

Appendix E

Visual Assessment

**Otter Tail Power
Minnkota Power Cooperative
Minnesota Power**

Visual Description and Potential Visual Impacts

**Bemidji to Grand Rapids 230 kV
Transmission Line Project**

Prepared by:

HNTB 700 International Drive, Suite 600, Minneapolis, MN 55425

December 18, 2008

Al Koeckeritz
Ottertail Power Company
PO Box 496
Address 2
Fergus Falls, MN 56538-0496



January 5, 2010

RE: 230 kV Bemidji-Grand Rapids Transmission Line Project
Visual Inventory and Potential Impacts

Dear Mr. Koeckeritz:

The visual inventory and preliminary visual impact materials prepared by HNTB were designed to introduce aesthetic considerations surrounding the proposed Bemidji-Grand Rapids segment of the CapX 2020 line.

The materials include:

- Reference Maps showing four potential routes (North, South, Central Routes 1 and 2), plus crossover segments for the two Central Routes
- Corridor Narrative (text description of the corridors under consideration, with number keys to corresponding photos)
- Five sets of number-coded photo pages showing the North and South Routes, the Central Corridor, the south non-Chippewa National Forest route, and details of the Bemidji-Wilton area
- Route Comparison Table

I hope you find these useful as you move the project forward.

Best regards,

A handwritten signature in black ink that reads 'Diane Hellekson'. The signature is fluid and cursive.

Diane Hellekson
Landscape Architect

230 kV Bemidji-Grand Rapids Transmission Line Project

Visual Description and Potential Visual Impacts

The following text describes the visual characteristics and potential impacts of three corridors under consideration for the Bemidji-Grand Rapids segment of the CapX 2020 line. These three corridors (North, Central and South) include four distinct routes, since the Central Corridor includes two route options: Route 2 (along Highway 2) and Route 1, which follows the existing Great Lakes Gas line.

Since the westernmost portion of each corridor is similar, crossing some of the same roads and other features, this area is described separately as the Bemidji-Wilton Area. Descriptions for the majority of each route, below, begin approximately six miles west of the Chippewa National Forest boundary and end at the Boswell substation near Cohasset. In general, the narrative considers each route from west to east.

For the purposes of analysis and applications, the corridors are 1000 ft wide, meaning that where the new is not replacing an existing transmission line, the actual location of the line could be any of several places inside the corridor boundary. Therefore descriptions here constitute *general* and *potential* outcomes. Final design decisions might mean that certain views or impacts are different than indicated here. Detailed design of power line locations will allow more detailed visual analysis in the future.

Bold numbers in parentheses refer to Key Points on the route maps and in some cases correspond to photographs, shown on separate pages.

See the accompanying table for comparisons of the various routes.

Bemidji-Wilton Area

Due to its proximity to the city of Bemidji, the westernmost area of the corridors, near the Wilton Substation, exhibits the highest concentration of residential properties. Since the proposed South and Central-Route 2 are closest to Lake Irving and the more populous parts of the city, **(1)** they would be visible to more nearby residents than the North Route and Central-Route 1, which in this area lie further south, closer to Lake Marquette and agricultural areas.**(2)**

A key difference in this western portion is that the North Route and Central-Route 1 follow an existing pipeline corridor, which exhibits no large-scale structures but is largely clear of trees, while the South Route follows an existing 115 kV transmission line. The main visual impact of a new South Route power line would be taller, wider vertical support structures replacing the current devices that support the overhead lines.

Central-Route 2, beginning just south of 15th St. NW, follows Hwy. 2 until about a mile west of City of Cass Lake. In the City of Bemidji near Division St. W., Central-Route 2 would cross the path of the 115 kV line mentioned above.

The North Route and Central-Route 1 would be noticeable to drivers and residents near the Bemidji Slough (3,4), where the line crosses this wildlife management area and Hwy. 71, and lies close to a Hwy. 2 interchange. Central-Route 2 would be immediately adjacent to this interchange (Washington Avenue S.) but would not cross the slough itself.

On local roads, particularly North Plantagenet Road SW/ CR 400, all four routes would be intermittently visible both close-up and from a distance.(5) The South Route is furthest from Hwy. 2, however, and probably the most screened by trees south of Plantagenet.

South and east of the slough and beyond Paul Bunyan Drive, the four routes begin more divergent paths.

