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ENBRIDGE PIPELINE
VISUAL IMPACT ASSESSMENT

DRAFT
October 29, 2008
VISUAL IMPACT ASSESSMENT

Produced for
Enbridge
by HNTB Corporation

DRAFT
October 29, 2008
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INTRODUCTION
INTRODUCTION

Project Scope

This Visual Impact Assessment examines the Enbridge Alberta Clipper/Southern Lights and Great Lakes alternative pipeline corridor alignments (Fig. 1) and their visual impacts on the landscape within and adjacent to the Chippewa National Forest (CNF). The document includes a plan for mitigating visual impacts.

Process

The methodology used in this assessment is based on the Visual Impact Assessment process developed by the Minnesota Department of Transportation (Mn/DOT VIA). This process has been used to assess visual impacts that would be caused by the construction or re-construction of state and federal corridor projects within Minnesota for nearly 20 years, including several highway projects in the Chippewa National Forest. For this assessment the Mn/DOT VIA process has been augmented to include visual impact assessment techniques developed by the Federal Highway Administration (FHWA) and scenic management practices developed by United States Forest Service (USFS).

The FHWA uses the concepts of landscape units, visual assessment units, and key views when developing a visual impact assessment. In its process of assessing scenic attractiveness, the USFS divided the Chippewa National Forest into landscape units called Landtype Associations (LTA). This assessment adopts the LTA as a description of the visual resources in a particular geographic area.

The FHWA further divides landscape units into visual assessment units with key views. A visual assessment unit is the specific area that is visible from a particular location. A key view is a representative or especially critical view within the visual assessment unit. For this assessment, key views are where one of the pipeline corridors could be seen, typically from a roadway or trail. Most of these key views are where a road, trail, or navigable waterway crosses the pipeline, while a few are from roads that parallel the pipeline.
Figure 1: Proposed Routes and Key Views

- Alberta Clipper and Southern Lights Route
- Great Lakes Alternative Route
- Cass Lake
- Lake Winnibigoshish
- Mississippi River
- Pike Bay Ball Club
- Portage Lake
- Leech Lake
- Sixmile Lake
- Portage Lake
- Cass Lake
- Leech Lake

Legend:
- Alberta Clipper/Southern Lights Key View
- Alberta Clipper Route
- Southern Lights Route
- Great Lakes Route Key View
- GLG_Revised
- Chippewa National Forest Limits

0 5,000 10,000 Feet
FIGURE 2: Scenic Integrity Objective

Legend
- Alberta Clipper Route
- Southern Lights Route
- Great Lakes Alternative Route

Scenic Integrity Objective (SIO)
- High
- Medium
- Low
Viewers in this assessment area all have views to the corridors being considered. Although both the Mn/DOT and FHWA VIA processes evaluate views from the corridor, in this case it was determined that since use of the corridor would be prohibited (limited to maintenance workers and regulatory personnel, who are there to view evidence of a disturbed pipeline, not the environmental context), it was not necessary to evaluate views from the corridor.

The scenic management practices used by the USFS also affected how the Mn/DOT VIA process was applied to this corridor. The USFS used its Scenery Management System (SMS) to evaluate and manage scenic resources throughout the Chippewa National Forest. The forest managers documented their approach in a July 2004 Land and Resource Management Plan. This plan classified landscapes and identified goals and objectives for maintaining, enhancing, restoring, and monitoring Scenic Integrity for each landscape.

FIGURE 3: VISUAL IMPACT ASSESSMENT PROCESS
According to SMS, Scenic Integrity refers to the degree of naturalness or disturbance (created by human activities) visible in the landscape. The highest ratings are given to those landscapes with little or no deviation from their natural character, and little if any evidence of human disturbance or management. If the existing or proposed pipeline would lessen the Scenic Integrity of a given area, mitigation would be required.

The USFS SMS process results in Scenic Integrity Objectives (SIOs) being assigned to specific landscapes as part of their required Forest Planning Process. The SIOs guide “management activities needed to achieve desired scenic conditions.” The CNF’s 2004 Revised Forest Plan considered six alternative management approaches with different emphases on scenic integrity. The SMS Handbook calls for considering the scenic integrity levels in each Forest Plan management alternative and once a preferred alternative is selected, the scenic integrity levels become SIOs.

The adopted plan for the CNF, Modified Alternative E, emphasizes improving scenic quality in views from popular travel routes and high use areas. Consequently, although the U.S. Highway 2 corridor through the CNF inevitably exhibits significant human disturbance, it receives a High SIO rating because it is one of the primary routes by which people experience and access the forest.

See Fig. 2 for an overview of (SIO) ratings. SIOs are also shown on Figs 4 through 8. The Visual Impact Assessment process is illustrated in Fig. 3.

Organization and Content

I. INVENTORY AND ANALYSIS

A. Landscape Units, Visual Assessment Units and Key Views

The FHWA VIA defines Landscape Units as “a portion of the regional landscape that exhibits a distinct Visual Character. The landscape often corresponds to a place or district that is commonly known among local viewers.” Landscape Units may be defined by pronounced landforms or geological forms, by the mass vegetation of an ecological community or by human-made built surroundings and the environment of the transportation corridor. The edges of the Landscape Unit may be diffuse or well-delineated.

To define Landscape Units, this assessment adopts the Chippewa National Forest’s Landscape Character Descriptions for Landtype Associations (LTAs), 1999. This documentation was used by CNF to evaluate scenic resources for its
The Landscape Character Descriptions define the natural and social environments of LTAs in all the areas of the CNF. Both the Alberta Clipper/Southern Lights and the Great Lakes alignments cross or are in close proximity to four LTAs:

- Bemidji Sand Plain (Bsp)
- Guthrie Till Plain (Gtp)
- Bena Dunes and Peatlands (Bdp)
- Rosy Lake Plain (RLp)

GIS maps delineating the LTAs are included as Figs. 4 through 6 (Alberta Clipper) and 7 through 8 (Great Lakes). The natural and social environments for these LTAs and their past management techniques are described in the Appendix.

FHWA VIA defines Visual Assessment Units as “subsets of Landscape Units that comprise all the surface areas visible from an observer’s viewpoint or from a series of viewpoints in the transportation corridor.” The logical Visual Assessment Units are the locations where the pipeline corridor is perceived from a roadway, forest road, hiking trail or waterway.

The Assessment identifies 24 Visual Assessment Units as Key Views, 16 for the Alberta Clipper/Southern Lights route and eight for the Great Lakes alignment. The Key Views are summarized in Table 1 and Figure 1. A detailed airphoto map of each Key View is included in the Inventory and Analysis of the report.

1. Visual Resources for Each Key View

This section describes the existing environment and visual character based on: LTA information; GIS data and high-resolution airphotos of the alignments provided by Enbridge; the CNF Land and Resource Management Plan, the CNF Environmental Impact Statement, Forest Plan Revision Summary; and on-site observations, illustrated with photographs.

Information on Management Areas (MA), as defined by CNF, is included for each Key View to further characterize the way the landscape appears and is intended to appear. (See Figs. 9 through 13.)
A. ALBERTA CLIPPER/SOUTHERN LIGHTS ALIGNMENT

<table>
<thead>
<tr>
<th>ID#</th>
<th>KEY VIEW</th>
<th>LTA</th>
<th>SIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC-1</td>
<td>Heartland Trailhead</td>
<td>none</td>
<td>none (nearest is Bsp to east)</td>
</tr>
<tr>
<td>AC-2</td>
<td>Pike Bay Loop</td>
<td>Bsp</td>
<td>High</td>
</tr>
<tr>
<td>AC-3</td>
<td>Cuba Hill Road</td>
<td>Gtp</td>
<td>High</td>
</tr>
<tr>
<td>AC-4</td>
<td>Ketchum Road / SF-2135</td>
<td>Bsp</td>
<td>High</td>
</tr>
<tr>
<td>AC-5</td>
<td>Sucker Bay Road / NF-2132</td>
<td>Bsp + close to Gtp</td>
<td>High</td>
</tr>
<tr>
<td>AC-6</td>
<td>Portage Lake Road NW / F-2175</td>
<td>Bsp</td>
<td>High</td>
</tr>
<tr>
<td>AC-7</td>
<td>Iowana Road / NF-2131</td>
<td>Bsp</td>
<td>High</td>
</tr>
<tr>
<td>AC-8</td>
<td>Portage Road NE</td>
<td>Bdp</td>
<td>High</td>
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<tr>
<td>AC-9</td>
<td>Wildwood Drive NW</td>
<td>Bdp</td>
<td>High</td>
</tr>
<tr>
<td>AC-10</td>
<td>County Road 8 / First Avenue W</td>
<td>Bdp</td>
<td>High</td>
</tr>
<tr>
<td>AC-11</td>
<td>Old Sixmile Lake Road / NF-2102</td>
<td>Bdp</td>
<td>High</td>
</tr>
<tr>
<td>AC-12</td>
<td>Sixmile Lake Road NE / NF-2127</td>
<td>Bdp</td>
<td>High</td>
</tr>
<tr>
<td>AC-13</td>
<td>Mississippi River</td>
<td>Bdp</td>
<td>none (adjacent land is High)</td>
</tr>
<tr>
<td>AC-14</td>
<td>County Road 118</td>
<td>Bdp</td>
<td>Low</td>
</tr>
<tr>
<td>AC-15</td>
<td>County Road 137</td>
<td>Bdp</td>
<td>High</td>
</tr>
<tr>
<td>AC-16</td>
<td>County Road 18 / Great River Road</td>
<td>none (nearest is Rlp to west)</td>
<td>none (nearest is High)</td>
</tr>
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</table>

B. GREAT LAKES ALIGNMENT

<table>
<thead>
<tr>
<th>ID#</th>
<th>KEY VIEW</th>
<th>LTA</th>
<th>SIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>GL-1</td>
<td>County Road 143</td>
<td>Bsp</td>
<td>High</td>
</tr>
<tr>
<td>GL-2</td>
<td>Forest Road 2133</td>
<td>Gtp</td>
<td>Low</td>
</tr>
<tr>
<td>GL-3</td>
<td>Forest Road 2135</td>
<td>Gtp</td>
<td>Low</td>
</tr>
<tr>
<td>GL-4</td>
<td>Unnamed Road, SE of FR-2135</td>
<td>Gtp</td>
<td>Low</td>
</tr>
<tr>
<td>GL-5</td>
<td>Sucker Bay Road</td>
<td>Gtp</td>
<td>Medium</td>
</tr>
<tr>
<td>GL-6</td>
<td>Portage Road NE</td>
<td>Bsp</td>
<td>Medium</td>
</tr>
<tr>
<td>GL-7</td>
<td>County Road 8</td>
<td>Bdp</td>
<td>Medium</td>
</tr>
<tr>
<td>GL-8</td>
<td>Sixmile Lake Road</td>
<td>Bdp</td>
<td>High</td>
</tr>
</tbody>
</table>

TABLE 1. VISUAL ASSESSMENT UNITS AND KEY VIEWS
FIGURE 4: Landtype Associations and Scenic Integrity Objective Alberta Clipper West Section
FIGURE 5: Landtype Associations and Scenic Integrity Objective
Alberta Clipper Middle Section
**FIGURE 6:** Landtype Associations and Scenic Integrity Objective
Alberta Clipper East Section
FIGURE 7: Landtype Associations and Scenic Integrity Objective Great Lakes West Section
FIGURE 8:
Landtype Associations and Scenic Integrity Objective
Great Lakes East Section
FIGURE 9: Management Areas
Alberta Clipper West Section
FIGURE 11: Management Areas
Alberta Clipper East Section
2. Viewers for Each Key View

In the FHWA VIA, Viewers include “neighbors who can see or be seen from the transportation facility defined by land use (residential, retail, commercial industrial, agricultural, recreational or civic) and travelers who currently use the existing transportation facility or may use the new facility in the future.”

The definition of “viewers” has been refined to meet the needs of this particular project. Unlike a transportation facility, the pipeline corridor serves no travelers. All viewers are getting views to the facility and no viewers are getting views from it.

Therefore, the Assessment identifies the following viewers, none of them travelers as defined by FHWA:

- **Residents** who live or work in proximity to Key Views or travel the roads that cross the pipeline en route to their residences;

- **Recreational and CNF staff visitors** to rest areas, trails, campgrounds/camp sites, boat launches and other facilities who can see the pipeline corridor from these sites and/or who travel the roads or rivers that cross the pipeline corridor to reach them.

- **Highway visitors**, those who may view the pipeline corridor from U.S. Highway 2 or other major roads near to or intersecting the corridor.

General traffic data counts from 2006 for U.S. Highway 2 between Cass Lake and Deer River indicate 3,400 Average Annual Daily Traffic (AADT) and 690 Heavy Commercial Average Annual Daily Traffic (HCADT). More detailed traffic counts were available for County Highway 8 in Bena and for U.S. Highway 2 west of Deer River near the Mississippi River, and they are cited in the text. It should be noted that the pipeline corridors are only visible from U.S. Highway 2 at five locations, as discussed in the relevant Key Views.

3. Visual Quality for Each Key View

The CNF rates the scenic environment as SIO according to the evidence of management activities that are visible from roads, trails, recreation sites and lakes with access. The SIO boundaries lie at least
one-quarter mile from the actual locations of the travel ways, recreation sites or water bodies.

The SIO designation informs the Visual Quality for Key Views. FHWA VIA says that Visual Quality evaluations must “correlate with public judgments of visual quality well enough to predict those judgments and is used to identify specific methods for mitigating each adverse impact that may occur as the result of a project.” The SIO ratings meet this definition but also involve directives regarding the level of management that will be necessary to maintain the rating.

The Alberta Clipper/Southern Lights pipeline corridor predominantly traverses areas rated with a High SIO (Table 1, Section A), although Key View AC-1, Heartland Trail, is outside the CNF and nearest a Medium SIO rating. The Mississippi River Key View, AC-13, has a Low SIO, although the landscape adjacent the crossing is rated High. The Great Lakes alignment has SIOs ranging from Low to High (Table 1, Section B).

B. Visual Impacts

The change in Visual Resources that will result from the project is examined for each Key View. Visual Impacts to the landscape during the pipeline construction are summarized along with the expected effects after construction is completed. There appears to be no change to viewers, either number or type, as a result of pipeline construction.

II. SYNTHESIS

Visual Impacts for each alignment are summarized and Key Views with noticeable impacts are highlighted and discussed. The relative level of Visual Impacts for the two alignment is compared.

