-construction conditions upon completion of the underground utility installation work. The pipeline alignment may be able to be adjusted during final routing, to the greatest practical extent, to further avoid and minimize impacts. At this time, Nashwauk intends to construct, own, and operate the gas pipeline as the designated public utility provider. Minnesota Steel would pay for the use of the pipeline. Since the Infrastructure Study was completed, the proposed pipeline has been increased from a 16-inch to a 24-inch diameter pipeline designed to deliver natural gas at a maximum rate of 206 million cubic feet per day and to operate at an average pressure of 599 psig, with an Maximum Allowable Operating Pressure of 1016 psig. In addition to serving the Minnesota Steel facility, the Nashwauk Public Utilities Commission will be seeking other industrial customers in the future, so the pipeline has been sized to allow for industrial expansion near Nashwauk.

A pipeline route permit application for the new pipeline was submitted to the Minnesota Public Utilities Commission (MPUC) on March 7, 2007 in accordance with the requirements of Minnesota Rules 4415. The MPUC subsequently accepted the application as complete on March 29, 2007 and initiated the public review process. The MPUC is the lead agency responsible for regulatory review and approval of the pipeline. That regulatory review requires evaluating potential human and environmental impacts associated with construction and operation of the proposed pipeline.

Public information meetings were held in Taconite and Nashwauk on April 18 and May 24, 2007 respectively to describe the pipeline permitting process and to receive public input. Due to substantial public concern expressed and Nashwauk proceeded, into the full pipeline permitting process, which will include additional public meetings, a citizen advisory committee to examine a wider range of pipeline route options, and an Administrative Law Judge (ALJ) who conducts a public hearing on the application and examines all evidence and testimony provided. Following the ALJ hearing, the MPUC will review the evidence and the ALJ's recommendation and make a final decision on whether to grant a pipeline permit and the specific conditions required in the final permit.

4.5 Land Use Affected By Pipeline Construction and Operation

The pipeline will be constructed using a 100-foot-wide construction right-of-way and temporary workspaces at water bodies, road and other crossings. The preferred route for the pipeline is 23.5 miles in length. This will add approximately 188 acres of new permanent right-of-way through the length of the pipeline. Land within the permanent right-of-way and any temporary workspace will be impacted during the construction period. The impact will be short-term, as the construction period normally will last about thirty (30) days at any one location.

All land will be restored as nearly as practicable to pre-construction conditions. No land will be removed from agricultural use since the pipeline will be buried well below plow depth and drain tile. The cropland could return to production as soon as construction was completed. Farmers will receive compensation for reduced productivity for the year of construction and the following two years, if appropriate. All pre-existing agriculture uses will be able to continue within the new permanent right-of-way after completion of this project.

Construction may affect appurtenant agricultural items such as drainage systems, fences and livestock. When active tile drainage systems are encountered temporary repairs will be made immediately to allow continuation of flow. A local tile contractor will make permanent repairs before the start of restoration activities.

The contractor will install temporary gates in fences crossed by this project. The Contractor will rebuild the fence where crossed. If it is necessary for livestock or farm machinery to cross the open trench, equipment bridges or trench plugs will be strategically located to allow access. The Contractor will use appropriate fencing or other means to prevent livestock from falling into open trenches.

The preferred pipeline route crosses four county roads: 10, 21, 58, 70, and State Highway 169. There is existing railroad, under which the pipeline will need to pass. Nashwauk will work closely with MDOT staff to determine the specific highway crossing plans and procedures.

There are a number of recreational areas near the proposed project and snowmobile trails that follow existing transmission line right-of-ways. Segments of these trails will be diverted and/or closed temporarily for construction of the pipeline.

4.5.1 Ownership Status of Lands Crossed by the Pipeline

Land in southeastern Itasca county is owned by private individuals, firms and corporations including mining and paper companies government agencies, township, city, county, state and federal.

4.6 General Construction and Operation Impacts and Mitigation

4.6.1 Agricultural Land

When pipeline excavation and installation is conducted on cropland, some mixing of the topsoil and subsoil is inevitable. Farmers may experience a slight decline in productivity in the soil above the pipeline. To compensate farmers for this potential lost production, Nashwauk agrees to pay landowners 100 percent damages for one year's worth of reduction in agricultural production across the entire cultivated area of gas pipeline right-of-way. Nashwauk will pay 15 percent damages for the second year and 10 percent damages for the third year reduction in agricultural production across the entire cultivated area of gas pipeline right-of-way. Although very little active farmland will be disrupted by construction of the proposed pipeline route, any areas of prime farmland that are or have been used for cropland in the last three years and are impacted by pipeline right-of-way will be managed in compliance with the Agricultural Impact Mitigation Plan provided in Appendix B of this application.

4.6.2 Wetland/Open Water

4.6.2.1 Watershed

The proposed route is located within the Mississippi Headwaters portion of Upper Mississippi River Basin. The Upper Mississippi River Basin originates at the Headwaters in Itasca State Park (Itasca County) and ends where the Mississippi River combines with the St. Croix River near Hastings. As the river runs its course, it drains a mixture of forests, prairie, agriculture and urban land areas. The Upper Mississippi River Basin covers approximately 20,100 square miles and drains 15 of the 80 major watersheds in Minnesota.

4.6.2.2 Wetlands

Of the 188 acres of permanent right-of-way, a total of 17.47 acres will be located on wetlands. A total of 24.69 acres of wetland habitat is located on the temporary right-of-way. Temporary impacts, including loss of vegetation, disturbances in wildlife habitat and soil, and loss of aesthetics of the environment, will result from construction of this project and will be mitigated by restoring the area following construction.

Wetlands in the project area are regulated by several agencies including the USACE and EPA at the federal level, and the Minnesota Board of Water and Soil Resources (BWSR) and the Minnesota Department of Natural Resources (MDNR) at the state level. At the federal level, Section 404 and Section 401 of the Clean Water Act provide regulation of wetlands that are hydrologically connected to U.S. Navigable Waters. The Minnesota Wetland Conservation Act (WCA) regulates wetlands at the state level (Minn. R. ch. 8420). Itasca County Soil and Water Conservation District has accepted responsibility for administering the WCA in the project area. Other state wetland regulations include designated Protected Waters and Protected Waters Wetlands regulated by the MDNR (Minn. R. 6115.0010–6115.0810). The Ordinary High Water Level (OHWL), as established by the MDNR, of Protected Waters Wetlands defines the upper extent of jurisdiction by the MDNR on these protected habitats.

In Minnesota and for the project, wetland impacts may require permits or approvals from as many as three agencies, the USACE (and the EPA through the USACE), the designated WCA Local Government Unit (LGU) under the oversight of BWSR, and the MDNR. In contrast, impacts to wetlands that are hydrologically isolated from U.S. Navigable Waters and are not MDNR Protected Waters Wetlands may only require WCA approval. However, formal jurisdiction of these wetlands is determined by each respective agency.

Wetlands are classified following the Classification of Deepwater Habitats of the United States (Cowardin et al., 1979) and USFWS Circular 39 publication Wetlands of the United States (Shaw and Fredine, 1956). Both systems were used to classify the wetlands along the proposed pipeline route. There are eight recognized wetland types in Minnesota that are defined by Circular 39.

There are a total of seven river or stream crossings associated with proposed pipeline route. Each of these river crossings has associated wetland areas. Two of these crossings are over the Swan River. The other crossings are over a tributary of the Swan River (perennial) and a perennial stream between Big and Little Diamond Lakes. The perennial stream between Big and Little Diamond Lakes was the only water crossing in this alternative that was field surveyed during the 2005 field season due to access limitations. The Swan River is the only water body identified as a protected water by the MDNR PWI, and therefore will require a license to cross this water body for the proposed pipeline. Additional field delineation will be required in spring 2007 to determine the amount of additional wetland impact from the route extension between Taconite and Nashwauk.

Wetland habitats associated with the water crossings for the proposed pipeline route are based on NWI classification and mapping. In areas where 2005 field surveys were conducted, the classification given is based on observations made during the field surveys. The wetland habitat for the two Swan River crossings is mapped by NWI as Type 1 (PFO1A) seasonally flooded and Type 6 (PSS/EM5C) scrub-shrub habitats. The wetland habitat at the tributary to the Swan River is mapped by NWI as Type 2 (PEM5Bd) wet meadow habitat. The perennial stream between Big and Little Diamond Lake was mapped during the 2005 field surveys and included Type 3 (PEMC) shallow marsh habitat. Total length of water crossings for these four crossings is estimated at 133 linear feet.

The three additional crossings added to the extended route have not yet been field evaluated for wetland type and length. Nashwauk will be conducting additional wetland delineation in accordance with applicable state and Federal guidelines.

4.6.2.3 Surface Waters Near The Proposed Pipeline Route

The proposed pipeline route lies within the northernmost region of the Upper Mississippi River Basin (UMRB) Watershed. The major surface waters near the Site are listed in Table E-13.