West of the Necktie River, the North Route veers north, crossing Hwy. 2 and a major Bemidji exit, Paul Bunyan Drive SE. (6) The line then follows an existing 69 kV transmission line that is parallel and immediately adjacent Tyler Ave. NE and Power Dam Rd. NE. The North Route crosses the Mississippi River (east of 7) in a forested area west of Parker's Lake Rd. NE. (8)

Where the North Route runs northwest-southeast and roughly parallel Hwy. 2, the South Route drops south to follow the aforementioned 115 kV line, which crosses Monroe Ave SE/229th Street and North Plantagenet Road SW. Similar to the North Route, the South would be intermittently visible, both close-up and distantly, from local roads, including Plantagenet (9), County Highways 9 (10) and 36. After crossing Hwy. 200 west of Laporte, the line continues along the existing transmission line route paralleling Hwy. 64 to the west, where it would be partially and intermittently screened by trees. (46)

As noted above, Central-Route 2 continues to parallel Hwy. 2 and dozens of residences near County Hwy. 45, Grace Lake and Midge Lake. (11) About a mile west of the City of Cass Lake, the line drops south to parallel a rail corridor and existing and proposed Enbridge pipelines. (33)

Central-Route 1 intersects fewer residential areas as it runs southwest along an existing pipeline corridor, crossing and paralleling the Necktie River, (12) and traversing agricultural and wildlife management lands south of Grace and Midge Lakes. The transmission line would be fully visible at several road crossings, including County Highways 36 and 45 and especially County Hwy. 9, (13) as well as on several north-south roads in eastern Hubbard County and western Cass County.

North Route

At 116 miles, the North Route is the longest corridor, with the second highest number of instances (49) where the power line crosses a road. Sixteen of these roads are primary or secondary highways. The line is immediately adjacent and parallel roadways for about 51 miles total, though trees may screen the view from the road for about half of this length.

Twenty-five water bodies would likely be cross or immediately adjacent to the line. One carry-in boat access point and three recreational trails would be in the power line's immediate vicinity.

Emerging from the Bemidji-Wilton area, the proposed line largely parallels an existing 69 kV transmission line, which runs close to Power Dam Road, Parkers Lake Road NE, Marcella Drive NE, Long Lake Drive NE, and Hwys. 31 and 71 before reaching Blackduck. The line would be visible for the majority of this segment, except for about one-fourth of the stretch where the line veers away from the road or is screened by trees. (17) The line would be most noticeable where it crossed roads at an oblique angle (15, 18) and where it would be visible

The proposed line departs from the existing transmission line south of Blackduck, where it takes an easterly path through sparsely populated, intermittently wooded land. (21,22) The main eastern route between Blackduck and Alvwood is CR 30, where the line would be visible to motorists about half the time. (20) The line follows CR 29 southeast to FR 2429 (23) across Bowstring River, then east overland and near low-volume roads (24,25) until reaching the northern shore of Whitefish Lake, where it would be visible to a small concentration of residents and recreational visitors to the lake. (26)

The line resumes the path of an existing 69 kV transmission line east of the Bass Lake substation (27) and continues across wetlands, unimproved roads and the Spur Lake Trail before reaching Hwy. 6. The route crosses the highway to follow an existing transmission line south, along or near Hwy. 6 (29), then crosses the highway again near Twin Lakes. The power line, while taller than the existing transmission line, is likely to be mostly screened by tall vegetation in this area.

The line continues south and then departs from the highway alignment until reaching the south shore of Jessie Lake, (31) where it would be visible to lake visitors and a small concentration of residents. South of this point, the line again runs parallel to Hwy. 6 before crossing again to traverse wetlands and other undeveloped land. For highway drivers in this area, the line could be visible in the distance, exhibiting a higher profile than the existing 69 kV line.

The North Route rejoins the Hwy. 6 corridor just south of CR 172 at Pine Ridge Cemetery, continuing south in the vicinity of a number of residents and businesses in northern Deer River. The proposed line would replace one or more existing 69 kV lines here. The route jogs southeast, then south to cross Hwy. 2, (32) now on the same alignment as an existing 115 kV transmission line, which runs close to the highway before reaching the Boswell substation

Central Corridor-Route 2 (Highway 2)

This 68-mile route traverses the central portion of Chippewa National Forest, primarily Highway 2, a major thoroughfare between Cass Lake and Grand Rapids. Since it is the shortest route, with most of its length nonresidential, it exhibits relatively few (30) road

crossings. Many of these crossings provide links to park and other recreational amenities, as well as residential areas south of the corridor.