III. MITIGATION AND ENHANCEMENT

Methods and techniques to minimize Visual Impacts that merit further discussion are mentioned and Key Views suitable for possible enhancements are pointed out. Design alternatives to be explored in the Visual Mitigation Plan are introduced.
ALBERTA CLIPPER / SOUTHERN LIGHTS
ALIGNMENT
Visual Resources

This Key View site, immediately south of U.S. Highway 2, coincides with an entry point for the Mi-gi-zí Trail, a 19-mile paved route that parallels Highway 2 until Pike Bay Loop (AC-2). Directly across Highway 2, about 300 ft. north, is Cass Lake and a rest area with parking and lake access via docks, a joint use facility of MnDOT and the City of Cass Lake. A few widely spaced young pines stand between the trailhead parking area and a frontage road.

The view southeast is of an Enbridge valve site, enclosed in chain link fence. Mown turfgrass surround the facility, and mature deciduous trees are visible in the background.

The view east is of low herbaceous vegetation in the foreground, with Highway 2 and Cass Lake to the north, a narrow mass of small trees/shrubs extending parallel to the road, and a backdrop of mature deciduous trees to the south. A single conifer is visible in the mid-ground. The deciduous trees buffer an open wetland further east-southeast.

The view south and southwest is of partially open, shrubby wetland and sparse deciduous trees. Massed conifers are visible in the distant background.

To the west, viewers see the small expanse of trailhead parking lot and access drive in the foreground, with widely spaced small coniferous trees nearby. Mature deciduous trees appear to the south, and mixed coniferous-hardwood forest straight west. A paved frontage road/bicycle trail is visible to the right, with Highway 2 immediately beyond that.

From Highway 2, viewers see the paved parking lot, an open area of low, grassy vegetation immediately adjacent it and extending southwest along the current pipeline easement. A mass of shrubs and mature trees flank this open area to the north-southeast and runs parallel to the highway, between the bike path and the wetland. The valve site is prominent, especially to those traveling east on Highway 2.

Scenic Integrity Objective

The area is outside Chippewa National Forest. The nearest SIO is Medium, 710 ft. east of the key view area, followed by a long stretch of High SIO.

Landtype Association

The closest LTA is Bemidji Sand Plain (Bsp), 710 ft. to the east.

Management Area

Closest management areas to this non-CNF site are Riparian Emphasis (RE) and Unique Biological, Aquatic, Geological or Historical (UB), 720 and 735 ft. east and southeast, respectively.
1

KEY VIEW

Mi-gi-zi Trailhead

Viewers

Residents
Located a quarter mile from the residential portion of Cass Lake, the site will be viewed by residents who travel by foot, bicycle, or motorized vehicle east on Highway 2 or the adjacent trail.

Recreational Visitors
The area is particularly visible to hikers on the trail and to highway users stopping at the rest area north of Highway 2, including those using a dock immediately north of the site.

Highway Visitors
The site will be particularly visible to drivers or passengers in vehicles on this segment of the highway.

Hwy 2  AADT 3900  (2006)
Hwy 2  HCADT 750  (2006)

Visual Quality
Residents and visitors perceive the area as a transition zone, part of neither the forest nor the city. With natural vegetation, including mature trees and wetland, along with mown lawn and paved surfaces, the area has characteristics of both forest and city. Aside from the trailhead parking lot, no clear design intention guides viewers. The fenced valve station stands out as the most prominent landscape feature, after the lake.

Visual Impacts
Since the pipeline east of the trailhead will be installed by a horizontal directional drill (HDD), surface disturbance will be confined to the location of the HDD entrance and exit points. During construction, a staging area accommodating construction equipment and pipe will be apparent from Highway 2 and the trailhead, and ground level disruption will only affect an area of grassy vegetation and parking lot near the current valve station.
KEY VIEW

Mi-gi-zi Trailhead

From frontage road, looking south to valve station

Valve station
KEY VIEW AC-1: Mi-Gi-Zi Trailhead
**VIEW AREA**

**Between Mi-gi-zi Trailhead and Pike Bay Loop**

**Visual Resources**

The area between Mi-gi-zi Trailhead (AC-1) and Pike Bay Loop (AC-2), is a 2.5 mile stretch of landscape, a “view area” rather than a key view.

The proposed pipeline corridor here is characterized primarily by natural vegetation, punctuated for about half the views by a paved trail. A sandy OHV trail and U.S. Highway 2 are visible for a half-mile segment midway between Mi-gi-zi Trailhead and Pike Bay Loop, and also for a half mile immediately west of the loop road.

The first half mile of the area east of AC-1 runs through a wetland characterized by both herbaceous and woody vegetation. Pike Bay and a low railroad bridge is visible to the south.

An upland landscape dominates the western stretch, with a variety of native trees, shrubs and herbs visible in many combinations. Tree cover ranges from heavy to sparse. For the half mile west of Pike Bay Loop, trees are few, with low grassy vegetation prominent.

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**Scenic Integrity Objective**

With the exception of a 35-foot strip of Medium, on the far western edge of CNF, the entire area is rated High.

**Landtype Association**

Bemidji Sand Plain (Bsp)

**Management Area**

With the exception of a 35-foot strip of Riparian Emphasis (RE) to the west, the area is all classified Unique Biological, Aquatic, Geological or Historical (UB).

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**Immediately east of Mi-gi-zi Trailhead, looking south to wetland, Pike Bay and railroad bridge**

**Heading east on Mi-Gi-Zi Trail, with Highway 2 at left**
VIEW AREA

Between Mi-gi-zi Trailhead and Pike Bay Loop

Existing pipeline corridor, south of the resort/marina entrance on Hwy. 2, where the proposed pipeline jogs southeast across trails.

Looking west along trail, south of resort/marina entrance

Looking west on trail south of the Highway 2 intersection with Strawberry Point Road (FR-2174)

Looking east on trail near Strawberry Road (Highway 2 on far left)

Viewers

Residents
The area will be viewed by residents who travel by foot, bicycle, or motorized vehicle east on Highway 2, but only for a half mile segment midway between Mi-gi-zi Trailhead and Pike Bay Loop. It will be also visible to residents who use the trail.

Recreational Visitors
The area is often visible to Mi-gi-zi Trail users and intermittently visible to those traveling on the highway and the OHV trail.

Highway Visitors
The area will be intermittently visible to drivers or passengers in vehicles, primarily in a half-mile area midway between the trailhead and Pike Bay Loop where the pipeline corridor lies closest to the road.

Hwy 2  AADT 3900  (2006)
Hwy 2  HCADT 750  (2006)
Visual Quality

Visitors in this area are clearly within a trail system, which is about half the time visually connected with U.S. Highway 2 and a parallel OHV route, and half visually isolated among walls of trees and shrubs, lending a feeling of being surrounded by nature.

The first half-mile of the area east of AC-1 runs offers an open, panoramic view to Pike Bay, while a more closed feeling occurs further west. The variations in the views, due to vegetation type, width of corridor and adjacent conditions, make for an interesting ride or walk along much of this area.

Visual Impacts

Starting at the east end of this view area, viewers will notice little if any change until about a half-mile east of Mi-gi-zi Trailhead, where the pipeline corridor makes a southwesterly jog across the trail and railroad (directly south of the resort/marina entrance on Highway 2). Construction activities west of this jog would widen the existing cut zone from 30 ft. to more than 100 ft., lending an open feeling to an area that now feels quite enclosed. This would be most apparent to users of the OHV trail, but cyclists and hikers on the paved trail further south would also notice this widening, particularly where the new pipeline cross the trail.

Starting 700 ft. east of Stone Point Road NE, where the pipeline jogs north to parallel Highway 2, a 1500-ft.-long segment of trees will be removed during construction. These trees now serve as a buffer between Highway 2 and both the railroad and trail, so their removal will change the view for both highway and recreational visitors.

Additional tree removals during construction will effectively widen much of the Highway 2 corridor between Strawberry Point Road (FR-2174) and Pike Bay Loop, making for a less forested feel for motorists and exposing both OHV and paved trail users to the highway.
VIEW AC-1A:
East of Mi-gi-zi Trailhead
VIEW AC-1A: Between Mi-gi-zi Trailhead and Pike Bay Loop
VIEW AC-1A: West of Pike Bay Loop

Legend
- Alberta Clipper Route
- Southern Lights Route

Key View

Strawberry Lake

Pike Bay

US HWY 2

MI-GI-ZI TRAIL

West of Pike Bay Loop
KEY VIEW

Pike Bay Loop

Visual Resources

The Key View at Pike Bay Loop suggests a transition from paved traveled ways (highway and trail) to dense mixed forest and pine plantations.

The north view is the intersection of Pike Bay Loop and Highway 2, an open, maintained area punctuated by a stop sign and a variety of other roadway and park signage. Wood bollards protect and direct trail users. The view beyond the road, slightly above eye level, is entirely wooded, with both deciduous and coniferous species. A pine plantation dominates the view to the northeast.

To the south, viewers see a gravel road, rising to cross the railroad, then curving off to the west and out of view, surrounded by mature deciduous forest and understory.

Looking east from Pike Bay Loop, viewers see low herbaceous vegetation in the foreground, giving way to mixed woody vegetation in the midground and background. To the left, Highway 2 is partially visible behind sparse deciduous trees and shrubs occupying a ditch south of the road. A dense pine plantation is visible behind the road. The rail line and trail is visible to the right, with a thick massing of mature pines and some deciduous trees.

To the west, the view, left to right is thus: a backdrop of deciduous trees, the rail line, a linear mass of thickly planted mature pines, an open expanse of trail, a ditch filled with mixed herbaceous and woody vegetation, which parallels a curve in Highway 2 to the right. Additional vegetation lies beyond this, to the north and in the distant background.

Viewers

Residents
This site is viewed by residents of the area using Highway 2 or the trail, and a number of residents near Pike Bay.

Highway Visitors
The site is completely visible to highway users.

Hwy 2  AADT 3400  (2006)
Hwy 2  HCADT 690  (2006)

Recreational Visitors
Visitor-viewers include campsite, trail and other recreational users, and travelers on Highway 2. Forest Service staff and other visitors use the road to access an experimental forest area to the south.

Scenic Integrity Objective
High

Landtype Association
Bemidji Sand Plain (Bsp)
This site is located in the largest consolidated portion of the Bemidji Sand Plain, which stretches between the western forest boundary, near Cass Lake, to Portage Lake. The sandy soils and flat landscape create conditions favoring vegetation that is dependent upon fire for regeneration.

Management Area
Unique Biological, Aquatic, Geological or Historical (UB). Also, 54 ft. south of Recreational Use – Scenic Landscape (RU), which includes much of the south shore of Cass Lake and Highway 2.
This segment of UB is part of the Ten Section area, which contains old-growth red and white pine trees as individuals and stands. The area is not suitable for timber management.

RU emphasizes land and resource conditions that provide a scenic, natural-looking landscape for recreational activities. It includes provision of wildlife habitat, and may be highly developed or remote. Some areas may be suitable for timber management.
2 KEY VIEW

Pike Bay Loop

Visual Quality

Viewers see scattered vegetation and a mix of conifers and deciduous trees, which form a natural-appearing edge to the cut zone at several locations. The open cut zone parallel to Highway 2 is perceived as an extension of the road’s right-of-way rather than a nature trail. Past the clutter of pipe markers and trailhead bollards at this location, viewers looking south from the highway or the trail have a sense of primarily thick forest to the south. Mature trees and heavy shrub cover are broken slightly by an access road, running southeast from the railroad to the existing pipeline corridor. Residents or recreational users traveling north on Pike Bay Loop have a sense of being surrounded by trees, which hug the road and filter the view. The paved trail is partially visible to the east when approaching the railroad crossing.

Visual Impacts

Pipeline construction will eliminate a 130 ft. wide area of trees in a diagonal swath across Pike Bay Loop, on the edge of a densely forested area. The main effect from the trail crossing would be for those looking east and southeast, where the new open area roughly parallels an existing cut zone for about 500 ft. A triangle of forest, 175 ft at its widest, north, end, would remain between the two.
While an existing valve site will still be screened by the triangle of trees and additional vegetation to the east, nighttime viewers traveling on Pike Bay Loop may be more aware of the site lighting. Due to the 130-ft. wide swath of trees eliminated between the road and the valve site, less tall vegetation will be in place to screen and filter the light. Proper revegetation and management will fill in just over half of this swath, leaving a 65-ft. permanent cut zone.

For those traveling toward campsites to the south, the condition of being surrounded by forest away from the road and trail, would occur about 200 ft. further south than at present.

Southeast of the railroad crossing, a workspace would eliminate a section of vegetation that currently separates the trail from the road. Those traveling north on Pike Bay Loop, or in either direction on the trail, would also notice a much more open view, with the railroad crossing and trailhead more apparent than the surrounding vegetation.

Motorists on the highway would notice a wide open space to the south, a more noticeable break in a fairly continuous forested area.

The view to the west would be less affected, although a swath of vegetation in the roadside ditch falls within the temporary workspace and most likely would be removed, affecting the view of both trail users and highway visitors on Highway 2. Herbaceous vegetation and some shrubs, if properly managed, would regenerate following construction, although no trees would be visible to passers-by for some years.
KEY VIEW AC-2:
Pike Bay Loop
KEY VIEW

Cuba Hill Road

Visual Resources

The views east and west are characterized by clear swaths of primarily herbaceous vegetation along the existing pipeline corridor, extending into the distance, flanked by mature forest. The western view is dominated by deciduous vegetation, while the eastern view includes more massings of pine trees.

The roadside immediately south of the existing pipeline corridor is forested. Southern views follow the narrow gravel road curving south-southeast. To the north lies the slightly elevated rail line, a view flanked by mature deciduous trees close to the road.

Viewers

Residents
Cuba Hill Road accesses no private land, so use is primary by Forest Service staff, commercial loggers and forest visitors.

Highway Visitors
The area is not visible to highway users.
Hwy 2 AADT 3400 (2006)
Hwy 2 HCADT 690 (2006)

Recreational Visitors
The road leads to Cuba Hill Lookout, and is used by visitors exploring the forest. The Soo Line Snowmobile Trail crosses the northern portion of this area.

Scenic Integrity Objective
High

Landtype Association
Guthrie Till Plain (Gtp)
The least prevalent LTA in the Chippewa National Forest, with varied soil conditions that support a diverse range of forest communities.