TABLE E-13
Surface Water Bodies Near The Proposed Pipeline Route

Surface Water	Watershed
Big Diamond Lake	Swan River
Cannisteo Mine Pit (CMP)	Swan River
Dunning Lake	Swan River
Greenway Mine Pit	Prairie River
Hill-Annex Mine Pit	Swan River
Holman Lake (Hill Lake)	Swan River
Lind Mine Pit	Prairie River
Little Diamond Lake	Swan River
Lower Panasa Lake	Swan River
Mississippi River	Mississippi River
Oxhide Creek	Swan River
Little McCarthy Lake	Prairie River
Little Sucker Lake	Prairie River
Big Sucker Lake	Prairie River

The Prairie River Watershed includes the northern and eastern portions of the project site. The Cannisteo Mine Pit (CMP) Watershed is isolated from the other watersheds as the CMP does not have an outlet. The remaining surface water bodies listed in Table E-13 are all within the Swan River Watershed. The Prairie River and the Swan River both drain to the Mississippi River.

The area of the preferred pipeline route contains many small wet surface depressions, wetlands, and several intermittent unnamed streams. The proposed pipeline will be constructed in an area that is along an existing drainage divide. The northern portion of the proposed pipeline lies in the Sucker Brook watershed that drains into the Prairie River. The southern portion lies in a sub-watershed that drains into the CMP. Potential impacts to these water-bodies from storm water discharges from the project during construction and operation will be minimized by appropriate storm water best management practices (BMP).

4.6.2.4 Streams

The proposed pipeline project crosses Swan River twice, a small stream tributary to the Swan River and an intermittent stream connecting Big and Little Diamond Lakes, according to the USGS topographic maps. Swan River is a protected water. Neither of the other crossings is listed as protected waters by the MDNR. The three pipeline crossings, which have not been ground-checked, include: an unnamed intermittent stream connecting Little Sucker Lake and Big Sucker Lake and two crossings of an unnamed intermittent stream draining into Little McCarthy Lake. These seven (7) stream crossings have been identified along the route of the proposed pipeline for an estimated total of 1,713 linear feet. The proposed method of crossing will be directional drilling such that there are negligible impacts to the streams. All appropriate MDNR permits will be secured before crossing streams. MDNR officials have indicated a preference that stream crossings in the area should be directionally drilled whenever possible. The method of crossing these streams during construction will minimize or avoid impacts to the bed and banks and is discussed in greater detail in the environmental impact section that follows this description narrative portion.

5.0 GEOLOGY

The route alternatives are all are located within the Superior Upland Section of the Laurentian Upland of the Canadian Shield physiographic province. The physical landscape of the region is typified by forests, lakes and bogs in glacial till over shallow bedrock. The landscape has been greatly affected by the glaciers that covered the land, the last of which left the area about 12,000 years ago. Physical relief is generally limited to a thousand feet or less in the project area. However, the maximum elevation range in the region is from elevation 600 feet above mean sea level (msl) at Lake Superior to elevation 2,301 feet above msl at Eagle Mountain, the highest point in Minnesota. Extensive mining activity has taken place in the immediate vicinity of the site where numerous mine pits, tailings basins and spoil piles can be found.

5.1 Existing Terrain

The area has very complex geology. The area has been thoroughly studied and characterized due to the extensive mining activities near the proposed project. The extent of disturbed mineland is shown in Figure 4, Appendix D. The bedrock geology has little impact on shallow pipeline installation.

The Nashwauk-Blackberry pipeline route is located within the Superior Upland Section of the Laurentian Upland of the Canadian Shield physiographic province (Leonards, 1962). The physical landscape of the region is typified by forests, lakes and bogs in glacial till over somewhat shallow bedrock. The landscape has been greatly affected by the glaciers that covered the land, the last of which left the area about 12,000 years ago. The maximum elevation along the proposed pipeline route is approximately 1,400 feet above mean sea level (MSL) near Nashwauk. The minimum elevation along the route is in Blackberry Township with an elevation of approximately 1,300 feet above MSL. General site topography is shown in Figure 2, Appendix D.

The Quarternary geology map of Minnesota (Hobbs and Goebel, 1982) indicates that the land in the project area is generally covered with ground moraine (glacial till) of the Nashwauk Moraine Association, which was deposited during the presence of the Rainey Lobe, late Wisconsinan stage of glaciations. The till is brown to gray, non-calcareous drift; clasts are predominantly igneous and metamorphic rocks of the Canadian Shield. The till exists over Rainey lobe outwash deposits which are undivided as to association.

The proposed pipeline route in an area that generally consists of low glacial moraines and till plains. The till is typically 25 feet thick or less along the proposed pipeline route. Bedrock outcrops also exist in the area. Much of the till has been stripped and removed along the Iron Range as part of past mining operations. The elevation of the till plains to the north and south of the site are at about elevation 1,330 feet MSL. Physically, the local landscape is dotted with 300-to-400-foot deep mine pits, large mine-pit overburden spoil piles, and tailing basins, all of which are associated with former iron ore mining activity. The extent of the mining disturbance near the proposed pipeline route is shown in Figure 4, Appendix D.

The surface geology in the route area consists of glacial outwash deposits, floodplain alluvium, and organic deposits. The glacial units originated from the three following sources (from earliest to latest): (1) Pre-late Wisconsinan deposits; (2) Superior Lobe deposits; and (3) Des Moines Lobe deposits. These glacial units include calcareous and noncalcareous components that make up glacial outwash sand, gravel, drift, and till. Some units contain modern and historic stream deposits that have been deposited onto floodplains during flood stage. Some of the deposits are re-deposited components of previously placed glacial deposits, creating ambiguous unit transitions in some areas. The organic deposits contain peat organic-rich silt and clay, and include small bodies of open water. Bedrock also either outcrops, or is present within 5 feet of the surface, at some points along the route. Bedrock along the gas pipeline alternatives generally consists of Giant's Range Granite, Pokegama Quartzite, and the Biwabik Formation. The depth of the gas pipeline is expected to be 7 to 8 feet bgs. Bedrock is closest to the ground surface along the gas corridor near the city of Taconite. In these areas bedrock is less than 50 feet bgs. In all other areas, the bedrock is shown to be more than 50 feet bgs (Meyer, Jennings, and Jirsa, 2004).

5.2 General Construction and Operation Impacts and Mitigation

Along the proposed route, the terrain is level to gently rolling with little or no elevation change. Little or no grading is anticipated in order to prepare the surface for the construction equipment over most of the route.

The overall effects of construction and operation of the pipeline on topography and geology will be minor, limited primarily to the results of construction activities. The primary effect from construction is disturbance of slopes along the proposed right-of-way because of excavation activities. Impacts on topography will be limited to the construction phase, during which time conditions along the pipeline right-of-way will be temporarily altered. Slopes may be re-contoured to accommodate construction equipment. Following the completion of construction, topographic and drainage conditions along the proposed pipeline right-of-way will be restored as close as practicable to their pre-construction configuration. Minor short-term impacts resulting from the spreading of excess soil from the excavation over the right-of-way and from the placement of a small berm of mounded soil over the pipeline will occur.

This technique is also referred to as "crowning" the trench. This will be done as necessary to compensate for settling of backfill and to reduce ditch slumping.

Little or no impact to the terrain and geology should result from construction, operation or maintenance of the pipeline facilities. No special construction techniques are expected to be necessary because of the terrain or geology. Impacts will be limited to the construction phase. The limited shallow excavation and site restoration associated with the proposed pipeline will not have a significant impact on geology or soils in the area. The minimal impacts on the limited farmland disturbed is compensated by easement amounts and damages for crop loss to be paid, when appropriate.

Sand, gravel and iron ore are the primary mineral resources likely to occur along the proposed pipeline route. No active mining operation will be directly affected by the construction of the pipeline. Any mineral reserves within the permanent right-of-way could not be utilized for the life of the project. Given the small area required by the pipeline relative to the widespread distribution of surrounding resources, this limitation should not impose any hardship.

Launcher and receiver facilities will be located at each end of the pipeline to allow for cleaning and internal inspection of the pipeline using intelligent pig technology. The only other associated facilities on the right-of-way beside markers required by the DOT will be cathodic protection facilities. These will consist of a rectifier and ground bed whose location will be determined by actual measurement of pipe to soil potentials along the route after the pipeline is installed.

6.0 SOILS

Nashwauk will minimize the adverse impacts to soils by implementing mitigative measures and BMPs. Nashwauk will also develop erosion control plans in conjunction with the Minnesota Pollution Control Agency (MPCA) storm-water discharge permit. Temporary erosion controls may include slope breakers, mulching, and the use of silt fences. Following construction, re-vegetation, seeding, lime application and fertilization will commence as soon as possible in accordance with any existing permit requirements, negotiations with landowners and recommendations from land management agencies. In order to protect topsoil resources, topsoil segregation procedures will be used as required in areas specified by applicable regulations, permit conditions or landowner requests. Environmental Inspector(s) will be used to ensure contractor compliance with these procedures.

Potential temporary impacts to soils resulting from construction and operation of the proposed pipeline project include increased potential for soil erosion; soil compaction; loss of soil productivity associated with mixing of topsoil; introduction of rock into the topsoil; and poor revegetation following construction. The magnitude of these impacts depends on several factors including the characteristics of the major soil types that will be crossed by the pipeline and the quality of construction restoration techniques.