While this route crosses fewer navigable water bodies than the other routes, the majority of these are major recreational lakes with nearby launches. Similarly, while this route necessitates fewer road crossings, it would affect more people, both area residents and park visitors, due to the high-volume road, proximity to the City of Cass Lake, and recreational context.

On the western edge (adjacent the Bemidji-Wilton area described above) the route would follow Hwy. 2 and an existing 69 kV transmission line, between a series of small lakes and Wolf Lake State Wildlife Management Area. Presenting a higher profile than the existing line near Midge Lake, it would likely be visible to residents here. **(11)**

The line drops south across Hwy. 2, where it briefly parallels an existing 115 kV transmission line that skirts the Otter Tail Power and Enbridge Energy buildings **(33)** west of the City of Cass Lake. The route then joins an east-west railroad and pipeline corridor, running parallel to an unpaved utility road, open space and industrial property. It would be visible from portions of U.S. Forest Service property **(34)** and several residences to the immediate north.

From the point where it crosses Hwy. 371, the major north-south route accessing the city, the power line would present a new visual feature for the City of Cass Lake. **(35)** Depending on its proximity to Railroad Street, which essentially forms the southern boundary of town, the line and its support structures would be seen either in close proximity, with several support structures providing visual punctuation, or in its entirety as a somewhat distant feature. The line would be most noticed by residents and visitors traveling south on Central Avenue, Norway Avenue and Norway Ave. N, Neils Avenue, and the eight “tree” streets (Ash, Basswood, Cedar, etc.). **(36)**

On the east side of town, the power line may continue east along the railroad corridor or veer northeast along an existing pipeline route. The latter route would have the pipeline joining the Highway 2 corridor near the MiGiZi Trailhead and pipeline station, and thus would be visible to both trail and highway users as well as visitors to the MnDOT rest area north of the Highway, on the shoreline of Cass Lake. The open, unforested character of this area would mean that the new transmission line would be clearly visible from Cass Lake itself.

If the route paralleled the railroad east of the city, the line would offer a more distant view for Highway 2 travelers and Cass Lake visitors.

Where Hwy. 2 squeezes between Cass Lake and Pike Bay, the transmission line may be visible to drivers or screened by trees, depending on its precise location. **(38, 39)** If the line is set back into forested area north of the highway, it would probably be more visible from the lake itself, though partially screened by trees.

The preliminary corridor indicates that the line could travel along the south side of Hwy. 2 between the two lakes. Due to the very small land area between the road and Pike Bay, the line would be fully visible if located here.

On the east side of Pike Bay, where the power line may cross Hwy. 2, it would likely be prominent to those traveling west, as well as travelers emerging north from Pike Bay Loop, which connects with campground, a boat launch and trails. The line is likely to traverse an open wetland and Strawberry Lake, directly across the highway from Pike Bay Loop. (39)

From Pike Bay Loop, the route closely parallels Hwy. 2 for the 36 miles to Deer River, with just one departure. Visibility of the line would vary along the route. Existing trees would partially or fully screen the structure for about half of the first 16 miles, from Pike Bay Loop to Bena. For the 22 miles from Bena (40) to Deer River, the landscape character is more open, with large wetlands and sparser trees to screen the power line and structures. While the line is not directly adjacent to Lake Winnibigoshish, some open landscape areas south of the lake may afford distant views of the power line. (41,42)

East of Cedar Road and an industrial site, the Hwy. 2 Route dips southeast to continue along a pipeline corridor that punctuates the south residential areas of the City of Deer River. Here it would be visible, with potentially some tree screening, from a concentrated residential area.

Southeast of Deer River en route to the Boswell Substation, the Central Route is fairly close to the North Route, which parallels Hwy. 2. (32) The Central Route would be closer to the highway, possibly hugging it to the north and paralleling an existing pipeline corridor here. For travelers on Hwy. 6, the new transmission line would be fully visible for about half of the six miles between Deer River and Boswell due to tree cover.

Central Corridor – Route 1 (Great Lakes)

Spanning a central portion of Chippewa National Forest, Central-Route 1 is the most visually isolated from highways and residential areas. It intersects approximately the same number of roads as the Highway 2 route (30), but parallels roads for only 12 of its 69 miles. The route generally follows an existing pipeline corridor, which is largely cleared of trees, allowing unobstructed views of the structure primarily at road crossings.