Management Area
General Forest (GF) and Unique Biological, Aquatic, Geological or Historical (UB)
GF emphasizes providing a wide variety of good, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat.

The UB segment, approximately 20 ft north, between the pipeline route and Highway 2, is part of the Ten Section area, which contains old-growth red and white pine trees, as individuals and stands. Thus, unlike much of the General Forest MA, the area is not suitable for timber management.

From Cuba Hill Road looking east
Visual Quality

Viewers proceeding either north or southeast on Cuba Hill Road experience clearings in the forest for both the railroad and the pipeline corridors. The impression is of views opening and closing in succession.

Looking east and west at the pipeline crossing, viewers see a linear but somewhat natural-appearing opening with volunteer species of trees and shrubs and scattered conifers along the edge between the cut zone and the surrounding forest.

Visual Impacts

Pipeline construction will almost double the width of the current cut zone intersecting Cuba Hill Road, resulting in a much more open appearance, approximately 200 ft. of roadway without woody vegetation to the east and west. Two extra workspaces totaling 7,500 sf, flank Cuba Hill Road and will result in a small widening of the cleared area along the curve in the road.

Years later, given replanting and proper management, the temporary workspace will fill in, leaving a cut zone that is 20 to 30 ft. wider than its current configuration.

Neither construction nor long-term effects is likely to be visible from Highway 2.
Legend

- Key View
- Southern Lights Route
- Alberta Clipper Route

KEY VIEW AC-3: Cuba Hill Road
Visual Resources

Viewers standing directly at the Key View shown on the map, will notice a clear area to the north, extending both east and west and somewhat ahead along Ketchum Road, which, like Cuba Hill Road, crosses the rail line and intersects Highway 2. Rail signage is visible over the slight topographic rise of the rail grade.

The views east and west show mature mixed deciduous-coniferous forest, with a somewhat open area—a powerline clearing—visible to the east. Views to the south follow the narrow gravel road, flanked by mature deciduous trees close to the road.

Viewers

Residents
Residents living near Sucker Lake and some northern areas of Leech Lake use Ketchum Road for access.

Highway Visitors
Hwy 2 AADT 3400 (2006)
Hwy 2 HCADT 690 (2006)

Recreational Visitors
This road and crossing is used by forest staff and occasional visitors to access forest, wetland areas, and several creek impoundments.

Visual Quality

Viewers proceeding either north or southeast on Ketchum Road/ SF-2135 experience clearings in the forest for the BNSF Railroad and the pipeline corridor. The impression is of views opening and closing in succession.

Looking east and west at the pipeline crossing, viewers see a linear but somewhat natural-appearing opening with volunteer species of trees and shrubs and scattered conifers lining the edge between the cut zone and the surrounding forest.

Scenic Integrity Objective
High

CNF Landtype Association
Bemidji Sand Plain (Bsp)
This site is located in largest consolidated portion of the Bemidji Sand Plain. The sandy soils and flat landscape create conditions that favor vegetation that is dependent upon fire for regeneration.

Management Area
General Forest
This MA emphasizes providing a wide variety of good, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.
Visual Impacts

Pipeline construction will approximately double the width of the current cut zone intersecting Ketchum Road, resulting in a much more open appearance, approximately 230 ft. of roadway without woody vegetation extending east and west. Two extra workspaces totaling 7,500 sf, are located on both sides of Ketchum Road, extending the impact of the cleared area by about 50 ft. to the south.

Years later, given replanting and proper management, the temporary workspace will fill in, leaving a cut zone that is about 50 ft wider than its current configuration.

Neither construction nor long-term effects are likely to be visible from Highway 2.

Apart from the key view, about 5,900 ft. west of Ketchum Road, an existing valve site will be expanded for the new pipelines. The current valve site is barely visible to boaters on the northernmost section of Sucker Lakes, and expansion is likely to increase this visibility. Replacing existing vegetation, along with increasing shrubs and trees south of the valve site, is likely to be effective in screening this new structure and fence.
KEY VIEW AC-4: Ketchum Road (SF-2135)
Visual Resources

The views east and west are characterized by clear swaths of primarily herbaceous vegetation along an existing pipeline, extending into the distance, flanked by mature forest to the west, dominated by planted pine, and sparser, primarily deciduous forest to the east. The eastern view is more open, in part due to the presence of a fenced valve site and pipeline markers, surrounded by maintained grass.

The edge of the existing cut zone is very close to the new pipeline crossing. Viewers looking south see Sucker Bay Road, a two-lane, striped asphalt facility with paved shoulders, flanked primarily by a cut zone, with forest beyond. A south-facing viewer will see heavy mature trees to the west and a more sparse vegetation—both shrubs and trees—on the east side of the road.

To the north lies the slightly elevated rail line and signage, a view flanked by mature trees, primarily pine plantation.

Scenic Integrity Objective
High

Landtype Association
Bemidji Sand Plain (Bsp); close to Guthrie Till Plain (Gtp)

This site is located in largest consolidated portion of the Bemidji Sand Plain. The area was formed when meltwaters carried coarse textured sands away from the Koochiching glacial lobe. Soils have a slightly yellowish color and 93% of the area has slopes less than 6%. The sandy soils and flat landscape create conditions favoring vegetation that is dependent upon fire for regeneration.

The Guthrie Till Plan, located 140 ft. to the south, is characterized by varied soil conditions that support a diverse range of forest communities. Although topography is varied, 96% of the area has slopes less than 6%.

Management Area
General Forest

This MA emphasizes providing a wide variety of goods, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.

Viewers

Residents
This road is used by residents living on or near Leech Lake to the south and Sucker Lakes to the east.

Highway Visitors
Hwy 2 AADT 3400 (2006)
Hwy 2 HCADT 690 (2006)

Recreational Visitors

Forest visitors and staff use this road to access a boat ramp, quarry and other forest, lake and wetland areas.
KEY VIEW

Sucker Bay Road/ NF-2132

Visual Quality

Viewers see a gap in the forest at the pipeline cut zone, punctuated in the foreground by orange pipeline markers and a valve site, which is partially-screened from the southwest by a small mass of trees and other vegetation.

Vegetation grows into the space of the cut zone, softening its edge and producing an undulating line that starts to blend the cut zone into the surrounding forest. But a few random stands that are remnants of a pine plantation jut out into the corridor.

Visual Impacts

Construction will affect those traveling on Sucker Bay Road by creating a cut zone almost double that of the existing pipeline corridor, about 110 ft. wider. The primary loss will be the majority of a mature pine plantation. The result will be an open area, without trees, of about 230 ft., wider than the road corridor itself. Extra workspace, totaling 7,500 sf. will extend the cleared area on both sides of the road. An additional structure and extended fencing will increase the visual impact of the valve site, adding a larger “built” component to the area.

Post-construction, given replanting and proper management, the extra work space and temporary workspace will gradually fill in, leaving a cut zone that is about 40 ft wider than its current configuration. Travelers on Highway 2 will notice the loss of mature trees and a larger clear area.
KEY VIEW AC-5:
Sucker Bay Road
(NF-2132)
KEY VIEW
Portage Lake Road NW/ F-2175

Visual Resources

Viewers standing at the point shown on the map will notice the road extending north-northwest, flanked by mature forest, with the rail grade visible between the trees.

The existing pipeline cut zone, beginning immediately north of the view point, is visible to the east and west as a grassy swath, punctuated by occasional shrubs or saplings, with thick, mature forest on each side. A viewer standing just south of the key view point will be surrounded by forest, almost exclusively pine plantation to the west and mixed deciduous and pine to the east. A rough dirt trail is apparent on the south edge of the west pipeline corridor.

The view south is mature pines, with the road flanked by trees, extending to the southwest.

Viewers

Residents
The road is used by residents of two properties on Portage Lake.

Highway Visitors
Hwy 2  AADT 3400  (2006)
Hwy 2  HCADT 690  (2006)

Recreational Visitors
Forest visitors and staff use this road to reach a Carry In boat access point.

Visual Quality

Viewers proceeding either north or southeast on Portage Lake Road NW/ F-2175 experience clearings in the forest for the BNSF Railroad and the pipeline corridor. The impression is of views opening and closing in succession.

Looking east and west where the pipeline corridor crosses the road, viewers see an unnatural linear cut through mature deciduous forest and the interruption of a pine plantation in this heavily forested area.

Scenic Integrity Objective
High

Landtype Association
Bemidji Sand Plain (Bsp)
This site is located on the Bemidji Sand Plain, the sandy soils and flat landscape create conditions that favor vegetation that is dependent upon fire for regeneration.

Management Area
General Forest
This MA emphasizes providing a wide variety of good, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.
Visual Impacts

Pipeline construction will approximately double the width of the current cut zone intersecting Portage Lake Road, resulting in a much more open appearance, approximately 230 ft. total without woody vegetation extending east and west of the road.

Two extra workspaces, totaling 7,500 sf, are located adjacent the temporary workspace, extending the impact of the cleared area by about 50 ft. to the south. These extra work spaces extend about 80 ft east and west of Ketchum Road.

Years later, given replanting and proper management, the temporary workspace will fill in, leaving a cut zone that is about 40 ft. wider than its current configuration.

Neither construction nor long-term effects are likely to be visible from Highway 2.
KEY VIEW AC-6:
Portage Lake Road
(F-2175)
KEY VIEW
Iowana Road/ NF-2131

Visual Resources
The Key View is located where Iowana Road/ NF-2131 crosses the pipeline corridor approximately 425 ft. south of Highway 2 and the BNSF Railroad. At this point, the highway, railroad and corridor are in very close proximity.

A gravel road, Leech Lake Route 1065, runs east from the crossing point and parallels the south edge of the corridor. One residence on the south side of this road faces the corridor.

Electrical power lines proceed along both north and south edges of the corridor. The cut zone in at this Key View has a more indistinct edge with large shrub masses growing under the power lines and into the space and a few free-standing trees.

South of the existing pipeline corridor, the road curves to the east, offering a view of thick trees before the pipeline corridor comes into full view.

The forest edge includes a mix of primarily deciduous species including oak and birch with an occasional conifer and a ground plane dense with shrubs.

Viewers
Residents
Residents of nine properties on or near Portage Lake use this road. One residence on Leech Lake Route 1065 also is on the corridor.

Highway Visitors
Hwy 2 AADT 3400 (2006)
Hwy 2 HCADT 690 (2006)

Recreational Visitors
With no developed recreational areas and little direct access to public land, this road is not frequented by visitors or Forest Service staff.

Visual Quality
Viewers proceeding either northwest or southeast on Iowana Road/ F-2131 experience clearings in the forest for the BNSF Railroad and the pipeline corridor. The impression is of views opening and closing in quick succession.

The forest exhibits a rich mix of species in this area, lending distinct northwoods character. This, and the curving road with more tree-focused views, makes the pipeline cut seem less pronounced.

Scenic Integrity Objective
High

Landtype Association
Bemidji Sand Plain (Bsp)
This site is located on the Bemidji Sand Plain, the sandy soils and flat landscape create conditions that favor vegetation that is dependent upon fire for regeneration.

Management Area
General Forest
This MA emphasizes providing a wide variety of good, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.
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KEY VIEW

Iowana Road/ NF-2131

Looking east from Iowana Road

Looking west from Iowana Road

Looking east from Iowana Road

Looking east from Iowana Road

Looking west from Iowana Road

Iowana Road, approaching pipeline corridor from the north

Visual Impacts

New construction would extend the effect of the existing pipeline cut zone along Iowana Road for about 70 ft south. An additional extra workspace, 7,500 sf, would clear an additional 70 ft. length along the road, extending 40 to 90 ft. east and west.

Following construction, given replanting and proper management, herbaceous plants and shrubs would fill in within a few years, and trees would follow a number of years later. The new, long-term cut zone would be only slightly narrower than the existing one. One mass of mature trees, occupying about 3,000 sf., west of the road, would not be replaced.

Although the net visual loss of vegetation would be among the least significant of the 16 key views, the composition of species and their size relative to the original vegetation would be noticeable.

Neither construction nor long-term effects are likely to be visible from Highway 2.
KEY VIEW AC-7: Iowana Road
Visual Resources

The Key View is at the crossing of Portage Drive NE and the pipeline corridor. The existing pipeline occupies a 125 ft.-wide permanent right-of-way south of U.S. Highway 2 and parallels the BNSF Railroad rail corridor that is between it and the highway.

At the intersection of U.S. Highway 2 with Portage Road NE, viewers see narrow bands of mixed deciduous and conifer trees lining both the rail and pipeline corridors that provide some screening.

Portage Road NE drops south from the highway and is crossed by the existing pipeline route approximately 925 ft. from the intersection. Looking west at the crossing, a driveway is visible leading to a residence along the edge of the cut zone. Low shrubs and oak saplings have grown into both sides of the cut zone and softened the edges, blending with the surrounding forest. The view eastward is more open and cleared to the edge of the pipeline corridor.

Viewers

Residents
This road is used by six residences on Portage Lake.

Highway Visitors
Hwy 2 AADT 3400 (2006)
Hwy 2 HCADT 690 (2006)

Recreational Visitors
Forest visitors and staff use this road to access sites on Portage Creek and a boat ramp on Leech Lake.

Scenic Integrity Objective
High

Landtype Association
Bena Dunes and Peatlands (Bdp)

The Key View is within a narrow band at the western edge of the Bdp that extends southwest to the shores of Portage Lake and that is bounded on the north by the Bsp and to the south, by the Rosy Lake Plain (RLp) described in Key View 16. Consequently, the site exhibits the characteristics of several LTAs, but predominantly Bdp.

Bdp occurs in one large, contiguous area adjoining the south and slightly west shores of Lake Winnibigoshish. The Bdp was formed by fine glacial sands that were blown into gentle dune and swale patterns with the result that 98% of the terrain is less than 6% in slope.

Rivers are prominent and wetlands comprise 54% of the total area. Conifer swamps and wet meadows, characterized by wetland grasses, open water and pine covered mounds, are the most common types of wetlands. Conifer swamps have a wide edge of marsh grasses that allow views to islands that are floating mats of sphagnum moss or covered with swamp conifers.

A thick hazel shrub layer is characteristic for most forests in the Bdp but swamp conifer forests have few shrubs in the understory, allowing long sight distances beneath their canopy.

Management Area
General Forest
This MA emphasizes providing a wide variety of goods, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.
**Visual Quality**

Viewers proceeding either north or south on Portage Road NE experience clearings in the forest for the railroad and the pipeline corridor. The impression is of views opening and closing in succession.