6.1 General Soil Composition

The preferred pipeline route crosses the mixed glacial soils of Southeastern Itasca County in Northeastern Minnesota. These include nearly level organic soils in upland depressions, nearly level to very steep loamy and silty soils on uplands, nearly level to sloping sandy, loamy and silty soils on uplands and iron mining areas, which could include slickens, mine pits, mine dumps and areas of revegetated mineland reclamation. The native soils in the area are a complex mixture of mineral soils, mostly Boralfs such as Zimmerman loamy fine sand, Cowhorn loamy very fine sand , Cutaway loamy sand, Sandwick loamy fine sand, Nashwauk fine sandy loam, Warba fine sandy loam, Nebish fine sandy loam, Keewatin silt loam, Itasca silt loam, Goodland silt loam on the upland areas. The mineral soils are mainly light-colored, sandy, glacially deposited and formed under forest vegetation. A mix of fibric, hemic and sapric organic soils such as Cathro muck, Greenwood peat, Blackhoof muck and Mooselake mucky peat dominate the lower wet areas. About one quarter of the entire county consists of peats or organic soils. The project study area contains many clustered mine pits, tailings disposal areas and associated mineland reclamation parcels. Specific soils information for the proposed route in Itasca County was obtained from the Natural Resource Conservation Service (NRCS).

6.1.1 Soil Characteristics and Assessments

The table below gives a comparison of soil parameters important to pipeline construction. Generally pipelines can be installed relatively easily in most soil types with application of appropriate techniques.

Table E-14 Soil characteristics by type

Soil Name	Type	Taxonomy	Per cent of total in Itasca County	Equipment Limits Excavation	Depth to high water table	Corrosion Risk Concrete
Blackhoof	Muck	Histic Humaquepts	0.1	Severe Ponding	+2 .0 - 1.0 ft	Moderate
Cathro	Muck	Terric Borosaprist	2.5	Severe Ponding	+ 1.0 - 1.0 ft	Low
Cowhorn	Sand	Aeric Haplaquepts	2.1	Severe Wetness	1.5 – 3.0 ft	Moderate
Cutaway	Sand	Arenic Eutroboralfs	4.6	Severe Caving	> 6 ft	Moderate
Goodland	silt loam	Typic Udorthents	0.7	Severe Caving	> 6 ft	Moderate
Greenwood	Peat	Typic Borohemists	7.5	Severe Ponding	+ 1.0 - 1.0 ft	High
Itasca	silt loam	Glossic Eutroboralfs	1.3	Slight	> 6 ft	Moderate
Keewatin	silt loam	Aeric Glossaqualfs	1.1	Severe Wetness	0.5 – 1.5 ft	Low
Mineland	Mineland	Human Modified Soils	0.8	Severe Variable	NA	NA
Mooselake	Mucky peat	Typic Borohemists	8.6	Severe Ponding	+1.0 – 1.0 ft	High
Nashwauk	Sandy loam	Typic Glossoboralfs	7.9	Moderate Dense Layer	> 6 ft	Moderate
Nebish	Sandy loam	Typic Eutroboralfs	4.4	Slight	> 6 ft	Low
Sandwick	Sand	Arenic Glossaqualfs	1.5	Severe Wetness	1.0- 2.0 ft	Moderate
Warba	Sandy loam	Glossic Eutroboralfs	6.4	Slight	> 6 ft	Moderate
Zimmerman	Sand	Alfic Udipsamments	4.1	Severe Caving	> 6 ft	High

According to the Itasca County Soils Survey (Nyberg, 1982), surface soils in the project area are characterized by the Nashwauk-Keewatin Association and consist of nearly level to very steep, well drained and somewhat poorly drained loamy and silty soils that formed in glacial till on till plains, and moraines. These soils are described below in alphabetical order by soil name.

6.1.1.1 Blackhoof (muck) Series (614)

Blackhoof forms on concave and plain slopes on till plains and glacial moraines. Most Blackhoof areas are undrained. It is ponded in the spring and after heavy rains. The average high water is two feet above the surface to one foot below the surface. The peat is somewhat shallow, on the order of a foot or less. Underlying materials are silts and silty clays. The upper peat is highly acidic. The lower material is mildly alkaline. Ponding and frost action are problematic for roadways.

6.1.1.2 Greenwood (Peat) Series (549)

These soils consist of peat and are formed in depressions or on poorly drained flat ground (bogs in glacial moraine). The soils are encountered in wetland areas. The organic soil is extremely acidic throughout. Seasonal high water is one foot above to one foot bgs ("bgs"). Tamarack and Black Spruce are supported in some Greenwood bogs. Equipment access is a problem due to the material's low strength. Because of low strength, road settlement is a problem.

6.1.1.3 Itasca (Silt Loam) Series (618)

This soil is well drained and occurs on nearly level to rolling plane and complex slopes on glacial till planes and moraines. Soil types include silt loam and fine sandy loam. The ground water table is more than 6 feet bgs. These soils are good for establishing grasses and legumes, wild herbaceous plants, hardwood trees, and coniferous plants. They are very poor for establishing wetland plants. The Itasca County Soil Survey describes the restrictions on shallow excavations to be "slight."

6.1.1.4 Keewatin (silt loam) Series (619)

This nearly level somewhat poorly drained soil is on plain and slightly concave slopes on glacial moraine and till plains. Acidity, permeability and fertility are similar to Nashwauk soils. Ponding and frost action are problematic for roadways.

6.1.1.5 Moose Lake (mucky peat) Series (797)

Moose Lake soils consist of peat. They are formed in depressions or on poorly drained flat ground and consist of bogs on lake plains, outwash plains and glacial moraines. The soils are encountered in wetland areas where the seasonal high water is typically one foot above to 2 feet bgs. Reaction is strongly acidic to neutral. Moose Lake soils are characterized by low strength and compressibility and because of this, road settlement is a problem.

6.1.1.6 Nashwauk (fine sandy loam) Series (622)

This nearly level to rolling, well drained soil is on convex slopes on glacial moraine. A few stones and boulders are on the surface and in the soil. Included with this soil in mapping are small areas of the nearly level, somewhat poorly drained Keewatin soils and small areas of the very poorly drained Blackhoof soils. Permeability is low in the Nashwauk. The surface layer is very strongly acidic to slightly acidic and the underlying soil is strongly acidic to neutral. The organic matter content and natural fertility are low. The excessive acidity and low fertility can be overcome with lime and fertilizer. Erosion is problematic due to the low fertility and the extended time to build-up substantial vegetation. Building local roads on contour and establishing well suited vegetation on the road banks help control erosion. Frost action is problematic for road surfaces. The material is ill-suited for septic tank fields due to its low percolation rate. Enlarging the septic field helps alleviate the problem, but may not totally solve it.

6.1.1.7 Sandwick (Loamy Fine Sand) Series (625)

This soil is somewhat poorly drained and occurs on nearly level glacial moraines and till plains. Soil types include loamy fine sand and loam. The groundwater table ranges from 1 to 2 feet bgs. This soil is fair for establishing grasses, legumes, and wetland plants and good for establishing wild herbaceous plants, hardwood trees, and coniferous plants. Wetness impedes shallow excavations, and cut banks tend to cave, according to the Itasca County Soil Survey.

6.1.1.8 Warba (Fine Sandy Loam) Series (240)

This soil is well drained and occurs in nearly level to rolling glacial moraines and till plains. Soil types include fine sandy loam, clay loam, and sandy clay loam. The ground water table is greater than 6 feet bgs. According to the Itasca County Soil Survey, restrictions on shallow excavations are "slight." These soils are fair for the establishing grasses, legumes, wild herbaceous plants, coniferous plants, and wetland plants.

6.2 General Construction And Operation Impact And Mitigation

6.2.1 Natural Gas Pipeline Construction Sequence

The first step in construction of a pipeline is to prepare the right-of-way. The centerline of the pipeline and points of intersection tangents will be established by a survey. Staking will be at a maximum of 400-foot intervals. A construction right-of-way up to 100 feet wide would be cleared. Aboveground vegetation and obstacles would only be cleared as necessary to allow safe and efficient use of construction equipment. Storage areas up to several acres may be required for storing equipment, pipe, and other materials and would be acquired through negotiations with affected landowners.

When encountered along a right-of-way, fences would be adequately braced before any opening to the fence is made. Locking gates or appropriate fencing would be installed when construction in the area has been completed. Any damage to fences, gates and cattle guards would be restored to the original condition or replaced. Access and livestock control would be employed during construction to limit impact to the use of the land. Clearing of the right-of-way would follow accepted industry practices and sound construction guidelines. In areas where timbering is required, trees would be cut in uniform length and stacked along the right-of-way based on the owner's preferences. The profile of stumps left from timbering would be as low as possible, and the removal of stumps would be limited to only that necessitated by pipeline installation. Debris created from preparation of the right-of-way would be disposed of using approved methods during restoration.