While a new transmission line along Central-Route 1 would affect fewer people than on the Central-Highway 2 Route, it could be argued that the impact would be more marked for Great Lakes area visitors, due to the structure's contrast to the pristine natural context. While this report does not cover ecological impacts, it is useful to note that the Great Lakes Route includes old-growth forest, which also provides aesthetic value, in the area called Ten Section. (44)

On the western side of the route, following the Bemidji-Wilton Area, the line runs in a northwest-southeast direction along existing and proposed pipeline corridors in the Necktie River vicinity. (12,13) This western portion of the route is more than half

forested, which fairly effectively screens the line, except at crossings, especially County Hwy. 45, where an agricultural area offers a longer open view.

The line continues southeast across Hwy. 371, where it would be visible close to the road and in the distance for travelers looking from the south and from Pike Bay Loop. **(43)** Beginning at Hwy. 371, and continuing east for 16 miles to Bena, the line would be adjacent, or nearly adjacent to a snowmobile trail.

A half-mile south of Pike Bay, the route may affect views around Moss and Twin Lakes. (s of **44**) While the area near the lakes is heavily forested, ensuring some screening, the lines could be visible from either or both of the lakes, depending on the precise placement of the structures within the 1000-ft corridor.

For approximately 9 miles between Twin Lake and Sucker Bay Road, the new line would follow land characterized by heavy forest cover, visible only to off-trail recreational users and those crossing any of three unimproved roads, including Cuba Hill Road. The line would be briefly visible where it and the existing pipeline, cross Sucker Bay Road, a major thoroughfare. The line continues through forested areas, crossing several forest roads and Sunset Beach Road NW, south of Portage Lake. South of Bena, the line would be visible to travelers along a half-mile or more of County Hwy. 8, where open wetlands intersect Central-Route 1. **(40)**

Four miles east of Bena, west of Nushka Lake, the Great Lakes Route veers north to Hwy. 2, where it overlaps with the Central-Highway 2 Route. Here, the new line would replace an existing 69 kV transmission line south of Hwy. 2. The line is within 300 ft of the road, but due to portions of screening vegetation and a railroad grade, it would be only intermittently visible for about 8 miles to the Mississippi River.

The route dips south at the Mississippi River, allowing occasional distant views from Hwy. 2 in the Ball Club area. **(42)** Travelers on County Hwy. 18 would be also notice the power line due to the wide areas of low wetland vegetation offering relatively long, uninterrupted views. Since the new structure is higher than the existing 69 kV line, and higher than most trees, it would be more noticeable even in the distance.

Views of the Great Lakes Route would be distant and intermittent from Ball Club to Deer River, where the line again follows a pipeline rather than an existing power line, creating a new form in the landscape. East of Deer River, **(32)** the new line would replace an existing 115 kV transmission line, creating a taller obstruction for those looking south from Hwy. 2, until Boswell Substation.

South Route

The 100-mile long South Route parallels major roadways for the majority of its alignment. Relative to the other routes, it is moderately populated, primarily around lakes and in the western portion. This route crosses the most roads (63) of the four routes and the most recreational water bodies (10), including Leech Lake, Big Sand Lake and the Mississippi River. **(50, 51)**

About six miles east of the Chippewa National Forest, near Lake Kabekona, the South Route parallels Hwy. 6 and an existing 115 kV transmission line a few hundred feet from the road. The new line would be 20 ft higher than the existing line, but screened by vegetation for much of this segment. **(46)**

The route departs from the existing line and cuts west along County Hwy. 23, where it intersects agricultural land, small lakes and scattered residences. Depending on its precise location within the 1000 ft corridor, the line might be visible along much of the road or partially screened by trees. Those traveling on County Hwy. 12 or State Hwy. 34 **(47)** would notice the line briefly at crossing points, perhaps somewhat longer at Hwy. 12. The power line intersects portions of County Hwy. 50 through a heavily wooded segment before reaching Hwy. 371 and a developed area near the Northern Lights Casino, on Hwy. 200 and 371. **(49)** Travelers near this intersection would have an unobstructed view of the power line and structures, particularly when traveling east or west. A number of residential roads off Hwy. 200 near the casino would also notice the new power line, which continues almost 30 miles from 371 to Remer.

This segment of Hwy. 200 and the South Route largely forested, with occasional rolling topography that will both screen and occasionally accentuate views of the power line. The largest impact along this route may be from Leech Lake, whose shores intersect about a mile of the route. **(50)** Depending on the precise placement of the line, recreational users on the south-central portion of the lake would likely see the power line as a distant but prominent feature. Several residences and boat access points are also in the path of the line in the Leech Lake vicinity.