Views east and west at the pipeline crossing show a wide grassy opening with a fairly soft edge of low-to-medium-height trees and shrubs. Trees are taller on the north side of the opening.

Vegetation in the foreground is varied, particularly to the west, where a small wetland occurs and a number of saplings have sprouted.

A residential driveway punctuates the west view, rising slightly toward a home visible in the distance.

**Visual Impacts**

The new alignment will be approximately 530 ft. south of the existing pipeline corridor and passes through a forested area that will require clearing for a 140 ft.-wide temporary workspace.

Additionally, two 7,500 sf workspaces are required on either side of Portage Road NE.

The new alignment will cut through a mixed forest of conifers, birch and oak with a relatively dense ground plane of shrubs and small trees. The pipeline is adjacent to wetlands to the northwest.

Approximately 500 ft. from Portage Road NE to the east and 750 ft. to the west, the new alignment bends slightly northward, so sight lines will be discontinuous.

Construction will affect those traveling on Portage Lake Road NE and whose residences will now be situated between the two rights-of-way.

Post-construction, given replanting and proper management, the extra work space and temporary workspace will gradually fill in, leaving a cut zone 75 ft. wide that must be maintained.

Neither construction nor long-term effects are likely to be visible from Highway 2.
KEY VIEW AC-8:
Portage Road NE
Visual Resources

The Key View is at the crossing of Wildwood Drive NW and the pipeline corridor. The existing pipeline occupies a 125 ft.-wide permanent right-of-way south of U.S. Highway 2 and parallels the BNSF Railroad rail corridor that is between it and the highway.

Wildwood Drive NW proceeds south from the highway until it crosses the BNSF Railroad corridor and the existing pipeline right-of-way and then it sharply angles southeastward. Viewers looking east at the existing pipeline crossing see a rough access road along the south edge of the cut zone.

Vegetation is varied in this area. North of the pipeline corridor, trees are more plentiful on the east side of the road, while the west is fairly open, due in part to a wetland there. Small clumps of trees and shrubs interrupt grassy expanses, and some tight plantings of pine offer punctuate the dominant deciduous plants.

Scenic Integrity Objective
High

Landtype Association
Bena Dunes and Peatlands (Bdp)

Bdp occur in one large, contiguous area adjoining the south and slightly west shores of Lake Winnibigoshish. The Bdp was formed by fine glacial sands that were blown into gentle dune and swale patterns with the result that 98% of the terrain is less than 6% in slope.

Rivers are prominent and wetlands comprise 54% of the total area. Conifer swamps and wet meadows, characterized by wetland grasses, open water and pine covered mounds, are the most common types of wetlands. Conifer swamps have a wide edge of marsh grasses that allow views to islands that are floating mats of sphagnum moss or covered with swamp conifers.

A thick hazel shrub layer is characteristic for most forests in the Bdp but swamp conifer forests have few shrubs in the understory, allowing long sight distances beneath their canopy.

Management Area
General Forest
This MA emphasizes providing a wide variety of goods, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.

Viewers
Residents
Several residences occur along this road.

Highway Visitors
Hwy 2  AADT 3400  (2006)
Hwy 2  HCADT 690  (2006)

Recreational Visitors
This road offers no direct connections to recreational facilities, although it does connect with County Road 8, where recreation area and waterfowl refuges are located.
Visual Quality

The varied vegetation lends a relatively open character to this landscape. The roadway and pipeline corridor make rather haphazard, angular cuts through the forest and meadow. While the road’s angle serves to isolate viewers visually from the highway and railroad, it makes the viewer more directly part of the pipeline corridor. In general, the sensation is less scenic and dramatic that other key views.

Visual Impacts

The new alignment, when combined with the existing corridor, will yield a cut zone totaling 205 to 220 ft. in width, about 40 ft wider than the existing cut zone.

During construction, which will occur in winter, a 140 ft.-wide temporary workspace will be established and two extra workspaces of 7,500 sf each will occur on either side of the road. The main effect will be to eliminate mature trees to the south of the existing open area. Construction will affect viewers on Wildwood Drive NW who will see up and down the pipeline corridor for at least the 320 ft distance that the roadway angles through the cut zone.

Post-construction, given replanting and proper management, the extra work space and temporary workspace will gradually fill in, but the new 205 ft. cut zone will be apparent.

Construction and long-term effects may be visible from Highway 2, especially from eastbound lanes, because of the lack of vegetation at the intersection and sightlines to the roadway.
Legend

Key View

Southern Lights Route

Alberta Clipper Route

KEY VIEW AC-9:
Wildwood Drive
Visual Resources

This Key View is at the northern edge of the town of Bena. The roadway, a two-lane asphalt facility with paved shoulders, proceeds south from U.S. Highway 2. Approximately 145 ft. from the intersection, it crosses the signalized BNSF Railroad corridor and then about 100 ft. further south, it will cross the new alignment for Alberta Clipper and Southern Lights.

The terrain in this area is level and mostly open with scattered stands of poplar and shrubs lining the ditches.

Looking west from the roadway toward the existing pipeline right-of-way, a clearing in the foreground blends into the cut zone bounded by forest visible in the distance. A power line runs down the center of the cut zone and a radio tower appears in the forest to the south. An access road skirts the southern edge of the cut zone, possibly leading to this facility.

The view east is similar with a broad clearing near County Road 8/First Avenue West and forest only to the south of the pipeline cut zone.

Scenic Integrity Objective
High

Landtype Association
Bena Dunes and Peatlands (Bdp)
Bdp occur in one large, contiguous area adjoining the south and slightly west shores of Lake Winnibigoshish. The Bdp was formed by fine glacial sands that were blown into gentle dune and swale patterns with the result that 98% of the terrain is less than 6% in slope.

Rivers are prominent and wetlands comprise 54% of the total area. Conifer swamps and wet meadows, characterized by wetland grasses, open water and pine covered mounds, are the most common types of wetlands. Conifer swamps have a wide edge of marsh grasses that allow views to islands that are floating mats of sphagnum moss or covered with swamp conifers.

A thick hazel shrub layer is characteristic for most forests in the Bdp but swamp conifer forests have few shrubs in the understory, allowing long sight distances beneath their canopy.

Management Area
General Forest
This MA emphasizes providing a wide variety of goods, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.

Viewers
Residents
Commercial businesses on U.S. Highway 2 and residences on the edge of Bena have a clear view of the pipeline corridor.

Highway Visitors
County Road 8/First Avenue West is heavily used by Bena residents and is the main connection to the east shore of Leech Lake:
AADT 1050 (2007)
Hwy 2 AADT 3400 (2006)
Hwy 2 HCADT 690 (2006)

Recreational Visitors
Forest visitors and staff use the road to access the Waterfowl Game Refuge and the Leech Lake Dam Recreation Area.
Visual Quality

Viewers perceive they are approaching a town because of the broad, flat clearing at the BNSF Railroad. But vegetation is scattered rather than intentional, and utility structures and pipeline markers are prominent. Long views show pleasant groupings of mature trees, reminding viewers of the larger forest context.

Visual Impacts

The existing pipeline cut zone is visible from the intersection of Highway 2 and County Road 8/First Avenue West due to the flat terrain and lack of tree cover in the vicinity.

During construction of the new alignment along the northern edge of town, a 140 ft.-wide swath of trees will be removed immediately east of County Road 8. One large tree near the west side of the road will be removed. Beyond that, about 140 ft. west, a line of smaller trees and shrubs will be removed.

When completed, a permanent 90 ft.-wide cut zone will remain, increasing the open character of the area.
KEY VIEW AC-10:
County Road 8, Bena
KEY VIEW

Old Sixmile Lake Road/ NF-2102

Visual Resources

The Key View is at the point where Old Sixmile Lake Road and NF-2102 split just at the existing pipeline right-of-way south of U.S. Highway 2 and the BNSF Railroad.

From both roadways, viewers see the pipeline cut zone dividing portions of a pine plantation.

Single rows of pines provide some screening where the roadways diverge. A larger swath of pine forest including mixed deciduous trees provides a buffer between U.S. Highway 2, the BNSF Railroad and the pipeline.

Viewers

Residents
The roads are used by three residences along the east shore of Sixmile Lake.

Highway Visitors
The area is not immediately visible from the highway.
Hwy 2 AADT 3400 (2006)
Hwy 2 HCADT 690 (2006)

Recreational Visitors
Forest visitors and staff use Old Sixmile Road to reach recreation facilities including the Sixmile Campground with camping and boat launch facilities.

Scenic Integrity Objective
High

Landtype Association
Bena Dunes and Peatlands (Bdp)
Bdp occur in one large, contiguous area adjoining the south and slightly west shores of Lake Winnibigoshish. The Bdp was formed by fine glacial sands that were blown into gentle dune and swale patterns with the result that 98% of the terrain is less than 6% in slope.
Rivers are prominent and wetlands comprise 54% of the total area. Conifer swamps and wet meadows, characterized by wetland grasses, open water and pine covered mounds, are the most common types of wetlands. Conifer swamps have a wide edge of marsh grasses that allow views to islands that are floating mats of sphagnum moss or covered with swamp conifers.
A thick hazel shrub layer is characteristic for most forests in the Bdp but swamp conifer forests have few shrubs in the understory, allowing long sight distances beneath their canopy.

Management Area
General Forest
This MA emphasizes providing a wide variety of goods, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.

Visual Quality

Viewers proceeding either northwest or southeast on Old Sixmile Lake Road or NF-2102 experience clearings in the forest for the BNSF Railroad and the pipeline corridor. The impression is of views opening and closing in succession.
Looking east and west at the pipeline crossing, viewers see an interrupted forest with the cut zone cleared to the hard edge of the pine plantation and a few scattered trees that remain in regular rows.
Visual Impacts

Due to the angle of the roadway and the thick buffer of trees that remain north of the pipeline corridor, visual impacts will not be seen from U.S. Highway 2.

Construction will be done in the winter because of the quantity of wetlands that must be crossed in this area.

During construction, a 140 ft. wide temporary workspace through the corridor will result in a line of mature trees being removed. When completed, a permanent 130 ft. wide right-of-way will be added to the existing 40 to 45 ft. wide right-of-way for a total cut zone of 170 to 175 ft. in width.

The new alignment will be very visible from Old Sixmile Road/ NF-2101 because of the road's angle of approach.

Post-construction, given replanting and proper management, the temporary workspace will gradually fill in, but the widened cut zone will remain.
KEY VIEW AC-11:
Old Sixmile Lake Road
(NF-2102)
**Visual Resources**

The Key View is located where Sixmile Lake Road NE/ NF-2127 drops south from U.S. Highway 2 and crosses the existing 45-50 ft. wide pipeline right-of-way.

From the roadway, the pipeline cut zone divides portions of a mixed deciduous and pine plantation to the east and the west. Low shrubs and small trees soften the edge of the cut zone along with single large pines and groups of conifers. An electrical power line proceeds down the center of the opening.

Approximately 630 ft. farther south, Sixmile Road NE/ NF-2127 crosses a second pipeline; the route that passes south of Bena. This permanent right-of-way is 25 ft. wide but the cut zone appears much wider.

The pipeline and the BNSF Railroad are not visible from U.S. Highway 2 because discontinuous portions of the pine plantation provide screening.

**Scenic Integrity Objective**

**Highland**

**Landtype Association**

Bena Dunes and Peatlands (Bdp)

Bdp occur in one large, contiguous area adjoining the south and slightly west shores of Lake Winnibigoshish. The Bdp was formed by fine glacial sands that were blown into gentle dune and swale patterns with the result that 98% of the terrain is less than 6% in slope.

Rivers are prominent and wetlands comprise 54% of the total area. Conifer swamps and wet meadows, characterized by wetland grasses, open water and pine covered mounds, are the most common types of wetlands. Conifer swamps have a wide edge of marsh grasses that allow views to islands that are floating mats of sphagnum moss or covered with swamp conifers. A thick hazel shrub layer is characteristic for most forests in the Bdp but swamp conifer forests have few shrubs in the understory, allowing long sight distances beneath their canopy.

**Management Area**

**General Forest**

This MA emphasizes providing a wide variety of goods, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.

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<th>Location</th>
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<td>AADT 3400</td>
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<tr>
<td></td>
<td>HCADT 690</td>
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**Viewers**

**Residents**

Sixmile Lake Road NE/ NF-2127 is a more direct route than Old Sixmile Road and is used by five residences along the east-south-east shore of Sixmile Lake.

**Highway Visitors**

This key view is not visible from the highway.

**Recreational Visitors**

Forest visitors and staff use this road which provides a more direct connection to recreation facilities including the Sixmile Campground with camping and boat launch facilities.
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**KEY VIEW**

**Sixmile Lake Road NE/ NF-2127**

**Visual Quality**

Viewers proceeding either north or south on Sixmile Lake Road NE/ NF-2127 experience a series of clearings in the forest for the BNSF Railroad and the two existing pipeline corridors. The impression is of views opening and closing in succession.

Looking east or west at the pipeline crossing, electrical power lines passing overhead dominate the view. Vegetation along the north side of the cut zone viewers appears natural with volunteer species of trees and shrubs softening the edge with the surrounding forest. But on the south side, the cut zone is cleared to a regimented row of pines and looks unnatural.

**Visual Impacts**

The existing pipeline cut zone is not visible from the intersection of U.S. Highway 2 with Sixmile Lake Road NE/ NF-2127 because the pine plantation and mixed deciduous forests provide a buffer and along with the vegetation in the adjacent wetlands, a naturalistic appearance.

Construction will proceed in the winter because of the quantity of wetlands that must be crossed in the area. During construction, a 140 ft. wide temporary workspace through the corridor will be created, along with two 7500-sf extra workspaces on either side of the roadway.

When completed, a permanent 130 ft.-wide right-of-way will be added to the existing 45 ft. wide right-of-way for a total permanent cut zone width of 175 ft.

The new alignment will be visible from the roadway as it crosses perpendicular to the pipeline corridor.

Post-construction, given replanting and proper management, the temporary workspace will gradually fill in, but the widened cut zone will remain.
KEY VIEW AC-12:
Sixmile Lake Road NE
(NF-2127)
**Key View**

**Mississippi River**

**Visual Resources**

The Key View is located where U.S. Highway 2 crosses the Mississippi River alongside the BNSF Railroad and where three pipeline routes will ultimately cross the river to the south.