After the construction area has been cleared of obstacles and prior to trenching, the area would be graded as necessary to create a relatively flat work surface for the passage of heavy equipment and vehicles for subsequent construction activities. Minimal grading would be required on most of the right-of-way where the terrain is flat to gently sloping. In particularly difficult terrain, additional construction right-of-way may be required. Grading and cut-and-fill excavation would be performed to minimize effects on natural drainage and slope stability. On steep terrain or in wet areas where the right-of-way must be graded at two elevations (i.e., two-toning) or where diversion dams must be built to facilitate construction, the areas would be restored upon completion of construction to original conditions. Excavation and grading would only be undertaken where necessary to increase stability and decrease the gradient of unstable slopes.

The State of Minnesota requires a 54 inch minimum depth of cover in certain areas as detailed in Minn. Stat. § 116I.06, subds. 1, 2, and 3. Specifications will provide for a minimum of 54 inches of ground cover for this proposed pipeline unless waived by the landowner, or to accommodate special construction needs. Federal minimum cover requirements range from 18 inches to 48 inches depending on the circumstances encountered. For most of the proposed route it is anticipated that requirements will call for at least 48 inches of cover over the pipeline.

Most trenching would be performed using a bucket-wheel ditching machine. Conventional tracked backhoes would be used where ground conditions are unsuitable for a ditching machine and if a deeper or wider trench is required. Trench dimensions will comply with applicable land use and regulatory requirements. In wet marshy areas, draglines and clamshells are used to do the ditching. To insure the pipe is buried at the proper depth, the trench will be drained or pumped dry where practicable, or concrete coated pipe will be set on weights to overcome any buoyant force. Where the pipe crosses highway or road ditches, the trench or boring is excavated deep enough to provide a minimum of 54 inches of cover over the pipe. All surfaced road crossings will be installed via directional drilling so that traffic flow will not be interrupted. Directional drilling may be used where the natural gas pipeline crosses lakes, rivers and/or streams.

In areas where there is a need to separate top and subsoil, a two-pass trenching process will be used. The first pass would remove topsoil and the second pass would remove subsoil, with soils from each of the excavations being placed in separate banks. This technique will allow for proper restoration of the soil during the backfilling process. Spoil banks will contain gaps to prevent storm runoff water from backing up or flooding.

The operation of stringing involves the placement of pipe, from a pipe storage facility or from the pipe mill, along the right-of-way. Pipe will be loaded onto trucks, transported to the right-of-way, and unloaded by trucks equipped with booms rigged to handle pipe. The pipe would be strung either prior to or after ditching. After the joints of pipe are strung along the trench and before the sections of pipe are joined together, individual sections of the pipe are bent to allow for uniform fit of the pipeline with the varying contours of the bottom of the trench and to accommodate changes in the route direction. A track-mounted, hydraulic pipe-bending machine is normally used for this purpose when using the size of pipe proposed for this project. The number of degrees of deflection that is allowed in a field bend is limited. Bends required that are greater than that allowed in the field are factory fabricated.

Installation of the pipe, following the bending, commences with internally swabbing the pipe, and aligning the bevels for welding. The weld material is deposited after the proper spacing and alignment of the bevels is accomplished. The line-up clamps are held until enough of the weld is completed to assure weld integrity. A critical phase of pipeline construction is the welding process. Welding is the joining of the individual sections of pipe to form the pipeline, and must be performed by a qualified welder in accordance with welding procedures that meet strict code requirements. Welders must be tested periodically to maintain the rigorous qualifications for certification of pipeline welding.

Every weld will be inspected by radiographic examination to ensure the quality and integrity of the weld. Radiographic examination is a nondestructive method of inspecting the inner structure of welds to determine if any defects are present. Defects would be repaired or removed as outlined in API 1104, which is incorporated by reference in 49 C.F.R. 192. After welding, the girth weld and the pipe adjacent to the weld must be protected from corrosion. When the field coating or wrapping of the weld is completed, the pipeline is ready to be lowered into the trench. Special side boom tractors spread out along the pipeline simultaneously lift the line and move it over the open trench. The welded string of pipe is then lowered into the trench. An electronic holiday detector is used to monitor the coating during this operation to assure the coating is not damaged.

After the pipe has been lowered into the ditch, the trench will be backfilled. The operation must be performed in a manner that prevents damage to both the pipe and pipe coating from equipment or backfill material. Excess backfill material will be bermed over the ditch centerline to permit natural settling. Where the ditching process was used to separate top and subsoil, backfill is also installed by placing the subsoil into the trench prior to placement of the topsoil to maintain the soil segregation. After backfilling, the pipeline will be tested to ensure that the system is capable of withstanding the operating pressure for which it was designed. In this process, the pipeline is filled with water at a pressure equal to 1.5 times the design pressure and is maintained for a minimum of eight (8) hours. Water availability and terrain conditions will determine test lengths, and test water will be disposed of pursuant to permit requirements.

The final phase of pipeline construction involves clean up and restoration of the right-of-way. Removal and disposal of construction debris and any surplus materials will be a part of the clean up. Restoration of the right-of-way surface involves smoothing by chisel plow or disc harrows or other equipment, and stabilizing when necessary. In non-cropland, the right-of-way will be re-vegetated according to agreement with the landowner or appropriate government agency.

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 vegetation removes protective cover and exposes soil to the effects of wind, sun, and precipitation, which may increase the potential for soil erosion and sediment movement 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. Nashwauk will minimize or avoid these impacts on soils by implementing the mitigation measures described in the AIMP (Appendix B)

Movement of heavy construction equipment can produce soil compaction. Soil characteristics that affect soil compaction include soil texture, soil moisture, grain size distribution, and porosity. Soil compaction has a restrictive action on water penetration, root development, and the rate of diffusion of oxygen into soils. Compaction has the effect of reducing yields of most agricultural crops. Soils with a surface texture of sandy clay loam, or finer, with a drainage class of somewhat poorly drained through very poorly drained, are likely to be susceptible to compaction. After construction is complete, if excessive compaction is found, mitigative measures may include remedial tillage and/or planting deep rooted legumes to correct compacted areas. Chisel or other type plowing, and/or other measures, during restoration of the affected area will mitigate soil compaction.

6.2.2 Erosion by Wind and Water

The potential for erosion caused by water is a concern in the construction and operation of the proposed pipeline project. Water erosion is strongly related to the permeability of a soil and to the cohesion of the soil particles that compromise a soil. Other soil properties that influence water erosion include soil texture, percent of organic matter, soil structure, and soil infiltration capacity. Soils containing high portions of silt and very fine sand are most erodible. Well-drained and well-graded gravels and gravel-sand mixtures with little or no silt are the least erodible soils. Erosion is influenced by slope length and gradient; the frequency, intensity, and duration of rainfall; and the amount of time bare soils are exposed.

Erosion is a ongoing natural process that can be accelerated by human activities. 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 water bodies and wetlands.

Nashwauk will implement the erosion control measures 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. Nashwauk 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.

Temporary and permanent erosion control measures will be employed during construction to minimize erosion caused by water and wind. Soil loss by wind could likely occur when the right-of-way area is very dry after the vegetative cover has been removed. During construction, activity will be limited when there was enough wind to cause erosion. Dust control will be done as needed, during the construction phase with water applied by spray bars mounted on trucks equipped with water tanks. Excessive dust is detrimental to construction activities and is controlled diligently to avoid loss of production and to promote safety. After construction, restoration of the right-of-way in non-cropland areas includes seeding and mulching that help prevent fugitive dust emissions. Impact to soils will be short term.

6.2.3 Prime Farmland and Topsoil Segregation

The Federal Farmland Protection and Policy Act of 1981 and the Minnesota Agricultural Land Preservation and Conservation Policy Act (M.S. 17.80–17.84) have been enacted to ensure that impacts to agricultural lands and operations are integrated into the NEPA process, and the impacts upon agricultural land are minimized to a reasonable extent. Because the supply of high quality farmlands is limited, the U.S. Department of Agriculture (USDA) encourages management and wise use of our nation's prime farmland. The route alternatives for this pipeline's corridors were evaluated to identify any soils classified by the Natural Resources Conservation Service (NRCS) as being Prime or Statewide Important Farmland. SEH staff consulted with the Minnesota Department of Agriculture in developing an Agricultural Impact Mitigation Plan to be used on any active farmland crossed by pipeline construction activities.

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).

The proposed pipeline alternatives would impact temporary right-of-way only during construction. After construction is complete, any temporary right-of-way areas would be restored to pre-construction conditions. Permanent impacts to prime farmland and farmlands of statewide importance would be limited to those areas of the permanent right-of-way. However, at this time the exact location of the permanent right-of-way for the proposed pipeline is not known, therefore prime farmland impacts estimates are based on linear feet crossed by the major pipeline route alternatives. Table E-15 below summarizes the linear feet and approximate miles that would be crossed by the four pipeline routes that are alternatives of the preferred route.