East of Leech Lake, the landscape continues to be largely wooded, punctuated by small lakes. Major intersections include County Hwy. 39, State Hwy. 84, the Boy River and a recreational trail. **(51)** Just west of Remer, the route clips the southeast corner of Big Sand Lake. Wetland areas southwest of the lake will give lake users a narrow view of the power line. The view from Hwy. 200 here, as throughout the route, depends largely on how close the line is located to the road, and how much existing vegetation is left to screen the structure.

West of Remer, the route heads north about two miles, offering a distant, mostly open view from Park Avenue, then heads east through heavily wooded land before reaching Hwy. 6. The route follows Hwy. 6 **(53, 54)** for about 18 miles, almost all the way to the Boswell Substation.

For the southernmost seven miles of the Route's path along Hwy. 6, it occupies Forest Service land, which is largely wooded, allowing for views of the power line mainly at intersections. **(53)** The views open up outside the forest boundary, near Leighton Lake, where a number of residences as well as lake users will gain views of the power line. Open views, punctuated by some forest areas, characterize the rest of the route, which crosses and distantly parallels the Mississippi River, briefly rejoins Hwy. 6 and then ends at Boswell.

In addition to the casino intersection and Leech Lake, this western end of the South Route will probably offer the most obvious views of the power line.

Route Comparison Table

(excludes Bemidji-Wilton Area)

		North Route		Central Route-Hwy. 2		Central Route-Great Lakes		South Route	
ROADWAY INVENTORY	Total route length	116		68		69		100	
	Distance route parallels road (fully visible and screened)	55 miles	Variety of roads, including Hwy.s. 71, 6 and 2.	46 miles	Primarily Hwy. 2	12 miles	Primarily Hwy. 2	80 miles	Hwy.s. 200, 6 and 64
	Overall, relative amount that route is visible from road	Somewhat	A mix of fully screened, intermittently screened and clear, unscreened views	Most	Full, unscreened views in and near City of Cass Lake, possibly on Hwy. 2 between Cass Lake and Pike Bay. Intermittent views along western portion of Hwy. 2.	Least	Primarily visible intermittently and in the distance along Hwy. 2, and briefly along Pike Bay Loop, off Hwy. 371	Somewhat	Intermittent views throughout, with three significant areas with full view of power line
	Number of times line crosses or intersects any road (at least 0.5 mi long)	49	Majority of crossings are low-volume roads	30	Variety of road types and volumes	30	Almost all crossing are very low-volume roads	63	Variety of road types and volumes
	Crosses or intersects primary or secondary highway	16		6		6		11	
LAND USE & LANDSCAPE CHARACTER	Residential context	Minimal	Includes lakeshores, northern Deer River, Blackduck environs	Highest	Includes Cass Lake, Bena, Ball Club and Deer River	Lowest	Almost none; Ball Club primary concentration	Moderate	Includes lakeshores, primarily Leech Lake and vicinity
	Developed (nonresidential) context	Minimal		Highest	Railroad, utility and other businesses in Cass Lake, Deer River	Lowest		Moderate	Commercial development near intersection of Hwy.s. 371 and 200, and
	Natural, agricultural or recreational context	Primarily	Mixed land use context	Moderately	Recreational uses dominate. Roadway injects transportation context into natural setting	Highest	Large natural forest area, currently interrupted mainly by pipeline corridor	Moderate	
RECREATIONAL INVENTORY	Recreational water bodies crossed by or immediately adjacent to power line	8	includes Mississippi (parallels Stump Lake), Turtle River Lake, Whitefish Lake, Jessie Lake	5	Midge Lake, Cass Lake, Pike Bay, Mississippi, Ball Club Lake	6	Moss Lake, Twin Lake, Mississippi River, Ball Club Lake, White Oak Lake	10	Includes Kabekona Lake, Leech Lake, Boy River, Mississippi River
	Boat access points	1	carry-in canoe	3	Ball Club boat ramp and 2 carry-in points	3	West Oak boat ramp and 2 carry-in sites	4	2 boat ramps, 2 carry-in sites
	Recreational trails crossed by power line	3	2 snowmobile, 1 general trail	7	Heartland trailhead, snowmobile route crossed four times, Mississippi canoe route	4	2 snowmobile trails (parallels trail for 16 miles), 1 general trail adjacent 371 and Mississippi canoe route	6	2 snowmobile trails, 4 general trails