One existing pipeline passes through wetlands and under the Mississippi River approximately 255 ft. south of the rail line in a permanent 150 ft. wide right-of-way. The new alignment will cross the river approximately 295 ft. south of this existing pipeline, passing under the river and through a large wetland, joining the existing pipeline east of the river. These lines parallel the highway and BNSF Railroad from this point eastward.

A third pipeline exists in a permanent 25 ft. wide corridor, crossing the river approximately 580 ft. south of the new alignment.

**Viewers**

**Residents**
There are no residents directly near this crossing.

**Highway Visitors**
Hwy 2  AADT 3450  (2006)
Hwy 2  HCADT 400  (2006)

**Scenic Integrity Objective**
River is outside CNF jurisdiction, so not assigned an SIO. Adjacent land SIO is High.

**Landtype Association**
Bena Dunes and Peatlands (Bdp)

Bdp occur in one large, contiguous area adjoining the south and slightly west shores of Lake Winnibigoshish. The Bdp was formed by fine glacial sands that were blown into gentle dune and swale patterns with the result that 98% of the terrain is less than 6% in slope.

Rivers are prominent and wetlands comprise 54% of the total area. Conifer swamps and wet meadows, characterized by wetland grasses, open water and pine covered mounds, are the most common types of wetlands. Conifer swamps have a wide edge of marsh grasses that allow views to islands that are floating mats of sphagnum moss or covered with swamp conifers.

A thick hazel shrub layer is characteristic for most forests in the Bdp but swamp conifer forests have few shrubs in the understory, allowing long sight distances beneath their canopy.

**Management Area**
Unique Biological, Aquatic, Geological or Historical.

This MA emphasizes preserving a particular value, in this case, the "wild," natural condition of the Mississippi River in an area of no encroaching development. This area is part of the river’s headwaters.

**Recreational Visitors**
Visitors access a Carry In site just south of U.S. Highway 2 at this location and canoe, boat and fish on the Mississippi River.

**Visual Quality**
Viewers from U.S. Highway 2 cannot perceive the character of the Mississippi River from the east-bound lane because it is blocked at eye level by the railroad grade approach and an aging railroad bridge. Canoeists and boaters on the river and people fishing on its banks have a view dominated by the underside of the roadway and railroad bridges, as well as long views of expansive wetlands, depending on exact vantage.
Visual Impacts

From Highway 2, the existing pipeline corridor is not visible, since the railroad grade approaching the river and the bridge over the river block long-distance views. Only a small swath of the river and its banks are visible under the structure of the bridge.

The pipeline in this area will be installed by a horizontal directional drill (HDD), which will minimize disturbance in the wetland. Surface disturbance will be limited to two areas, a half mile apart, where the drill enters and exits. Neither point is likely to be visible to highway or recreational visitors. The unlikely viewer who explores the wetland on foot may perceive construction depending on the precise location of the drill entry and exit sites.

A large extra workspace at the west edge of the wetland will be screened from viewers by tree masses. The eastern workspace, which will remove a 30,000 sf. area of trees, may be visible to eastbound highway viewers, but not in great detail, for it is 750 feet from the roadway and surrounded by a U-shaped buffer of undisturbed trees. Westbound viewers will not be able to see the workspace due to a thick row of trees.

Those boating on the river south of the highway may notice the eastern workspace, which at its closest is 1,000 ft. from the river, and is surrounded by the U-shaped buffer of trees.
KEY VIEW AC-13: Mississippi River
Visual Resources

The Key View is located where County Road 118 drops south from U.S. Highway 2, proceeds across the BNSF Railroad line and one existing pipeline corridor, and past several residences and businesses. At this point, approximately 1,700 ft. from the intersection, a second existing line crosses County Road 118.

This existing right-of-way is 100 ft. wide and the new alignment will run parallel just north of it, adding 50 ft. in width.

The pipeline cut zone crosses wetlands on either side of the roadway and continues through mixed deciduous and pine forest set back some distance from the road to both the east and west. Low shrubs and small trees soften the edge of the cut zone in the distance along with single large pines and groups of conifers. An electrical power line marches down the center of the opening.

Looking west, Pipeline Road is visible along the north edge of the existing cut zone and leads to a group of residences in the woods that face the pipeline corridor.

Scenic Integrity Objective
Low

Landtype Association
Bena Dunes and Peatlands (Bdp)

Bdp occur in one large, contiguous area adjoining the south and slightly west shores of Lake Winnibigoshish. The Bdp was formed by fine glacial sands that were blown into gentle dune and swale patterns with the result that 98% of the terrain is less than 6% in slope.

Rivers are prominent and wetlands comprise 54% of the total area. Conifer swamps and wet meadows, characterized by wetland grasses, open water and pine covered mounds, are the most common types of wetlands. Conifer swamps have a wide edge of marsh grasses that allow views to islands that are floating mats of sphagnum moss or covered with swamp conifers.

A thick hazel shrub layer is characteristic for most forests in the Bdp but swamp conifer forests have few shrubs in the understory, allowing long sight distances beneath their canopy.

Management Area

General Forest

This MA emphasizes providing a wide variety of goods, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.

Viewers

Residents
Nine homes and/or businesses on the western edge of Ball Club, a Leech Lake Reservation community, are in proximity to the pipeline corridor.

Highway Visitors

The corridor is not visible from Highway 2 but is seen from County Road 118 and Pipeline Road.

Recreational Visitors

Visitors use this roadway to access a public Carry In site on the Leech Lake River.
**Visual Quality**

Looking east or west at the pipeline crossing on CR-118, power lines passing overhead interrupt the long view. Vegetation along both sides of the cut zone appears natural, with trees, shrubs and wetland grasses softening the edge of the surrounding forest.

Residents on CR-119 see a narrow natural looking cut when traveling east. A section of cut zone on the west side of 119 appears as a scruffy meadow.

**Visual Impacts**

Construction will open a 140-ft.-wide temporary workspace through the corridor, which will be most noticeable in the diagonal portion of the alignment, which runs southeast from the bend at CR-119 to CR-118.

Extra workspaces on the bend of CR-119 will create a much more open character for residents there. Any travelers on 119 will also notice a long diagonal swath of trees removed in the temporary workspace.

Two 7,500-sf extra workspaces at CR-118, along with the widened temporary workspace, will create a significantly more open feeling north of a small wetland, obvious to any visitors or residents traveling the road.

The new pipeline corridor will not be visible from Highway 2 due to screening trees and distance.
KEY VIEW AC-14:
County Roads 118 and 119, Ball Club
Visual Resources

The Key View is located on County Road 137 approximately 1,080 ft. southwest of the intersection with U.S. Highway 2 where the new pipeline will be added to two existing corridors. From the highway intersection, County Road 137 proceeds across the BNSF Railroad line and one existing pipeline corridor, and past several residences before arriving at the Key View.

The existing pipeline right-of-way in this location is 100 ft. wide and the new alignment will run parallel just north of it.

The pipeline cut zone passes through mixed deciduous and pine forests set back some distance to the east and west of a broad opening at the road crossing. Grasses, low shrubs and small trees soften the edge of the cut zone and in the distance, occasional single large pines and groups of conifers stand out. An electrical power line marches down the center of the opening.

Scenic Integrity Objective
High

Landtype Association
Bena Dunes and Peatlands (Bdp)

Bdp occur in one large, contiguous area adjoining the south and slightly west shores of Lake Winnibigoshish. The Bdp was formed by fine glacial sands that were blown into gentle dune and swale patterns with the result that 98% of the terrain is less than 6% in slope.

Rivers are prominent and wetlands comprise 54% of the total area. Conifer swamps and wet meadows, characterized by wetland grasses, open water and pine covered mounds, are the most common types of wetlands. Conifer swamps have a wide edge of marsh grasses that allow views to islands that are floating mats of sphagnum moss or covered with swamp conifers.

A thick hazel shrub layer is characteristic for most forests in the Bdp but swamp conifer forests have few shrubs in the understory, allowing long sight distances beneath their canopy.

Management Area
General Forest

This MA emphasizes providing a wide variety of goods, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.

Viewers

Residents
Eight residences on the eastern edge of the Ball Club community are in proximity to the pipeline.

Highway Visitors
The corridor is not visible from Highway 2 but is seen from County Road 137.

Recreational Visitors
Visitors use this roadway to access a public Carry In site on the Leech Lake River.
15

KEY VIEW

County Road 137

Crossing County Road 137; two new lines will parallel one in place

Crossing County Road 137; two new lines will parallel one in place

Visual Quality

Viewers looking east or west at the pipeline crossing see overhead powerlines dominating a long open view. Vegetation along both sides of the cut zone appears natural with trees, scattered groups of shrubs and grasses softening the edge with the surrounding forest.

In general, the views along this section of road are heterogeneous, due to varied vegetation and land use.

Visual Impacts

During construction of the new pipeline in the existing right-of-way, a 140 ft.-wide temporary workspace through the corridor north of the existing line will be necessary along with an area for extra workspace 7,500 sf on the east side of the road.

When completed, a permanent 150 ft.-wide right-of-way will be retained in proximity to several residences that are north and south of the corridor, creating more open views in areas that had mature trees. The effect will be most changed on the west side of CR-18, where a larger mass of trees will be removed.

Post-construction, given replanting and proper management, the temporary workspace will gradually fill in, but a broadened cut zone will look significantly different.

The new pipeline construction will be too far south to be visible from Highway 2.
KEY VIEW AC-15: County Road 137
**Visual Resources**

The Key View is located on County Road 18/Great River Road, a two-lane facility with paved shoulders that extends south-southwest from U.S. Highway 2. The Great River Road is part of the National Scenic Byways program and begins at the origin of the Mississippi River in Itasca State Park and follows the river through seven states, ending at Woodville, Mississippi.

Approximately 330 ft. from the intersection with Highway 2 and across the BNSF rail line, the roadway crosses the pipeline corridor.

The existing right-of-way with four pipelines is 100 ft.-wide and to the north, the new lines will add 50 ft. to its width.

The pipeline cut zone passes through sparse mixed forests set back some distance east and west of the broad opening at the road crossing. Grasses and a few low shrubs fill the wetlands in the cut zone on either side of the roadway and a several large pines and deciduous trees stand out in the generally thin and brushy woods. A nearby residence is visible through a gap in the forest to the southwest.

**Scenic Integrity Objective**

The area is outside Chippewa National Forest. The nearest SIO, 100 ft west, is High.

**Landtype Association**

The closest LTA is Rosy Lake Plain (RLp) to the west

The Rosy Lake Plain (RLp) occupies three large, separate areas including the Leech Lake River vicinity where this Key View is located. It is also close to Key View 8, Portage Road NE to the west.

RLP formed from shallow water deposits of a glacial lake so the landscape appears predominantly flat with 97% less than 6% slope. Wet meadows, streams and wetlands comprise almost half of the total area and include dense conifer swamps with restricted viewsheds but also wet meadows and bogs with open views.

Dense forests of tamarack, white birch and aspen are regenerating areas where spruce pine budworm infestations and subsequent fires have left clearings.

**Management Area**

General Forest

This MA emphasizes providing a wide variety of goods, uses and services, including wood and other commercial products, scenic quality, recreational uses, and wildlife habitat. Some of this land may be suitable for timber management.

**Screening**

Screening is minimal between U.S. Highway 2, the BNSF Railroad and the pipeline corridor. A fringe of water-tolerant shrubs grows in the ditch and along the rail line in this otherwise open landscape.

**Viewers**

**Residents**

Private lands are scattered throughout the area and 18 residences line County Road 8, especially around the Leech Lake River just south of the pipeline.

**Highway Visitors**

Hwy 2  AADT 3450  (2006)
Hwy 2  HCADT 400  (2006)
Recreational Visitors
Visitors drive the historic Great River Road and use the roadway to access a public carry-in site on the Leech Lake River.

Visual Quality
Viewers on U.S. Highway 2 see the pipeline cut zone, especially from the east-bound lane. Residents along County Road 18 and recreational visitors driving the Great River Road see a broad cut zone with few trees and scattered shrubs with a character more like the nearby cleared agricultural land than suitable to a forest setting.

Visual Impacts
A 140 ft. wide temporary workspace will be necessary during construction of the new pipeline in the right-of-way south of the four existing lines. Additionally, workspaces totalling 7500 sf on the east side of the road and 4655 sf on the west side are required.

When completed, a permanent 165 ft. wide right-of-way will be retained. One residence is in proximity, near the roadway crossing approximately 150 ft. southeast, and has a view of the corridor.

Post-construction, given replanting and proper management, the temporary workspace will gradually fill in, but the widened cut zone will remain. Screening is also critical between U.S. Highway 2 and the wide pipeline corridor and along County Road 18 which bears the status of a National Scenic Byway.
KEY VIEW AC-16:
County Hwy. 18
Great River Road
GREAT LAKES ALIGNMENT
Visual Resources
In general, this alignment passes through mature forest, primarily dry mesic pine/oak, along with boreal hardwood/conifers, dry mesic pine and mesic northern hardwood. Several large wetlands intersect the route, which crosses Moss Lake (south of Pike Bay), skirts the south end of Ten Section Lake and crosses Portage Creek.

For 16,000 linear feet, the alignment occupies the Ten Section Unique Biological/Historical Management Area on the forest’s eastern edge. Protected from logging during the early 1900s, this area includes large red and white pines as stands and individual trees within younger stands.

Crossings are characterized by forest roads of varying width, and several major roadways. Crossings of interest are identified as Key Views in Figure 1. The prefix of GL before each number designates “Great Lakes,” to distinguish these from the 16 Alberta Clipper Key Views.

Key Views
GL-1. County Road 143
Approaching this Key View, drivers on this route between Cass Lake and Walker notice trees on both sides of the road, appearing as a continuous stretch north of the proposed pipeline route and as a narrow band to the south. Adjacent the Key View to the west is a 200-ft-wide developed area, including a large building and parking area with minimal vegetation surrounding it. To the east is mature, varied forest, with a diagonal cut zone for the existing pipeline. An approximately 30-ft clear zone is maintained on both sides of the road.

Scenic Integrity Objective
Primarily Low and Medium with small areas of High (Key Views 1 and 8) on east and west ends of alignment, due to proximity to heavily traveled roadways.

The eastern portion of the Great Lakes Route through CNF is the same as for points 13 through 16 above.