Table E-15
Prime and Statewide Important Farmland – Major Alternative Route Right-of-Way s

NRCS Soil Designation	Alternative 1 (05-ICMSI-1)		Alternative 2 (05-ICMSI-2)		Citizen's Route – Alternative 1 (07-MPUC-P1)		Citizen's Route – Alternative 2 (07-MPUC-P2)	
	Linear Feet (lf)	Approx. Miles	Linear Feet (lf)	Approx. Miles	Linear Feet (lf)	Approx. Miles	Linear Feet (lf)	Approx. Miles
Prime Farmland	45,123	8.5	68,161	12.9	65,102	12.3	47,828	9.0
Prime Farmland, if drained	21,645	4.1	14,718	2.8	10,028	1.9	11,583	2.2
Farmland of Statewide Importance	18,194	3.4	7,437	1.4	12,917	2.4	14,577	2.8
Subtotal	84,962	16	90,316	17.1	88,047	16.6	73,988	14
Total Route Length	143,856	27.2	129,830	24.6	173,174	32.8	157,973	29.9
Percent of Soils in Route Designated as Prime Farmland, Statewide Important, or Prime Farmland if drained	59%		70%		51%		47%	

Where pipeline excavation and installation is conducted on cropland, some mixing of the topsoil and subsoil is inevitable. Farmers may experience a slight decline in productivity in the soil above the pipeline. To compensate farmers for this potential lost production, Nashwauk agrees to pay landowners 100 percent damages for one year's worth of reduction in agricultural production across the entire cultivated area of gas pipeline right-of-way. Nashwauk will pay 15 percent damages for the second year and 10 percent damages for the third year reduction in agricultural production across the entire cultivated area of gas pipeline right-of-way. Although very little active farmland will be disrupted by construction of the proposed pipeline, any areas of prime farmland that are or have been used for cropland in the last three years and are impacted by pipeline right-of-way will be managed in compliance with the Agricultural Impact Mitigation Plan provided in Appendix B of this application.

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 B), however, these impacts will be temporary and will not result in a permanent decrease in soil productivity.

Mixing of topsoil with sub-soil could affect productivity of cropland. Soil segregation practices eliminate most mixing of topsoil and subsoil. Nashwauk will employ topsoil segregation methods in annually cultivated or rotated agricultural lands. Where appropriate, the contractor will use double ditching techniques that involve removing the top soil first to a stockpile along the outer edge of the easement. Then a second excavation will remove the sub-soil to a stockpile adjacent to the top soil. After installing the pipe, the contractor replaces the subsoil first and then the top soil such as to maintain soil segregation. Nashwauk will suspend construction activity on the right-of-way when conditions such as wet weather are conducive to soil compaction.

Nashwauk will implement the measures described in its AIMP (Appendix B) 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.

6.2.4 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. Topsoil depths along the route differ according to variations in climate, vegetation, and land use. A portion of the route 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. A significant portion of the route in mineland area is extremely variable and may have almost no topsoil. 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 the topsoil will be stripped to its full depth to a maximum of 12 inches (or as otherwise agreed to with the MDA) from the trench area. Nashwauk is proposing to limit the depth of topsoil stripping to 12 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. 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 in agricultural areas along the pipeline corridor. Implementation of proper topsoil segregation as detailed in the AIMP prepared by Nashwauk in consultation with the MDA (Appendix B) 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.

6.2.5 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. In addition, approximately 20 percent of the pipeline route crosses mucks or peat soils with organic surface horizons. These horizons also may be susceptible to rutting during pipeline construction. Nashwauk will minimize compaction and rutting impacts by implementing the measures described in AIMP (Appendix B). 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.

6.2.6 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 1 percent of the route crosses stony or rocky soils or mineland areas.

It is estimated that less than 1 percent of the pipeline route crosses areas with shallow bedrock (*i.e.*, bedrock within 5 feet of the surface). These are areas in Itasca County. If bedrock is encountered within the trench, Nashwauk only will backfill with this rock to the depth of the original bedrock layer. During clean up, Nashwauk 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.

6.2.7 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.

Nashwauk 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. Nashwauk 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

The ecological plant communities in the Nashwauk gas pipeline project area are influenced by topography and land uses. Timber harvesting is the primary land use that has impacted much of natural, forested vegetation in the region. Timber harvesting has influenced the composition and dynamics of most of forest cover in the region. Both clear cutting and selective harvesting of timber are applied to defined tracts of land within the pipeline right-of-way resulting in a patchwork like pattern of cleared recently cut areas and stands of forest cover of varying ages and compositions. Land uses are discussed in Section 4.0.

Much of the regional flora has been observed through field reconnaissance activities in the general area. The common ecological communities observed in the region are classified following the descriptions derived from the *Field Guide to the Native Plant Communities of Minnesota: The Laurentian Mixed Forest Province* (MNDNR 2003), a vegetation classification system for north central and northeastern Minnesota.

Much of the forested habitats in vicinity of the pipeline right-of-way consist of northern mesic hardwood forest, which is typical on well-drained to moderately-well-drained loamy soils, most often on stagnation moraines and till plains and less frequently on bedrock hills. The plant community association is dominated with sugar maple (*Acer saccharum*), basswood (*Tilia americana*), and northern red oak (*Quercus rubra*). The presence of paper birch (*Betula papyrifera*) and red maple (*Acer rubra*), and occasionally yellow birch (*Betula allegheniensis*) and quaking aspen (*Populus tremuloides*) are also observed.

Other common forested habitats in the vicinity of the pipeline are northern wet-mesic boreal hardwood-conifer forest. This hardwood forest is most commonly observed on level, clayey sites with high local water tables on glacial lake deposits, stagnation moraines, and till plains. The plant community association is variable, with canopy species generally dominated by quaking aspen, paper birch, and balsam fir (*Abies balsamea*). Other less frequent associates are red maple, white spruce (*Picea alba*), or black ash (*Fraxinus nigra*).

Very commonly found throughout the region, and certainly with the vicinity of the pipeline right-of-way are areas of second growth aspen forest, which are near even-age stands emerging after logging activities. This community has a tree canopy dominated with quaking aspen and balsam poplar (*Populus balsamifera*).

In areas where the proposed pipeline follows existing, linear, maintained right-of-ways the vegetation is dominated with herbaceous species and occasional shrubs. Wetland habitats are also commonly found through out the existing right-of-way, but are generally vegetated with herbaceous species and few shrubs due to maintenance activities keeping shrubs and trees from overgrowing the right-of-way. Uplands in the right-of-way are generally dominated with old field grasses and forbs.

7.1.1 LandSat Vegetative Cover Types

LandSat-Based Land Use-Land Cover (Raster) data was used to assess vegetative coverage of the alternative pipeline routes. These data originated from the Manitoba Remote Sensing Centre, and are downloadable from the MNDNR on-line Data Deli.

Typical vegetative communities for the region that could occur within the proposed pipeline route are described in Section 7.3.7.1 of the Route Application for the Preferred Route. Survey of these vegetative communities have not been completed for the Alternative Routes, however, impacts to vegetative communities within the pipeline route are summarized using land coverages provided by the LandSat-Based Land Use-Land Cover (Raster) data provided by the Manitoba Remote Sensing Centre.

Clearing of the right-of-way in non-agricultural areas will be limited to the minimum amount required to install safely the proposed pipeline. After construction, Nashwauk will only maintain a minimum amount of cleared right-of-way for operations and maintenance purposes. Construction of the proposed pipeline will result in short term impact to vegetation and not cause any appreciable change in the type of vegetation cover. Where the route is in forested use, vegetation maintenance to control tree and shrub regrowth along the right-of-way will be necessary.

The preferred pipeline route is 23.5 miles in length. A mix of wetland and upland habitat types fall within this corridor, and are summarized below in Table E-16. Wetland habitat is found within three (3) miles of the corridor. It is anticipated that establishment of new right-of-way for the proposed route would require tree and shrub clearing for installation of the pipeline. Deciduous, mixed wood, and regeneration/young forests are the most common vegetative habitats that will be cleared for the pipeline route. Grassland habitats are not anticipated to be cleared of trees and shrubs, although these habitats could be used for access and staging of construction equipment as the pipeline is installed. In the future, the right-of-way will be mowed/brushed as needed to manage re-emerging trees and shrubs.

Table E-16
Summary of Vegetative Communities and Miles Crossed within Major Alternative Routes

Vegetative Community [1]	Linear Feet (lf)	Approximate Miles
Alternative 1 (05-ICMSI-1)		
Coniferous Forest	2,042	0.4
Deciduous Forest	13,821	2.6
Grassland	25,897	4.9
Mixed Wood Forest	8,720	1.7
Regeneration/Young Forest	10,691	2.0
Shrubby Grassland	950	0.2
Open Water	98	0.0
Wetlands – Bogs	4,363	0.8
Wetlands – Marshes & Fens	5,095	1.0
Total	**71,677 linear feet**	**13.6 miles**
Alternative 2 (05-ICMSI-2)		
Coniferous Forest	4,338	0.8
Deciduous Forest	19,221	3.6
Grassland	27,463	5.2
Mixed Wood Forest	16,423	3.1
Regeneration/Young Forest	23,775	4.5
Shrubby Grassland	2,444	0.5
Open Water	98	0.0
Wetlands – Bogs	5,951	1.1
Wetlands – Marshes & Fens	5,438	1.0
Total	**105,151 linear feet**	**19.9 miles**
Citizen's Alternative 2 (07-MNPUC-1)		
Coniferous Forest	2,407	0.5
Deciduous Forest	42,045	8.0
Grassland	50,077	9.5
Mixed Wood Forest	24,113	4.6
Regeneration/Young Forest	12,271	2.3
Shrubby Grassland	9,844	1.9
Open Water	1,698	0.3
Wetlands – Bogs	18,336	3.5
Wetlands – Marshes & Fens	18,089	3.4
Total	**178,880 linear feet**	**33.9 miles**
Citizen's Alternative 2 (07-MNPUC-2)		
Coniferous Forest	3,725	0.7
Deciduous Forest	42,043	8.0
Grassland	32,316	6.1
Mixed Wood Forest	19,685	3.7
Regeneration/Young Forest	10,217	1.9
Shrubby Grassland	2,685	0.5
Open Water	134	0.0
Wetlands – Bogs	14,830	2.8
Wetlands – Marshes & Fens	15,979	3.0
Total	**141,614**	**26.8 miles**

[1] Plant Community description based on the LandSat-Based Land Use-Land Cover (Raster) data (Manitoba Remote Sensing Centre).