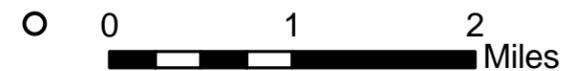
Wilton Substation

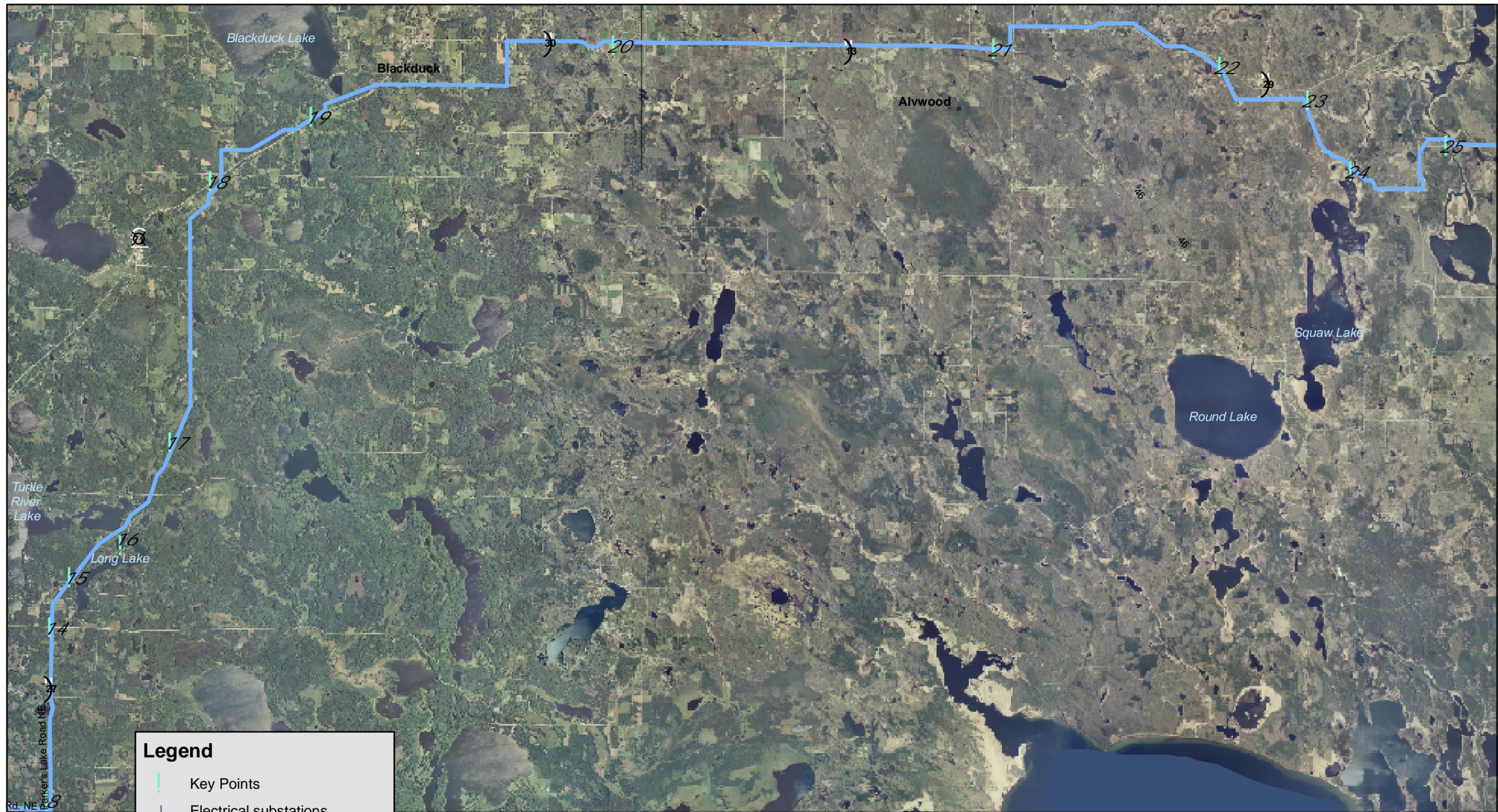
Legend

- | Key Points
- | Electrical substations
- North Route
- South Route
- Central-Route 1 (Great Lakes)
- Central-Route 2 (Hwy. 2)
- Central Crossover Segments