Landtype Association
* Guthrie Till Plain: 47,000 lf
* Bemidji Sand Plain: 35,000 lf
* Bena Dunes and Peatlands 29,800 lf
* Rosy Lake Plain: 10,500 lf

Management Area
The alignment crosses the following five MAs, for the distance shown, in linear feet.
* General Forest (GF) 59,700 lf
* General Forest, Longer Rotation: 35,000 lf
* Unique Biological Area (UB) 6,000 lf
* Experimental Forest (EF) 11,100 lf
* Riparian Emphasis (RU) 2,800 lf

GL-2. Forest Road 2133
The cut zone of the existing pipeline intersects this narrow road at a slightly curved angle, diminishing the sense of openness. Beyond the somewhat...
KEY VIEW GL-1:
County Road 143

Legend
- Key View
- Great Lakes Alternate Route
KEY VIEW GL-2:
Forest Road 2133
irregular edge of the cut zone, which is about 70 ft. wide, the tree cover is dense, mature and uninterrupted.

**GL-3. Forest Road 2135**
Due to the road’s oblique angle of approach to the cut zone, drivers or others approaching from the east have a long view of the existing cut zone, extending straight west. More vegetation is cut around the diagonal intersection here than at the previous Key View, although scattered trees have grown up near the road, interrupting the impact of the existing pipeline corridor.

**GL-4. Unnamed road, SE of FR-2135**
This low-volume winding road with an irregularly vegetated edge passes the pipeline route in an area of somewhat sparse woody vegetation. The existing cut zone provides a distinct, 70-foot punctuation in this old forested area, although a variety of small trees and shrubs remain. Since the topography rises somewhat, tree debris from recent clearing is not easily seen from the road.

**GL-5. Sucker Bay Road**
A major route through the forest, this road has a wide, maintained clear zone and drivers travel at relatively high speeds. Views are of trees, the road corridor itself, small side roads and crossings. Several smaller roads or trails in the vicinity may slightly diminish the density of the forest cover depending on the view angle of the passersby.

**GL-6. Portage Road NE**
This Key View is surrounded by heterogeneous vegetation and a large disturbed area to the southeast, abutted by closely spaced planted pines. This mix of open and closed, partly cultivated vegetation likely diminishes viewers’ awareness of the cut zone of the existing pipeline. The view from the road to the west is more natural, with a mix of various-aged trees and a narrow view through the existing pipeline corridor, which does not exhibit a sharp edge here.

For recreational visitors on the Soo Line Trail, just east of GL-6, tree cover is more complete, despite the much wider cut zone extended both northeast and southwest, toward the disturbed area. The trail is narrow and the views are largely dominated by mature forest, some planted.

**GL-7. County Road 8**
About a half mile southwest of Bena, this location offers wide, clear views to the east-northeast, due to the road’s elevation and an adjacent herbaceous wetland, largely uninterrupted by trees.

To the west, viewers notice a mixture of closed forest, primarily conifers, and a wide section of pipeline cut zone to the east-southeast. Immediately south, a 120 ft. clear area provides a foreground to a solid wall of trees.
KEY VIEW GL-3: Forest Road 2135

Legend
- Key View
- Great Lakes Alternate Route
KEY VIEW GL-4:
Unnamed Street
South of FR-2135
KEY VIEW GL-5:
Sucker Bay Road

Legend
- Key View
- Great Lakes Alternate Route

0 300 600 Feet
KEY VIEW GL-6: Portgage Road NE

Legend
- Key View
- Great Lakes Alternate Route
KEY VIEW GL-7:
County Road 8
KEY VIEW GL-8:
Sixmile Road NE
GL-8. Sixmile Lake Road NE

This Key view is 1,000 ft. south of Highway 2 and 625 ft. south of the Alberta Clipper Route. The existing cut zone at this juncture is very wide, more than 170 ft. in some places, with a long open corridor visible to the east, flanked by an irregular border of trees, shrubs and herbs. The view is similar, but less linear, to the west. Vegetation north and south is dense, both pine plantation and mature deciduous trees, situated very close to the road.

The above description covers the Great Lakes alternative alignment through the western section of the CNF. From Key View GL-8 (Sixmile Lake Road) to the east, the route is the same as the Alberta Clipper/Southern Lights alignment, coinciding with AC Key Views 13 through 16.

Viewers

Viewers mainly consist of staff and recreational visitors who drive or hike in the area. The alternate portion of the route (east of AC Key Views 13 through 16) is not visible to U.S. Highway 2 viewers.

The number of viewers is highest at Key View GL-1, a major through route between Cass Lake and Walker, and Key View GL-7, County Road 8. The latter offers direct access to at least 20 homes and the Leech Lake Dam Recreation Area, with campground and boat launch.

A small number of area residents also view the route at GL Key Views 2, 5, 6, and 8.

Most recreational viewers probably cross the route via the Soo Line trail, which intersects the route just east of Key View 6.

Visual Quality

With a few exceptions, the main impression of those passing the proposed Great Lakes pipeline route is of being in a remote area surrounded by mature forest, but with a clearing—the cut zone for the existing pipeline—extending into the distance. The impression is largely natural and remote, though the cut zone imposes an artificial element.

The impact of the existing cut zone is strongest in the areas where the mature trees hug the road closely, such as at Key View GL-2.

The cut zone is least notable, and the visual impression generally less natural, in areas where the road dominates, such as Key View GL-1 which intersects a busy road, development and agricultural land, and GL-5, where the pavement and clear zone adjacent the road creates a corridor that is wider than the pipeline cut zone. Here, the effect is of passing through a remote area, surrounded primarily by trees.

At GL-6, Portage Road, the cut zone is also less significant due to the heterogeneous nature of the vegetation and more open, unforested land in the immediate vicinity. The area is less “natural” in character than most other GL Key Views. The Soo Line Trail crossing 600 ft. northeast, however, does afford visitors with a somewhat more closed, natural view.
Visual Impacts

Note: The plan for the Great Lakes alignment is less detailed than for the Alberta Clipper/Southern Lights route. Therefore, the following analysis is more general in its discussion of the spatial and temporal aspects of pipeline impacts.

The new pipeline work area and permanent easement would expand the existing cut zone, which closely parallels the GL alternate alignment. The current corridor varies in the abruptness of edge and in width, factors that influence the degree of impact to viewers crossing the pipeline route, either by vehicle or by foot.

During construction, cutting additional vegetation would create a more severe, artificial edge to the mature forest, reminding visitors that they are not entirely surrounded by nature, nor entirely separated from human development. Generally, the area would feel less remote to people passing through, particularly during construction and in the years immediately following, before successional and newly planted vegetation matured.

The adverse effect on drivers and other visitors would be most noticeable at Key View GL-2, which is now tightly surrounded by mature trees. This crossing would become more open and sunlit more of the day, and the sensation of being surrounded by forest would be largely lost.

Visitors at Key Views GL-3, GL-4 and GL-5 would also notice a much different landscape character. At GL-3, due to the alignment of the road, visitors would have an unavoidable view down a wide new disturbed cut zone to the west. At GL-4, the rough edges of the existing cut zone would become regular, at least temporarily, until new vegetation took hold.

At GL-5, Sucker Bay Road, an expanded pipeline corridor would be about the width of the road corridor, making for a much more open, less forested experience for those traversing this view.

Despite the disturbed area that makes GL-6 less than pristine, the view west from Portage Road would be greatly changed, with a sharply artificial edge replacing the irregular, natural vegetation. In this same vicinity, users of the Soo Line Trail would experience a wider, less enclosed view to the northeast and southwest. With fewer trees for screening, those traversing the trail would have a clear view of the exposed soil of the disturbed area, particularly when traveling southeast.

Pipeline construction and its aftermath would have the least impact at Key View GL-1, which, with a wide roadway, development and irrigated cropland, is already highly “unnatural.” Key View GL-8 would be affected, but due to the wide, the spatial change would be less dramatic.

Without more detailed analysis of the alignment, it is unclear whether the pipeline construction would impact any of the unique old-growth stands on the western portion of the forest. Even if the pipeline did not directly harm any of the valued old trees, the construction process may wish to ensure that no indirect damage occurs, such as opening a corridor that would expose trees to excessive wind or creating a conduit for invasive species.
SYNTHESIS
Impacts for Alberta Clipper/Southern Lights Alignment

Since this alignment largely parallels U.S. Highway 2 and an existing pipeline corridor, creating an open cut through the forest approximately 100 feet wide, the main effect will be a widening of that existing treeless corridor (Figs. 14, 15 and 16). The widening will be most noticeable at 16 Key Views where roads and trails cross the newly widened corridor or along U.S. Highway 2 where a vegetative screen between the existing pipeline corridor and the highway will be removed.

Most viewers of the pipeline corridor are highway visitors, perhaps as many as 5,000 people a day in 3,400 vehicles on U.S. Highway 2. They are primarily commuting or hauling goods, some for very long distances through a very unchanging landscape across northern Minnesota. Highway visitors are generally less interested in a pristine native landscape than other viewer groups. Highway visitors are primarily interested in landmarks that lead them to their destination, like unique trees, a particular lake, or a specific structure, like a building, bridge or sign.

Not all viewers on U.S. Highway 2 are highway visitors. Some are using U.S. Highway 2 and the roads and trails that cross the pipeline corridor as a way to access recreational facilities. These recreational visitors are more sensitive to changes to visual resources. They have purposefully traveled to the area to see the native natural environment.

FIGURE 14.
BEFORE CONSTRUCTION
and will consider the widened corridor an adverse visual impact. Recreational visitors, especially as bicyclists and pedestrians, will view the pipeline corridor for a much longer duration than other viewers and will, therefore, have a greater need for mitigation.

A much smaller number of viewers are residents who will view the pipeline corridor from the roads that cross the pipeline when they travel between U.S. Highway 2 and their homes south of the proposed pipeline. These are viewers who live (some just seasonally) in northern Minnesota in part for its native landscape. Most residents would consider the removal of trees and the creation of an obviously artificial landscape with tall vertical vegetative walls and rectilinear edges to be an adverse impact. Unfortunately, they would be obliged to view this outcome several times a day.

The corridor widening could particularly disturb vegetation at the following eight Key Views:

3. Cuba Hill Road
4. Ketchum Road/SF-2135
5. Sucker Bay Road/NF-2132
7. Iowana Road/NF-2131
8. Portage Road NE
12. Sixmile Lake Road NE/NF-2127
14. County Road 118
15. County Road 137.
Another category of impact includes pipeline corridor visibility from U.S. Highway 2.

Several Key Views have little or no vegetation to screen the pipeline from the roadway.

Key View AC-1, Mi-gi-zi Trailhead, is in a transition zone between the City of Cass Lake and the Chippewa National Forest. The Key View is a focal point for recreational users due to the nearby trailhead, rest area and lake access.

While the trailhead itself will not see loss of trees due to underground drilling pipe installation, several points to the east, adjacent the trail and Highway 2, will be affected, particularly where the pipeline crosses the trail. The result will be a more open, less forested appearance intermittently for about half of distance between the Mi-gi-zi Trailhead and Pike Bay Loop.

Just to the east is Key View AC-2, Pike Bay Loop, which lies within a CNF Management Area designated Unique Biological/Aquatic/Geologic/Historic. Nearby is the Ten Section area which contains old-growth red and white pines. The Mi-gi-zi Trail parallels U.S. Highway 2 in this location and large portions of the forest that screens it from the roadway would be removed by pipeline construction. Visibility for both highway and trail visitors would be affected as well as the character of this area which CNF has designated exempt from timber management.

Key View AC-10, County Road 8/First Avenue West at the northern edge of the Village of Bena marks another transition zone between town and the forest. The flat and highly visible area at the entrance to Bena presently contains little vegetative relief and the pipeline corridor will add to the impression of barrenness.

Removal of vegetation for the pipeline corridor at Key View AC-16, County Road 18/Great River Road, will result in a broad, cleared swath at the roadway’s intersection with U.S. Highway 2. The status of County Road 18/Great River Road as a National Scenic Byway suggests this view merits special attention.

Key View AC-9, Wildwood Drive NW, is also visible from the eastbound lanes of the U.S. Highway 2 but it has less direct sightlines and fewer viewers from the roadway.

Impacts for Great Lakes Alignment

Located in a relatively remote part of the forest, this route follows an existing pipeline and its cut zone. Since a detailed pipeline construction plan is not available, it is not possible to quantify the precise extent of the interruption to vegetation. Overall, the effect will be of widening the
existing pipeline cut zone, offering a more open character and, at least temporarily, a more artificial edge to between the vegetation and the cut zone.

The impact will be most noticeable at Key Views GL-2, -3, -4 and -5, where the current condition is of a closed forest. In many of the other areas, the impact may be subtle, due to an already open character created by road conditions, land use and existing vegetation type.

Recreational use of this area is premised on its existing visual quality and largely untrammeled wilderness character. Any intrusion into this area would evoke a more adverse impact due to viewer sensitivity than would the Alberta Clipper/Southern Lights alignment. The intrusion would be exacerbated by ongoing maintenance activities in the corridor, which would consist of increased traffic and noise from regular mowing of valve sites and periodic clearing of the cut zone.

**Comparison and Recommended Alternative**

With the exception of a few Key Views (for example, AC-1, Mi-gi-zi Trail; AC-2, Pike Bay Loop; and AC-16, County Road 18/ Great River Road), the Alberta Clipper/Southern Lights alignment offers relatively less change to more viewers, while the Great Lakes alternative affects fewer viewers overall. But viewers encountering the Great Lakes alignment will find the changes it brings more noticeable and pronounced.

The Alberta Clipper/Southern Lights alignment will result in disturbance and vegetation removal in a relatively developed area, near the U.S. Highway 2 corridor, while the Great Lakes alignment is generally more remote. Viewers who are further into the forest, and further away from highly traveled roads like U.S. Highway 2, are more likely to perceive a widened cut zone as a dramatic interruption of the forest, particularly at crossings that currently evince a closed character typical of a mature forest. Increased traffic and periodic noise due to maintenance activity would be a more poignant interruption in this more isolated section of the forest.

In addition, the Great Lakes route includes fewer high-volume, paved crossings. Crossings considered for this alignment are of generally lower volume that those for Alberta Clipper/Southern Lights corridor.