There would be tree cutting and vegetation clearing along the major alternative routes. However, impacts to vegetation and wildlife along the alternative routes would be expected to be minimal due to the widespread abundance of similar habitat present. Long-term impacts to vegetation associated with construction of any of the major alternative routes would primarily include the clearing and maintenance of forest vegetation along the permanent right-of-way. During construction activities, the removal of vegetative cover and exposure of soil would increase the potential for wind and water erosion, and could increase soil temperatures because of additional sunlight exposure.

Other construction impacts such as the clearing of temporary right-of-way and workspace would be largely short-term in nature. Nashwauk would minimize impacts to vegetation adjacent to the right-of-way by restricting construction activities to only the approved work areas. After construction of the proposed project would be completed, the work areas would be restored to pre-construction conditions to the extent possible. This restoration would include re-vegetation with seed mixtures specified by permit conditions, land managing agencies, or landowners. It is expected that the immediate restoration efforts following construction would help ensure only short-term impacts to vegetation. After construction is completed, Nashwauk would maintain a route right-of-way that would be cleared of trees and shrubs to facilitate operation, maintenance, and inspection of the pipeline. Along with pipeline markers, this right-of-way route would also enhance pipeline safety by prominently identifying the location of the pipeline.

Given that the major alternative routes are located within a timber production area subject to frequent clear cutting, comprised entirely of secondary growth, and within the forest setting of northern Minnesota, trees are not rare and no significant impacts to trees are anticipated due to any of the alternatives proposed. The need for tree mitigation is not anticipated, nor is mitigation for impacts to other vegetative communities occur anticipated for any of the alternatives discussed.

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.

On the working side of the corridor, an approximately 60-foot-wide area will be cleared of trees; of this, an approximately 40-foot-wide area will be maintained as additional permanently cleared right-of-way. Where 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 50 acres of forest land, of which 20 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, Nashwauk 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. Nashwauk 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, water bodies). 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.

7.2 Wildlife

Fauna (animals) within the vicinity of the major alternative route right-of-ways are typical to northern areas. The following discussion describes the wildlife habitats as related to the wetland and upland vegetative communities within the region, and faunal assemblages that are expected to occur within these habitats.

The fauna utilizing habitats found within the northern mesic hardwood forest are common to second growth mixed forests. Avifauna (birds) diversity is highest within this community compared to other habitats. This includes nesting and foraging habitats for songbirds and raptors. The northern mesic hardwood forest also provides suitable habitats for reptiles, primarily nesting habitats for turtles when aquatic habitats are in close proximity, and for the two species of snake found in northern Minnesota. The list of potential mammals that utilize this northern mesic hardwood forest includes predators and large ungulates such as moose and deer that are common to northern Minnesota. Beaver also utilize this community for forage.

As a wildlife habitat, the northern wet-mesic boreal hardwood-conifer forest provides similar habitat components as the northern mesic hardwood forest community. The well defined shrub layer and older tree canopy increases the habitat structure and complexity of the regional flora, and likely that area within the proposed right-of-way.

Faunal biodiversity within the second-growth aspen forest vegetative community is expected to be lower than forest habitats described above due to the lack of habitat complexity and structure, and tree diversity. This may be especially applicable to the younger stands of aspen. In contrast, these aspen communities also provide habitat for species that may not be found in other habitats and/or have habitat preferences that are exclusive to aspen forests. The presence of the aspen communities within the region likely increases the overall habitat complexity within the proposed project area. Quaking aspens are often considered keystone species for which many other species are dependent on. Aspens are an important part of the north woods food web for many levels of fauna ranging from microscopic insects, to beaver and moose. Aspen stands are likely perpetuated through clear cutting activities as many stands of aspens are even aged and shaped like clear cut parcels.

Wetland habitats for fauna are relatively diverse and common throughout the proposed pipeline right-of-way. The Type 8 bog habitat is the most unique and is potential habitat for rare species of fauna, primarily birds, insects and small mammals. All other types of wetlands (Types 1-7) that are not hydrologically connected to lakes are the most important for amphibians. These wetlands provide optimum amphibian breeding habitats due to a lack of fish (predators) populations.

Scrub-shrub and forested wetlands provide nesting and foraging habitat for songbirds and raptors. The forested bog wetlands also provide habitat for insect fauna that are exclusive to bog habitats. Open shallow and deep water marsh wetlands and the lake shore fringes provide foraging habitats for wading birds, rails, and waterfowl. Fish habitats are typically restricted to lakes in the region, but the preferred pipeline right-of-way does not specifically cross any lakes in the area.

7.2.1 Crossings of Rivers, Streams, and Bodies of Water

There are several streams, rivers, and bodies of water within the vicinity of the major route alternatives. There are several water crossings associated with these pipeline corridors, however detailed analyses have not been completed at this time. Tables 7-9 and 111 describe which of these water resources will be crossed per major alternative routes. Fisheries habitat analyses associated with these water resources have not been completed in detail. Wetlands associated with the pipeline route alternatives project area are discussed under a separate section specific to potential wetland impacts.

7.2.2 General Construction and Operation Impacts and Mitigation

Construction and operation of the 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 is in an area predominantly available for wildlife movement and relocation. 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 reestablished. 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. It is anticipated that the incremental loss of this forested habitat along the existing cleared right-of-way will not significantly affect wildlife populations. Nashwauk will consult with the MDNR and USFWS regarding the restoration and revegetation of any designated wildlife areas crossed depending on final route selected.

7.3 Fisheries

7.3.1 Existing Fisheries Resources

The fisheries habitat in the pipeline Route alternatives project area has not been evaluated in detail. Information regarding the type of water body, river, or stream that is crossed due to the project alternatives is quantified in the table of combined environmental analyses.

Smaller streams in the project area can be important for allowing fish to move between more permanent suitable habitats, but are generally not primary fishery resources. If fish species are present in these small stream systems, they tend to be dominated by small non-game species such as Cyprinids (minnows, dace, creek chub) and Percids (darters).

The rivers in the project area, primarily the Swan River, Prairie River, and their tributaries, are more significant for fisheries than the smaller streams. Both of these river systems discharge into the Mississippi River and serve to connect many of the lakes including Trout Lake, Holman Lake, Twin Lake, and Swan Lake. Because of the interconnectedness of these rivers and lakes, the fish assemblages are likely to be similar in most of these rivers. While specific data have not been provided, it is likely that the rivers would support prime game fish species such as northern pike (*Esox lucius*), largemouth bass (*Micropterus salmoides*), panfish (*Lepomis* spp.), and possibly walleye (*Sander vitreus*).

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. To minimize the potential for adverse impacts on fisheries at river and stream crossings, Nashwauk will implement erosion and sediment control measures specified in the AIMP (Appendix B) and limit the duration of construction in these water bodies. 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. 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 water body crossings until immediately before the pipeline is installed across the water body. 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.

7.4 Threatened And Endangered Species

The following discussions regarding threatened, endangered, and other rare species are separated based on federal and state protection and regulatory authority.

7.4.1 Federal Protected Species

The entire Nashwauk pipeline project area has potential habitat for or is with in the range of three federally-listed species, bald eagle (Haliaeetus leucocephalus – federal status, de-listed threatened), gray wolf (Canis lupus – federal status, threatened); and Canada lynx (Lynx canadensis – federal status, threatened).

The federal Endangered Species Act is regulated by the U.S. Fish & Wildlife Service (USFWS) and entire pipeline project area is within USFWS Region 3. The Region 3 list of federally protected species describes Itasca County, Minnesota as occurring within the breeding range of bald eagle, within primary range of the gray wolf, and within range of the Canada lynx. There are no federally protected plant species identified by the USFWS within the pipeline right-of-way project area.

The USFWS should be contacted by the Minnesota Department of Commerce, as the lead agency reviewing this permit, to request if there is a need for Endangered Species Act Section 7 Formal Consultation, and for general guidance to ensure compliance with the federal Endangered Species Act related to the proposed project activities.