The high number of users of the Alberta Clipper/Southern Lights alignment is reflected in the high Scenic Integrity Objective for all but two of the sixteen Key Views. Since two sites are out of the forest proper, they do not possess SIO ratings, but they are in close proximity to High and Medium SIO areas.
For the Great Lakes alternative, the majority of the area is rated Medium and Low SIO, with High ratings at the east and west ends of the route. For noteworthy crossings, SIO ratings comprise an equal number of Medium and Low (3 each), with two High ratings—one at each end. It should be mentioned that the Great Lakes route is the same as four Key Views on the Alberta Clipper Route (AC-13 through -16); these are rated Low, Low, High and High, respectively.

The two alignments traverse similar Management Areas (primarily Unique Biological (UB) and General Forest). The character of the Ten Section UB area is more isolated in the Great Lakes alternative, and in this sense perhaps more unspoiled than the UB portion fragmented by U.S. Highway 2, north of Pike Bay.

In addition, the Great Lakes corridor traverses an area of Experimental Forest, which is not a component in the Alberta Clipper/Southern Lights corridor, and a portion of Riparian Emphasis, which is represented only by a narrow strip in that alignment.
MITIGATION
AND
ENHANCEMENT
General Mitigation Strategy

In its 2004 Land and Resource Management Plan, Chippewa National Forest (CNF) set forth standards and guidelines for management activities in areas with a Moderate or High Scenic Integrity Objective (SIO) designation. (The vast majority of Key Views along the Alberta Clipper route are High.) The plan dictates that permanent openings “will blend with the adjacent landscape and have a natural appearance that mimics natural openings.” Scenic resource management guidelines call for interruptions in vegetation (including pipeline corridors) to be located so as to reduce their linear appearance if they can be viewed from travel ways and/or recreation sites.

The plan also states that temporary openings (for example, pipeline workspaces) “will be similar in size, shape and edge characteristics to natural openings in the landscape being viewed” or will “mimic a natural disturbance process typical for the area.” Additional aims are to encourage vegetative diversity, seasonal color and enhance the big-tree character of the forest.

Figs. 17 and 18 are conceptual illustrations to show corridor conditions during and after construction.

FIGURE 17.
CORRIDOR CONDITIONS DURING CONSTRUCTION
Four overarching strategies may be employed to mitigate loss of vegetation where pipelines cross existing roadways and otherwise altered views. These include

1. **Planting Strategies.** Revegetation is the primary tool in restoring visual integrity to areas disturbed during pipeline construction. Four distinct techniques to achieve particular effects are described here.

   A. **Overstory.** In areas when mature trees are being removed, restoration of visual integrity will usually require replacing some of those trees, using quantities and spacing that will eventually result in a closed canopy. Large trees are an important part of the Chippewa Forest’s identity, affecting a viewer’s sense of enclosure and scale as well as the way sunlight and shadows play across a given site.

   B. **Understory.** Nature tends not to create abrupt transitions. To avoid a sheer wall of trees adjacent grassy cut zones, mitigation should include intermediate-height plants, both small-stature trees (12 to 25 ft) and shrubs (approximately 6 to 12 ft.). In some cases, native herbaceous plants may be appropriate additions to a planted edge in order to achieve an attractive, gradual transition. (See Fig. 19 and photographs on following page.). Understory plantings should be used in vegetated islands as well as with existing and newly planted overstory trees.
These photos of existing forest areas show a gradual vertical transition from overstory to understory vegetation at the edge of a corridor.
C. Vegetated Islands. These are strategically placed groups of 5 or more large woody plants used to screen or punctuate views. Trees or shrubs may be used alone or in combination with one another, but in all cases understory species should be planted on perimeter in order to create a more natural appearance. Shrubs should be employed in lieu of trees where a dense eye-level screen is desired, or when trees are unfeasible due to proximity to structures or pipelines. Vegetated islands are especially useful when pipeline configuration precludes a solid, linear massing of trees, or when the surrounding landscape is quite open and a savanna-like appearance is desired.

When vegetated islands are placed between or otherwise close to pipelines, care must be taken to avoid future impact caused by roots. At least five ft of herbaceous, mowable vegetation must remain on each side of pipes (or a 10 ft clear zone centered over every pipe) and plants with aggressive, spreading root systems should not be employed in these situations.

In some cases, a slight alteration of landform may help enhance the screening function of a vegetated island or help enhance a sense of enclosure; see strategy 3 below.

D. Naturalistic edge. In nature, plants rarely regenerate in straight lines. In the same way understory plantings help soften the vertical edge of a forest, planting a naturalistic edge help soften the horizontal transition from forest to mown or paved landscape. The idea here is to use a variety of plants arranged to form a complex, undulating edge. In plan view, a naturalistic edge will have a wiggly, rather unpredictable appearance. In addition to groups of plants, occasional trees or shrubs will be planted singly to punctuate the edge.

This overarching technique will apply primarily to overstory and understory areas. It may be used on larger tree islands, but since tree islands are by definition quite compact, with edges that may need to facilitate mowing adjacent ground, there is less opportunity to employ a naturalistic edge. (See Fig. 20 and photographs below).
2. **Mitigation Vegetation Removal.** This technique is for special situations where trees, particularly mature planted pines, form a severe visible edge following construction. Removing selected trees in an irregular pattern, particularly those that are less vigorous or healthy, can help to establish a naturalistic edge. This edge may be further enhanced with adjacent understory plantings that also employ a naturalistic edge.

3. **Landform Elements.** The ground plane of northern Minnesota is subtle. In certain situations, slight landform modifications may be effective in limiting views of the pipeline corridor from roads and trails (Fig. 21), particularly when combined with shrub plantings. In areas where vehicle access must be maintained, raised landforms must be arranged to allow passage between them, and generous turning radii (approximately 34 ft.) should be maintained. To avoid becoming a visual impact itself (Fig. 22) any land-shaping must be done with gradual slopes that mimic the natural terrain.

![Figure 21. Landform Elements](image1)

![Figure 22. Landform Sightlines](image2)
Shrubs with relatively shallow root systems may be planted atop landform elements, with the understanding that they will be cut back in order to preserve access to the pipeline corridor.

Landform elements will be used primarily in the most visible sites—high volume county roads and those, like AC-1, Mi-gi-zí Trailhead, that are easily seen from Hwy. 2.

**FIGURE 23**

**MITIGATION**

**PLANTING STRATEGIES AND CONSTRAINTS**

In general, tree and shrub stems are to remain away from pipelines for 5 ft. on either side. This means there will be a 10-ft mowable herbaceous plant zone centered over each pipe. However, on higher-volume roads or other highly visible areas, shrub may be planted atop subtly raised landforms in order to better screen the corridor. Table 2 shows which sites employ landform and vegetated island mitigation techniques.
VALVE SITES

Any of these three strategies may be used at valve sites, in addition to key view road crossings. Modification of materials may also help mitigate the visual impact of valve sites. These could include surface treatment of buildings to better blend with the forest and fencing materials to help camouflage elements within fence or to blend with the surroundings.

Appropriate lighting design will help minimize the nighttime impact of valve sites. In addition to being sure that light levels do not exceed Enbridge Lighting Standards (D11-202, December 1999), employing full cutoff fixtures could greatly reduce light pollution in the dark forest.

Site-Specific Mitigation Schemes

The preceding strategies have been applied to each Key View site on the Alberta Clipper/Southern Lights alignment, with the exception of AC-13, Mississippi River. At this site horizontal directional drilling will result in very minor visual disturbance, which will be repaired as indicated in the Environmental Mitigation Plan.

It is recommended that CNF staff or a consultant trained in landscape architectural design be present during visual mitigation implementation to approve plant locations and arrangements. Precise placement of tree islands and landforms, in particular, will result in the most thorough, visually appropriate mitigation.

The following table summarizes mitigation measures for each site, and a series of color-keyed maps show schematic plans for mitigating the effects of pipeline construction.

While these maps consider sightlines, existing and proposed pipeline locations, and adjacent vegetation and structures, they are schematic, not construction drawings, and may not represent all site conditions that could affect mitigation work.

In most areas, a 10-ft-wide, mowable herbaceous clear area is to be centered over each pipeline, as illustrated in Figure 23. To ensure this, both new and previously installed pipelines must be marked prior to planting or earth-moving. However, along high-volume roads and other high-visibility areas, this requirement is relaxed in order to better screen the pipeline corridor.

All existing two-track access roads leading from larger-volume forest and county roads, must be maintained in the same or close to the same location, not blocked by vegetation. Final design may result in minor re-routing of these roads to maximize critical screening.
All mitigation work near roadways must be coordinated with the appropriate governmental units, whether county, tribal, state or federal. On Hwy. 2, vegetation should begin 30 ft. from the edge of pavement. Since special circumstances may affect this guideline, all plans should be approved by highway officials.
### TABLE 2. MITIGATION STRATEGIES AND TECHNIQUES BY SITE

<table>
<thead>
<tr>
<th>Site</th>
<th>Planting Strategies</th>
<th>Mitigation Vegetation Removal</th>
<th>Landform Changes</th>
<th>Special Concerns</th>
<th>Plant Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC-1: Mi-gi-zi Trailhead</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Screen valve site from road and parking lot. Restore 10,000 sf workspace.</td>
<td>Outside forest; nearest is red pine forest (fire-dependent)</td>
</tr>
<tr>
<td>AC-1A: Between Mi-gi-zi</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Narrow area requires careful tree placement to achieve screening.</td>
<td>Red pine forest (fire-dependent)</td>
</tr>
<tr>
<td>AC-2: Pike Bay Loop</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Screen valve site north of Hwy. 2. Restore 7,500 sf workspace.</td>
<td>Red pine forest (fire-dependent)</td>
</tr>
<tr>
<td>AC-3: Cuba Hill Road</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Screen valve site north of Hwy. 2. Restore 7,500 sf workspace.</td>
<td>White pine-hardwood forest (fire-tolerant)</td>
</tr>
<tr>
<td>AC-4 Ketchum Road</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Screen valve site from roadway. Restore 7,500 sf workspace.</td>
<td>Mixed pine hardwood forest (fire dependent)</td>
</tr>
<tr>
<td>AC-4: West: Valve Site</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Screen valve site and tree removals from Sucker Lake.</td>
<td>Mixed pine hardwood forest (fire dependent)</td>
</tr>
<tr>
<td>AC-5: Sucker Bay Road</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Soften mature mixed forest edge. Restore 7,500 sf workspace.</td>
<td>Mixed pine hardwood forest (fire dependent)</td>
</tr>
<tr>
<td>AC-6: Portage Lake Road</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Screen valve site and tree removals from Sucker Lake.</td>
<td>Mixed pine hardwood forest (fire dependent)</td>
</tr>
<tr>
<td>AC-7: Iowana Road</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Soften mature mixed forest edge. Restore 7,500 sf workspace.</td>
<td>Red pine forest (fire-dependent)</td>
</tr>
<tr>
<td>AC-8: Portage Road NE</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Screen valve site and tree removals from Sucker Lake.</td>
<td>Red pine forest (fire-dependent)</td>
</tr>
<tr>
<td>AC-9: Wildwood Drive</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Screen valve site and tree removals from Sucker Lake.</td>
<td>Red pine forest (fire-dependent)</td>
</tr>
</tbody>
</table>

**Key**

- **Overstory Trees**: Replacement of large overstory species such as pine, oak, spruce, fir, aspen birch.
- **Understory Vegetation**: Small trees and shrubs, and potentially herbaceous plants along edges, often adjacent overstory, to create a gradual vertical transition.
- **Vegetated Islands**: Trees, shrubs or a combination of the two used in small groupings to screen a particular view.
- **Mitigation Vegetation Removal**: Selective removal of existing plants, primarily trees, to create a natural-looking transition rather than a straight wall of trees.
- **Landform Changes**: Subtle raised areas that, when planted, will help to screen a particular view.
## Planting Strategies

<table>
<thead>
<tr>
<th>AC-10: 101st Ave. W/ CR-8, Bena</th>
<th>Overstory Trees</th>
<th>Understory Vegetation</th>
<th>Vegetated Islands</th>
<th>Mitigation Vegetation Removal</th>
<th>Landform Changes</th>
<th>Special Concerns</th>
<th>Plant Community</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Follow plan to establish street tree rows. Restore 9,375 sf workspace.</td>
<td></td>
<td>Red pine forest (fire-dependent)</td>
</tr>
<tr>
<td>AC-11: Old Sixmile Lake Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Soften, break up hard pine plantation edge. Restore 140 ft wide temporary workspace.</td>
<td></td>
<td>Red pine forest (fire-dependent)</td>
</tr>
<tr>
<td>AC-12: Sixmile Lake Road NE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Soften, break up hard pine plantation edge. Restore 7,500 sf workspace.</td>
<td></td>
<td>Red pine forest (fire-dependent)</td>
</tr>
<tr>
<td>AC-13: Mississippi River</td>
<td>No visual impact mitigation required</td>
<td></td>
<td></td>
<td></td>
<td>Minor mitigation needed; mainly HDD sites on either side of river at edge of wetland.</td>
<td></td>
<td>Wet meadow (fire-dependent)</td>
</tr>
<tr>
<td>AC-14 NORTH: County Roads 118 &amp; 119, Ball Club</td>
<td></td>
<td></td>
<td></td>
<td>Screen nearby residences from corridor.</td>
<td></td>
<td>Red pine forest (fire-dependent)</td>
<td></td>
</tr>
<tr>
<td>AC-14 SOUTH: County Roads 118 &amp; 119, Ball Club</td>
<td></td>
<td></td>
<td></td>
<td>Restore two 7,500 sf workspaces.</td>
<td></td>
<td>Red pine forest (fire-dependent)</td>
<td></td>
</tr>
<tr>
<td>AC-15: County Road 137</td>
<td></td>
<td></td>
<td></td>
<td>Soften mature mixed forest edge. Screen nearby residences from corridor. Restore 7,500 sf workspace.</td>
<td></td>
<td>Red pine forest (fire-dependent)</td>
<td></td>
</tr>
<tr>
<td>AC-16: Great River Road</td>
<td></td>
<td></td>
<td></td>
<td>Screen nearby residences from corridor. Restore two workspaces: 7,500 sf and 4,655 sf.</td>
<td></td>
<td>Outside forest; nearest is red pine forest (fire-dependent)</td>
<td></td>
</tr>
</tbody>
</table>

### Key
- **Overstory Trees:** Replacement of large overstory species such as pine, oak, spruce, fir, aspen birch.
- **Understory Vegetation:** Small trees and shrubs, and potentially herbaceous plants along edges, often adjacent overstory, to create a gradual vertical transition.
- **Vegetated Islands:** Trees, shrubs or a combination of the two used in small groupings to screen a particular view.
- **Mitigation Vegetation Removal:** Selective removal of existing plants, primarily trees, to create a natural-looking transition rather than a straight wall of trees.
- **Landform Changes:** Subtle raised areas that, when planted, will help to screen a particular view.
Mitigation Scheme
KEY VIEW AC-2: Pike Bay Loop
Mitigation Scheme
KEY VIEW AC-4 WEST:
Valve Site West of Ketchum
Mitigation Scheme
KEY VIEW AC-5:
Sucker Bay Road
Mitigation Scheme
KEY VIEW AC-7: Iowana Road
Mitigation Scheme
KEY VIEW AC-9:
Wildwood Drive
Mitigation Scheme

KEY VIEW AC-10:
County Road 8/First Ave. W
Mitigation Scheme
KEY VIEW AC-14 NORTH:
County Road 118/119
Mitigation Scheme

KEY VIEW AC-14 SOUTH: County Road 118
Mitigation Scheme
KEY VIEW AC-15:
County Road 137
Mitigation Scheme

KEY VIEW AC-16:
County Road 18/ Great River Road
Vegetation Management

Using plants to mitigate the visual impacts caused by the construction of a pipeline corridor requires a long-term commitment to vegetation management. Mitigation only begins with the initial planting. Since the pipeline corridor will be maintained indefinitely, so must the required mitigation plantings.

Through most of Chippewa National Forest, the pipeline corridor is essentially a clearing, noteworthy for its uninterrupted length, its nearly uniform width, its straightness and the lack of vertical variety along its edges.

Forest clearings often occur as a result of disturbance. Fire, wind and floods are all natural examples of natural disturbance. Animals trampling or browsing vegetation also cause disturbance. People cause disturbance where they harvest trees or mow grasses, or when they develop land, thereby altering hydrology, microclimates and species composition.

The clearing for a pipeline corridor is typically maintained through a regimen of managed disturbance—annual mowing in some areas, coupled with periodic removal of woody vegetation (brush-hogging). These activities are for the purpose of retaining pipeline integrity by preventing root encroachment, maintaining vehicle access for repair and facilitating aerial visual inspection for leaks.

Employing the following maintenance techniques will create and perpetuate a corridor that appears natural and yet may reduce maintenance costs.

LIMITING VIEWS

As indicated in the inventory and analysis section of this document, the pipeline corridors in the Chippewa National Forest will be seen primarily from roadways crossing the pipeline. Maintaining plantings that reduce the visibility of the corridor as seen from these roads is critical to successful mitigation. The following management practices are related to plantings that reduce visibility from the roadway:

- Annually, mow the road right-of-way between the edge of the shoulder and the location of the pipeline markers.
- Maintain an 80-ft “no-mow” zone as a buffer extending away from the road beginning at the edge of the right-of-way line.
- To accommodate vehicular access for emergencies and maintenance, provide one mowed trail that winds its way
from the edge of the mown right-of-way through the 80-ft no-mow buffer. Limit the width of the trail to 10 feet with curves gentle enough to accommodate emergency and maintenance vehicles.

- Beyond the 80-ft no-mow zone, maintain visibility of the pipeline corridor by mowing a 10-ft wide strip centered over each individual pipeline. Do not mow this strip more than once a year.

- Vegetated islands occurring between pipelines should be maintained, by plant trimming or removal) only when their stems encroach into the 10 ft mow zone over individual pipelines.

- Beyond the 80-ft no-mow zone, clear the full-width of the corridor periodically (usually only once every 4 to 7 years, depending on the rate of re-growth, to maintain visual access.

- When mitigation vegetation spreads beyond its intended boundaries, it should be removed in a way that retains the natural appearance of the remaining plants. Plants should be pruned in a way that respects their natural growth pattern, not in a hard artificial line. Straight-line “hedge-type” trimming is not acceptable. Similarly, when plants need to be removed at the roots or trunk, remaining vegetation should create an edge that in plan view creates a curving or “wiggly” line.

- Depending on the size of initial plants, it may be necessary to mark boundaries of new plantings during the first year or two, prior to maintenance activities. This way, crews will know the exact limits of their work, and will be less likely to impinge on plantings by inadvertent removal or damage, or "straightening out" planted edges. The goal is to retain an irregular, undulating edge to nearly all plantings. (The exception is at AC-10, County Road 8, where street trees are planted in a straight line.)

- Approximately 300 feet from the road, allow regenerating woody vegetation to develop into vegetated islands that avoid the 10-ft clear area over pipelines. These islands need not be maintained except to keep them from growing over the pipeline. Certain species with aggressive, spreading root systems, such as sumac, may not be appropriate for these islands.
CORRIDOR UNIFORMITY

Where views of the corridor are not blocked, retaining a natural looking edge will reduce long-term visual impact. The following management techniques will help maintain a corridor edge that appears to be part of the forest rather than an artificial cut.

- As with mitigation plantings, naturally occurring, regenerating vegetation should be cut or cleared in an irregular, “wiggly” line, parallel to the pipelines, for a distance of 300 ft on either side of a road crossing. (Individual undulations, or “wiggles,” can be as long as 50 feet.) Within this 300 ft buffer, the “brush line,” where woody vegetation is allowed to regenerate, should, at some points approach the outermost pipeline—between 10 and 20 ft away before retreating back 50 feet in an undulating line.

- In the rest of the corridor, beyond the 300 ft buffer, woody vegetation should be allowed to regenerate up to 25 ft from the outermost pipelines. A straight mowing or cutting line is acceptable beyond the 300 ft roadway buffer.

- When clearing any corridor edge, some shrubs and understory trees should remain intact, not just large-diameter trees or those that will mature to become overstory.

- Clearing to control woody vegetation and maintain visual and vehicular access to the corridor may be conducted every five years or more. The longer the interval between cuttings, the better it will be for visual amenity, as well as for animal habitat. The latter is important not just ecologically, but for visitors’ aesthetic experience in the forest.

Thoughtful maintenance practices will ensure that the pipeline corridor remains screened or appears to be a natural clearing, thus reducing visual impact over the long term.
APPENDIX
APPENDIX

Information Sources


List of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>AADT</td>
<td>Average Annual Daily Traffic</td>
</tr>
<tr>
<td>CNF</td>
<td>Chippewa National Forest</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
</tr>
<tr>
<td>HCADT</td>
<td>Heavy Commercial Average Daily Traffic</td>
</tr>
<tr>
<td>LTA</td>
<td>Landtype Association</td>
</tr>
<tr>
<td>Bdp</td>
<td>Bena Dunes and Peatlands</td>
</tr>
<tr>
<td>Bsp</td>
<td>Bemidji Sandplain</td>
</tr>
<tr>
<td>Gtp</td>
<td>Guthrie Till Plain</td>
</tr>
<tr>
<td>Rlp</td>
<td>Rosy Lake Plain</td>
</tr>
<tr>
<td>MA</td>
<td>Management Area</td>
</tr>
<tr>
<td>Mn/DOT</td>
<td>Minnesota Department of Transportation</td>
</tr>
<tr>
<td>SIO</td>
<td>Scenic Integrity Objective (from USFS SMS)</td>
</tr>
<tr>
<td>SMS</td>
<td>Scenery Management System</td>
</tr>
<tr>
<td>USFS</td>
<td>U.S. Forest Service</td>
</tr>
<tr>
<td>VIA</td>
<td>Visual Impact Assessment</td>
</tr>
</tbody>
</table>
Landtype Associations (LTAs)

Alberta Clipper/Southern Lights Alignment and Great Lakes Alignment

Excerpts from Landscape Character Descriptions, Chippewa National Forest, 1999

Bemidji Sand Plain (Bsp)

Natural Environment

The largest consolidated portion of the Sand Plain stretches between the western Forest boundary, near Cass Lake to Portage Lake. The various areas of sand plain comprise 12.5% of the CNF and were formed as meltwaters carried coarse textured sands away from the Koochiching lobe. Soils have a slightly yellowish color and 93% of the area has slopes less than 6%. Lakes are a prominent feature and comprise 25% of the total area. Many small and large lakes like Cass Lake are surrounded by pine or mixed pine hardwood forests and have clear, highly reflective waters with sandy bottoms and lake edges suitable for swimming beaches. Wetlands are a less prominent feature compared to other LTAs and comprise 25% of the total area. The most common forests occur along the edges of drainages and where there is a high water table; they are composed of hardwoods with a thick understory. Wetlands are small and generally open.

The sandy soils and flat landscape create conditions that favor vegetation that is dependent upon fire for regeneration. Red pine forests are common and widely distributed, often lined in rows in plantation forests. Fire suppression has resulted in an unnaturally dense understory of hazel.

Social Environment

The largest and most popular recreation facilities occur in this LTA. Private land is almost exclusively near lakes or major roads due to the infertile nature of the sandy soil for farming. Property around lakes is typically summer residences with more year-round residences along major roads.

Guthrie Till Plain (Gtp)

Natural Environment

The Guthrie Till Plain exists in four separate areas and comprises 5% of the total area of the CNF; all areas adjoin the north shore of Leech Lake. The till plain was formed by a glacier moving across the landscape that dumped rocks in a uniform manner and when the meltwaters pooled and receded, they left behind variations in soil deposition and topographic changes. 96% of the till plain has slopes less than 6% and relief changes from 1300 to 1450 feet. The Guthrie Till Plain has
the smallest total acreage (95 acres) in lakes which occur within mixed
pine-hardwood, hardwood and conifer swamp forests. Artificial im-
poundments comprise the majority of open water (1190 acres). Water
moves across the plain’s dense soils into intermittent streams or drain-
ages lined with black ash.

Dense, forested wetlands comprise 25% of the till plain area. Open,
grassy wetlands with a few trees also occur frequently. A diversity of
forest communities are supported by the soil conditions within a small
area; this LTA exhibits a diverse landscape of colors and textures in
close proximity to each other.

Natural disturbance patterns vary within the till plain because of the
diversity of plant types but the management prescription has been
focused on clearcutting as the primary (human) disturbance pattern to
produce large areas of aspen. Clearcuts in pine forests tend to ap-
ppear as open vistas with small shrubs and grasses. Remnant trees,
clumps or individuals are typically large diameter red and white pines or
smaller diameter oak or paper birch. A variety of management practices
maintain the open appearance until pine seedlings mature. Then the
landscape takes on a highly cultivated, plantation appearance. Today
the wetlands appear more open primarily due to beaver activity.

Social Environment

There are no developed recreation sites but the Soo Line snowmobile
trail crosses the northern portion of the till plain. Private land use pat-
terns vary among the four areas; the two most western contain very
few inholdings except those along Sucker Bay and Ottertail Point and
the eastern sections contain little Forest Service land. The southern
section has a high percentage of agricultural land while the Sugar Point
area has resorts and lake homes.

Bena Dunes and Peatlands (Bdp)

Natural Environment

The Bena Dunes and Peatlands occur in one large, contiguous area
adjoining the south, and slightly west shore of Lake Winnibigoshish
extending eastward to Mud Lake and comprise 6% of the CNF. Winds
blew fine glacial sands into a gentle dune and swale pattern that is
mostly (98%) less than six percent in slope. Lakes, with the exception
of Sixmile Lake, are not prominent. Rivers are prominent with Leech
Lake River marking the southern boundary of this LTA and wetlands
comprise 54% of the total area.

Wet meadows and conifer swamps are the most common wetlands.
The wet meadows are characterized by wetland grasses, open water
and pine covered mounds, especially along the shores of the Leech
Lake River and the Mississippi River. Vistas within the Conifer swamps
have a wide edge of marsh grasses that allow views to islands that are
floating maps of sphagnum moss or covered with swamp conifers. A thick hazel shrub layer is characteristic for most forests in the landtype but swamp conifer forests have few shrubs in the understory, allowing long sight distances beneath their canopy.

The management prescription calls for clearcutting as the primary disturbance pattern to produce large stands of aspen. The prescription focuses on conifer sawtimber in upland pine areas and aspen in lowland places. Clearcuts in pine forests tend to appear as open vistas with small shrubs and grasses. These management practices are used to maintain an open appearance and the landscape takes on a highly cultivated, plantation appearance.

Social Environment

Recreation facilities include the Sixmile Campground with camping and boat launch facilities and boat launches into Ball Club Lake. Almost all of the private land in this LTA is along Sixmile Lake, the Great Mississippi Road or in the Ball Club community which is an urban center for the Leech Lake Reservation. Resorts are concentrated along the south shore of Lake Winnibegoshish, adjacent to Bena and several rural housing developments.

Rosy Lake Plain (RLp)

Natural Environment

The Rosy Lake Plain occupies three large, separate areas and 14% of the total Forest. The plain is located around Leech Lake River, around the northeastern half of Leech Lake and Mud and Goose Lakes. Stoney Point (between Pike Bay and Cass Lake) with a hardwood and pine forest has been designated a Natural Research Area.

The Rosy Lake Plain formed from shallow water deposits of a glacial lake so the landscape appears predominantly flat with 97% less than 6% slopes. Lakes cover 10% of the area and occur in the sandier portions. Wet meadows surrounding the lakes provide a picturesque backdrop to the spruce-fir forest.

Streams meander through the wet meadows and along with the wetlands; they are a prominent feature, comprising 48% of the total area. Most common are dense conifer swamps with restricted viewsheds but also wet meadows and bogs with open views.

Wet soils cause shallow rooted trees in conifer swamp forests to blow over in wind storms. Increased light within the gaps allows regeneration of white spruce and cedar and black spruce in the bogs.

Spruce-fir forests typically experience infestations of spruce budworm and following a die-out, large fires usually occur leaving blackened skeletons of trees and a primarily open landscape. Then dense forests of tamarack, white birch and aspen regenerate the area.
The management prescription calls for clearcutting as the primary disturbance pattern to produce large stands of aspen. The prescription focuses on conifer sawtimber in upland pine areas and aspen in lowland places. Clearcuts in pine forests tend to appear as open vistas with small shrubs and grasses. These management practices are used to maintain an open appearance and the landscape takes on a highly cultivated, plantation appearance.

Social Environment

Boat launches are the only recreational facilities in the interior parts of the Rosy Lake Plain. Private lands are scattered throughout and are predominantly year-around residences along major roads. Some private land, mostly with summer homes, is along lakeshores and the Leech Lake River.
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