7.4.2 Minnesota Protected Species

The MNDNR Natural Heritage Information System (NHIS) database contains documented occurrences of non-status (tracked), special concern, threatened, and endangered species; sensitive ecological and natural resources; and, results of the Minnesota County Biological Survey (MCBS). This data request was made June 8, 2007.

State-listed threatened or endangered species are protected under the Minnesota Endangered Species Statute (Minnesota Statutes, Section 84.0895). The MNDNR was contacted to request a review of the NHIS for occurrences within the Nashwauk, Taconite, and Bovey regions relative to the proposed pipeline right-of-way. At the request of the MNDNR, the specific locations of these occurrences are not provided in this permit application to protect the integrity of these rare or protected species.

The results of this data request show several occurrences of state-listed rare or protected species identified by the MNDNR NHIS within the Nashwauk, Taconite, and Bovey areas. Of these occurrences, several are within 0.5-mile of the proposed pipeline right-of-way for the major route alternatives. The following table summarizes these occurrences within 0.5-mile per each major route alternative.

Table E-17. State-listed Species within 0.5-mile of Alternative Route Locations			
NHIS Occurrence Number	**Scientific Name**	**Common Name**	**Protection Status[1]**
Alternative 1 (05-ICMSI-1)			
Flora			
5417	*Ranunculus lapponicus*	Lapland Buttercup	SPC
31538	*Ranunculus gmelini*	Small Yellow Water Crowfoot	NON
Fauna			
9526	*Haliaeetus leucocephalus*	Bald Eagle	SPC
2193	*Haliaeetus leucocephalus*	Bald Eagle	SPC
18786	*Falco peregrinus*	Peregrine Falcon	THR
Alternative 2 (05-ICMSI-2)			
Fauna			
16282	*Haliaeetus leucocephalus*	Bald Eagle	SPC
Citizen's Alternative 1 (07-MNPUC-1)			
Flora			
1054	--	Native Plant Community, Undetermined Class	--
30927	*Botrychium matricariifolium*	Matricary Grapefern	NON
24083	*Botrychium simplex*	Least Moonwort	SPC
32633	*Botrychium rugulosum*	St. Lawrence Grapefern	THR
28510	*Platanthera flava var. herbiola*	Tubercled Rein-orchid	END
30846	*Spiranthes casei*	Case's Ladies'-tresses	NON
28537	*Liparis liliifolia*	Lilia-leaved Twayblade	NON
32636	*Botrychium rugulosum*	St. Lawrence Grapefern	THR
24107	*Botrychium simplex*	Least Moonwort	SPC
24655	*Platanthera flava var. herbiola*	Tubercled Rein-orchid	END
14002	*Haliaeetus leucocephalus*	Bald Eagle	SPC
28513	*Sparganium glomeratum*	Clustered Bur-reed	SPC
27788	*Potamogeton vaseyi*	Vasey's Pondweed	SPC
27800	*Potamogeton vaseyi*	Vasey's Pondweed	SPC
29251	*Polemonium occidentale ssp. lacustre*	Western Jacob's Ladder	END
29207	*Arethusa bulbosa*	Dragon's-mouth	NON
30845	*Malaxis monophyllos var. brachypoda*	White Adder's-mouth	SPC
29264	*Arethusa bulbosa*	Dragon's-mouth	NON
29253	*Cardamine pratensis var. palustris*	Cuckoo Flower	NON
Fauna			
29258	*Botaurus lentiginosus*	American Bittern	NON

Citizen's Alternative 2 (07-MNPUC-2)			
Flora			
1054	--	Native Plant Community, Undetermined Class	--
30927	*Botrychium matricariifolium*	Matricary Grapefern	NON
24083	*Botrychium simplex*	Least Moonwort	SPC
32633	*Botrychium rugulosum*	St. Lawrence Grapefern	THR
28510	*Platanthera flava var. herbiola*	Tubercled Rein-orchid	END
30846	*Spiranthes casei*	Case's Ladies'-tresses	NON
28537	*Liparis liliifolia*	Lilia-leaved Twayblade	NON
32636	*Botrychium rugulosum*	St. Lawrence Grapefern	THR
24107	*Botrychium simplex*	Least Moonwort	SPC
24655	*Platanthera flava var. herbiola*	Tubercled Rein-orchid	END
18648	*Myriophyllum tenellum*	Leafless Water Milfoil	NON
18227	*Littorella uniflora*	American Shore-plantain	SPC
27797	*Utricularia gibba*	Humped Bladderwort	NON
27796	*Elatine triandra*	Three Stamened Waterwort	NON
27795	*Utricularia gibba*	Humped Bladderwort	NON
29251	*Polemonium occidentale ssp. lacustre*	Western Jacob's Ladder	END
29207	*Arethusa bulbosa*	Dragon's-mouth	NON
30845	*Malaxis monophyllos var. brachypoda*	White Adder's-mouth	SPC
29264	*Arethusa bulbosa*	Dragon's-mouth	NON
29253	*Cardamine pratensis var. palustris*	Cuckoo Flower	NON
Fauna			
29258	*Botaurus lentiginosus*	American Bittern	NON

[1] Non-status – No state protection status, but species may be monitored due to other concerns
END - Endangered
THR – Threatened
SPC – Species of Special Concern

7.5 General Construction and Operation Impacts and Mitigation

Nashwauk will continue to consult with the MNDNR 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, surveys to confirm their presence may be necessary. Subsequent mitigation plans to avoid and minimize impacts on affected species may also become necessary. Nashwauk also will consult with the MNDNR and USFWS to determine the exact location of any known bald eagle nesting sites that are within the project vicinity. If these sites are located in close proximity to construction areas, Nashwauk 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 ¼ mile of the pipeline route are active and/or avoiding construction within ¼ mile of active nests during the bald eagle's nesting season between February 1 and August 15.

8.0 WATER RESOURCES

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.

8.1.1 Surficial Aquifers

Surficial aquifers occur above the bedrock in unconsolidated sediments deposited by glaciers, streams, and lakes. 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.

Maps in Appendix D show 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.

8.1.2 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. 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.

8.1.3 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 in Itasca County

8.1.4 Public Water Supply Wells

Nashwauk 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.

8.1.5 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 route does not cross any Wellhead Protection Areas (MDH, 2005);

8.1.6 Domestic Water Supply Wells

Nashwauk 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. Nashwauk's review of the CWI database identified domestic water supply wells within 200 feet of the pipeline route.

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 preconstruction 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. 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, Nashwauk does not anticipate that blasting will be required during project construction. To the extent it is necessary, however, Nashwauk will implement safeguards to prevent or minimize effects to groundwater resources. Nashwauk 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. Nashwauk 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, Nashwauk 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 appropriate emergency contacts and reporting requirements. As part of pipeline operations, Nashwauk 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 Permit Application provides a description of Nashwauk's programs for preventing accidental releases of natural gas

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 will cross portions of the Upper Mississippi River Basin.

9.1 Waterbody Crossings

9.1.1 Existing Water bodies

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 water bodies (lakes, streams, rivers, and drainage ditches) along the pipeline route. This review identified 33 water bodies crossed by the proposed pipeline route, including 24 perennial streams and 9 intermittent streams. Six of these water bodies are designated as Protected Waters by the MDNR. The preferred pipeline route does not cross any major rivers.

9.1.2 State Designated Trout Streams

Minnesota Rule 6264, Subp. 4 designates trout streams in Minnesota. Alternatives 10 and 11 of the major pipeline route alternatives cross designated trout streams.

9.1.3 Water body Construction Methods

Nashwauk is planning to install the pipeline under most streams using the open-cut method; Nashwauk also is evaluating the use of directional drilling methods to cross the sensitive water bodies. The following sections describe typical construction procedures that will be used to install the proposed pipeline across water bodies.

9.2 Clearing and Grading

Nashwauk 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.

Before trenching, Nashwauk may need to grade approaches to water bodies 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 water body from the right-of-way. Extra workspaces at water body 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 water body bank to minimize the potential for sediment to flow off the construction right-of-way and back into the water body. Grading will be directed away from the water body to reduce the potential for material to enter the water body.

9.2.1 Temporary Equipment Bridges

To allow the passage of equipment along the construction right-of-way, temporary bridges will be installed across water bodies, with the possible exception of water bodies that are too wide to bridge and minor water bodies 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 water body. 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 water body with or without a culvert; 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.

9.2.2 Trenching and Installation

After the initial clearing and grading is completed, the pipeline will be installed across the water bodies using one of these methods: open-cut, dam-and-pump, or directional drilling. These methods are described below.

9.2.2.1 Open-cut Method

The open-cut method is a water body crossing technique that often minimizes total duration of in-stream disturbance. This method will involve excavating the trench through the water body or ditch using draglines or backhoes operating from the stream banks. Spoil excavated from the water body 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 water body. 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 water body 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.

Nashwauk will attempt to complete in-stream trenching and backfilling within 24 hours for minor water bodies (<10 feet wide) and within 48 hours for water bodies 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.

9.2.2.2 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 water body 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 water body bed or adjacent banks. The pump capacity will be greater than the anticipated flow of the water body 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 water body 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 water bodies or wetlands. Backhoes working from one or both water body banks, or within the isolated water body bed, will excavate the trench across the water body 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.

9.2.2.3 Directional Drilling Method

Nashwauk will evaluate use of the directional drilling method at selected water body crossings. This method can be used to minimize or avoid impacts on the streambed, banks, and associated riparian vegetation at the water body 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 water body.

Directional drilling is accomplished in three general stages. The first stage will consist of drilling a small diameter pilot hole along a pre-determined path under the water body. 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.

Nashwauk will conduct geotechnical investigations to evaluate the feasibility of using this method at the selected water bodies. Geotechnical investigations are necessary because the pipeline route will cross regions with soils that may not be conducive to directional drilling 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 this method at the water body crossing, an alternate environmentally acceptable method will be specifically designed for the crossing.

9.2.3 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 directional drilling 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 water bodies. 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 water bodies or wetlands.

9.2.4 General Construction and Operation Impacts and Mitigation on Water bodies

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. Nashwauk's proposed water body construction methods, specifically with respect to erosion control, bank stabilization, and bank revegetation, will minimize short- and long-term impact to the water bodies 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 water bodies. 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 water body, causing increased water temperature which potentially could be detrimental to coldwater fisheries. Nashwauk will avoid and minimize impacts to water bodies by implementing the erosion and sediment control measures described in the AIMP (Appendix B). Nashwauk also will limit the duration of construction within water bodies and limit equipment operation within water bodies 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 may be used at selected water bodies to avoid and minimize impacts to these water bodies. The directional drilling method is a well-established construction technique for installing pipelines under large water bodies that avoids impacts associated with conventional open-cut methods. Directional drilling installations have the potential to affect water bodies, however, through inadvertent releases of drilling muds during construction. If directional drilling is used to cross water bodies, Nashwauk will develop and implement an Directional Drilling 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 water body could affect aquatic resources and contaminate the water body downstream of the release point. Nashwauk will minimize the potential impact of spills of hazardous materials by adhering to the relevant provisions in its AIMP (Appendix B).

9.2.5 Hydrostatic Testing

Nashwauk 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. Nashwauk is evaluating potential sources for appropriating hydrostatic test water, including major water bodies crossed by or adjacent to the proposed pipeline and/or groundwater sources such as high-capacity irrigation wells or municipal wells. Nashwauk also is evaluating transferring water from one test section to another to minimize the total quantity of water needed to complete the hydrostatic test. Nashwauk 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 water body where it was appropriated, or discharged to a different water body 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 water bodies, energy dissipation devices will be used to reduce the discharge energy to prevent stream bottom scour. Nashwauk 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.

9.3 Wetland Crossings

Nashwauk 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, Nashwauk used the NWI data to estimate the number, size, and locations of wetlands along the pipeline route. Nashwauk will conduct wetland delineation surveys along the pipeline route in the fall of 2007 or Spring 2008 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).

9.4 Wetlands

Wetlands are defined by the U.S. Army Corps of Engineers (USACE) (*Federal Register,* 1982) and the U.S. Environmental Protection Agency (EPA) (*Federal Register,* 1980) as follows: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

According to the USACE, one positive indicator (except in certain situations) from each of three elements must be present in order to make a positive wetland determination, which are as follows:

- Greater than 50 percent dominance of hydrophytic plant species;
- Presence of hydric soil; and
- The area is either permanently or periodically inundated, or soil is saturated to the surface during the growing season.

Wetlands in the project area are regulated by several agencies including the USACE and EPA at the federal level, and the Minnesota Board of Water and Soil Resources (BWSR) and the Minnesota Department of Natural Resources (MDNR) at the state level.

At the federal level, Section 404 and Section 401 of the Clean Water Act provide regulation of wetlands that are hydrologically connected to U.S. Navigable Waters. The Minnesota Wetland Conservation Act (WCA) regulates wetlands at the state level (Minn. R. ch. 8420). Itasca County Soil and Water Conservation District has accepted responsibility for administering the WCA in the project area. Other state wetland regulations include designated Protected Waters and Protected Waters Wetlands regulated by the MDNR (Minn. R. 6115.0010–6115.0810). The Ordinary High Water Level (OHWL), as established by the MDNR, of Protected Waters Wetlands defines the upper extent of jurisdiction by the MDNR on these protected habitats.

In Minnesota and for the project, wetland impacts may require permits or approvals from as many as three agencies, the USACE (and the EPA through the USACE), the designated WCA Local Government Unit (LGU) under the oversight of BWSR, and the MDNR. In contrast, impacts to wetlands that are hydrologically isolated from U.S. Navigable Waters and are not MDNR Protected Waters Wetlands may only require WCA approval. However, formal jurisdiction of these wetlands is determined by each respective agency.

9.4.1 Wetland Identification and Mapping Process

Wetlands were identified, assessed, and where possible field delineated for the routes of the proposed gas pipeline corridors. Field investigations were not performed in areas where land access had not been granted. Wetland delineations will be conducted in these areas for the corridors and site following final route selection. In general, assessment of the wetlands are completed in three successive stages:

- Off-Site Assessment
- On-Site Screening
- Field Wetland Delineation

9.4.2 Off-Site Assessment

Off-site assessment was conducted first through remote sensing to identify potential wetland locations, wetland type and conditions, and to engage in preliminary planning and siting of facilities. Several resources were used in the off-site assessment including:

- USFWS National Wetlands Inventory ("NWI")
- U.S. Geological Survey ("USGS") topographic maps
- MDNR Protected Water Inventory ("PWI")
- Itasca County Soil Survey
- Farm Service Agency Aerial photographs (2003)
- Preliminary plans for the pipeline routes
- Local land-use maps

Through this off-site assessment, the above-mentioned resources were used to create a preliminary map of potential wetland habitats, including National Wetland Inventory (NWI) boundaries, where available, overlaid on aerial photography using GIS. The preliminary map was then used for preliminary site planning and for on-site screening of wetland locations throughout the property. The above-referenced off-site methods were also utilized to identify wetland locations, types and estimates of wetland impacts for the areas of the pipeline corridors. Permission has not yet been received from all landowners and easement holders where these corridors are proposed. On-site field delineation of wetlands in these areas will be completed as soon as practicable.

9.4.3 Existing Wetland Resources

The analysis of the NWI data identified approximately 3 miles of wetlands along the preferred pipeline route, which is about 8 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 routes. 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 water body discussion above. Common plant species found in wetlands crossed by the pipeline route are discussed in Section 7.1.1.2.

Based on NWI wetland data, the proposed pipeline will cross 31 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 Nashwauk's existing pipelines. Nashwauk will verify the size and characteristics of these wetlands as part of its field delineations.

9.4.4 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. In general, construction activities will be minimized in wetlands to reduce the disturbance to vegetation and soils and to maintain wetland hydrology.

9.4.5 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.

9.4.6 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.

9.4.7 Backfilling, Cleanup, and Revegetation

After the pipeline is installed in the trench, Nashwauk 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. Nashwauk 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 water body or undisturbed portions of the wetland. Timber construction mats, if used, will be removed during the cleanup operations.

Nashwauk 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, Nashwauk will seed unsaturated wetlands with a temporary cover crop of annual ryegrass. No lime, mulch, or fertilizer will be used in wetlands.

9.4.8 General Construction and Operation Impacts and Mitigation on Wetlands

The NWI data indicates that about 31 wetlands will be crossed by the project. Assuming a 100-foot-wide construction right-of-way, pipeline construction across these wetlands will result in temporary impacts to approximately 31 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). 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. Nashwauk will minimize wetland impacts by implementing the mitigation measures described in its AIMP.

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, Nashwauk periodically will remove woody vegetation from forested and scrubshrub 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, Nashwauk will maintain an additional 35-foot-wide right-of-way in an herbaceous state; Nashwauk 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

Nashwauk hired the 106 Group who reviewed existing site file data maintained by the Minnesota Historical Society to identify previously recorded cultural resources within the proposed construction right-of-way for the original preferred route. This review did not identify any archaeological sites or historic built property.

10.2 Consultation With Federal And State Agencies

Nashwauk 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. Nashwauk 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, Nashwauk 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, Nashwauk will ask their subcontractor the106 Group to 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 Nashwauk anticipates that the field surveys will be conducted between the spring of 2008 or fall of 2007. 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 Nashwauk Blackberry Pipeline Project, Nashwauk expects that the COE will contact make any required contacts as part of their normal review and notification process

10.4 General Construction And Operation Impacts And Mitigation

As noted above, Nashwauk 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, Nashwauk 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 boring or directional drilling 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. Nashwauk 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

11.1.1 State-Designated Recreation Areas

11.1.1.1 State Forest Land

If the pipeline route crosses any state managed forest land Nashwauk will be required to obtain a license from the MDNR to construct the pipeline across these state forests. 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.

11.1.1.2 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 may cross WMAs depending on the final route chosen. Nashwauk will be required to obtain a license from the MDNR and follow all mitigation and restoration requirements if it chooses to construct the pipeline across any WMA.

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 construction of Nashwauk's pipeline corridor will minimize potential impacts on public lands and recreational areas in the right-of-way 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. 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. Nashwauk 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.

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. Nashwauk will coordinate with the MDNR and local governments regarding the river crossings.