230 kV Bemidji-Grand Rapids
Transmission Line Project
MAP 1

Bemidji-Wilton Area



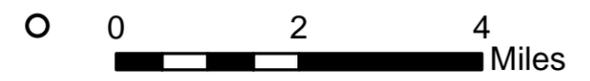


Legend

-  Key Points
-  Electrical substations
-  Central-Route 1 (Great Lakes)
-  Central-Route 2 (Hwy. 2)
-  Central Crossover Segments
-  North Route
-  South Route

230 kV Bemidji-Grand Rapids
Transmission Line Project
MAP 2

North Route





Legend

-  Key Points
-  Electrical substations
-  Central-Route 1 (Great Lakes)
-  Central-Route 2 (Hwy. 2)
-  Central Crossover Segments
-  North Route
-  South Route

230 kV Bemidji-Grand Rapids
Transmission Line Project
MAP 3

North Route



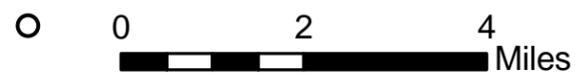


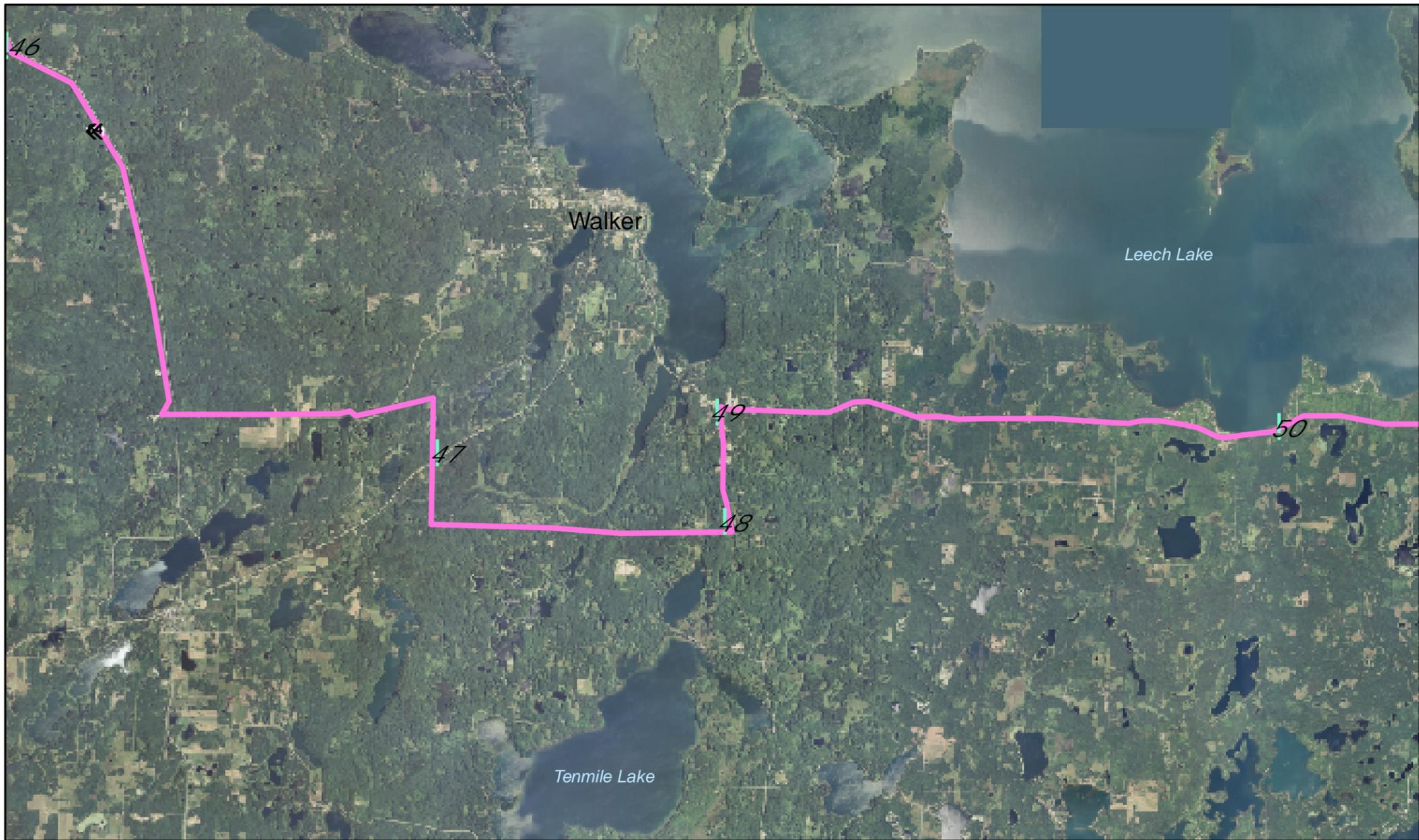
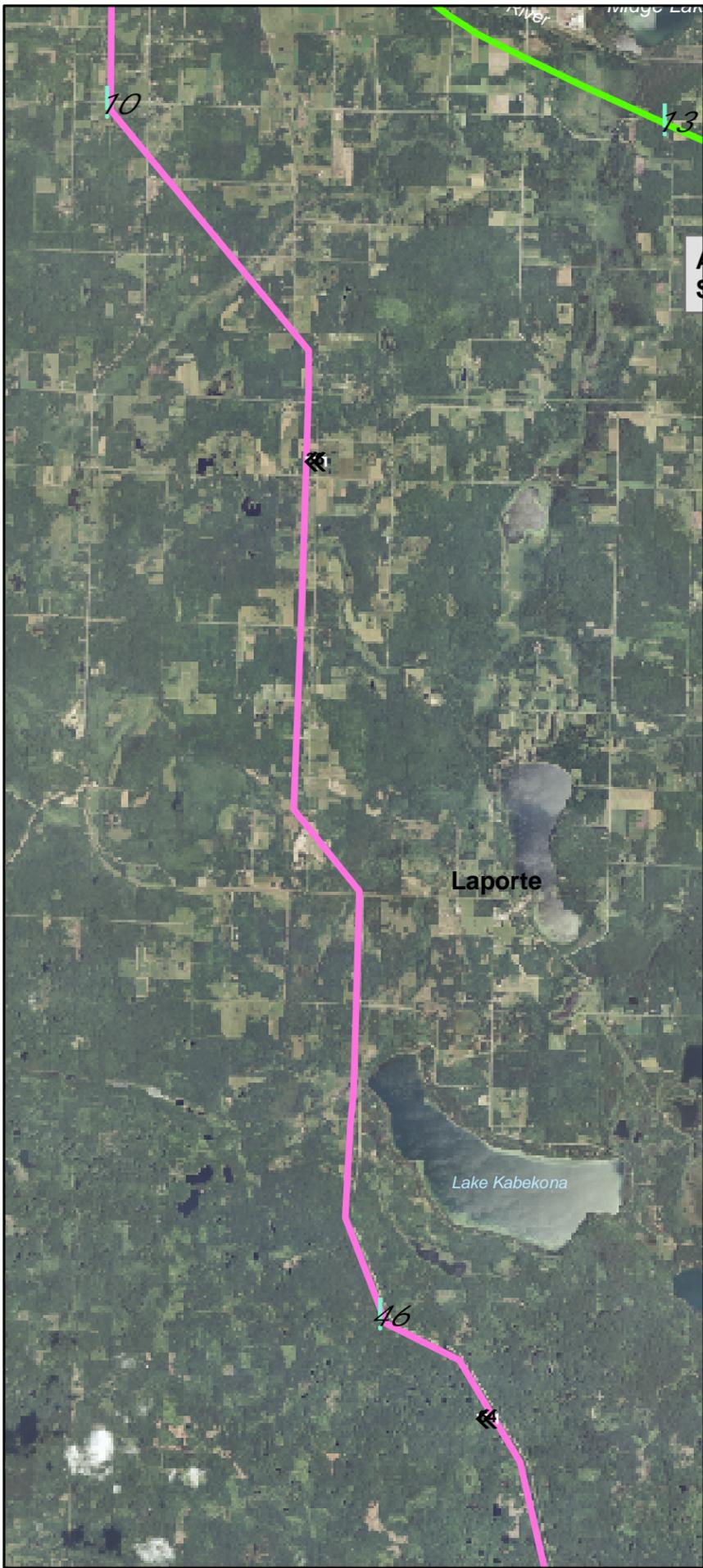
Legend

- | Key Points
- | Electrical substations
- Central-Route 1 (Great Lakes)
- Central-Route 2 (Hwy. 2)
- Central Crossover Segments
- North Route
- South Route

230 kV Bemidji-Grand Rapids
Transmission Line Project
MAP 4

Central-Routes 1 & 2





Legend

-  Key Points
-  Electrical substations
-  Central-Route 1 (Great Lakes)
-  Central-Route 2 (Hwy. 2)
-  Central Crossover Segments
-  North Route
-  South Route

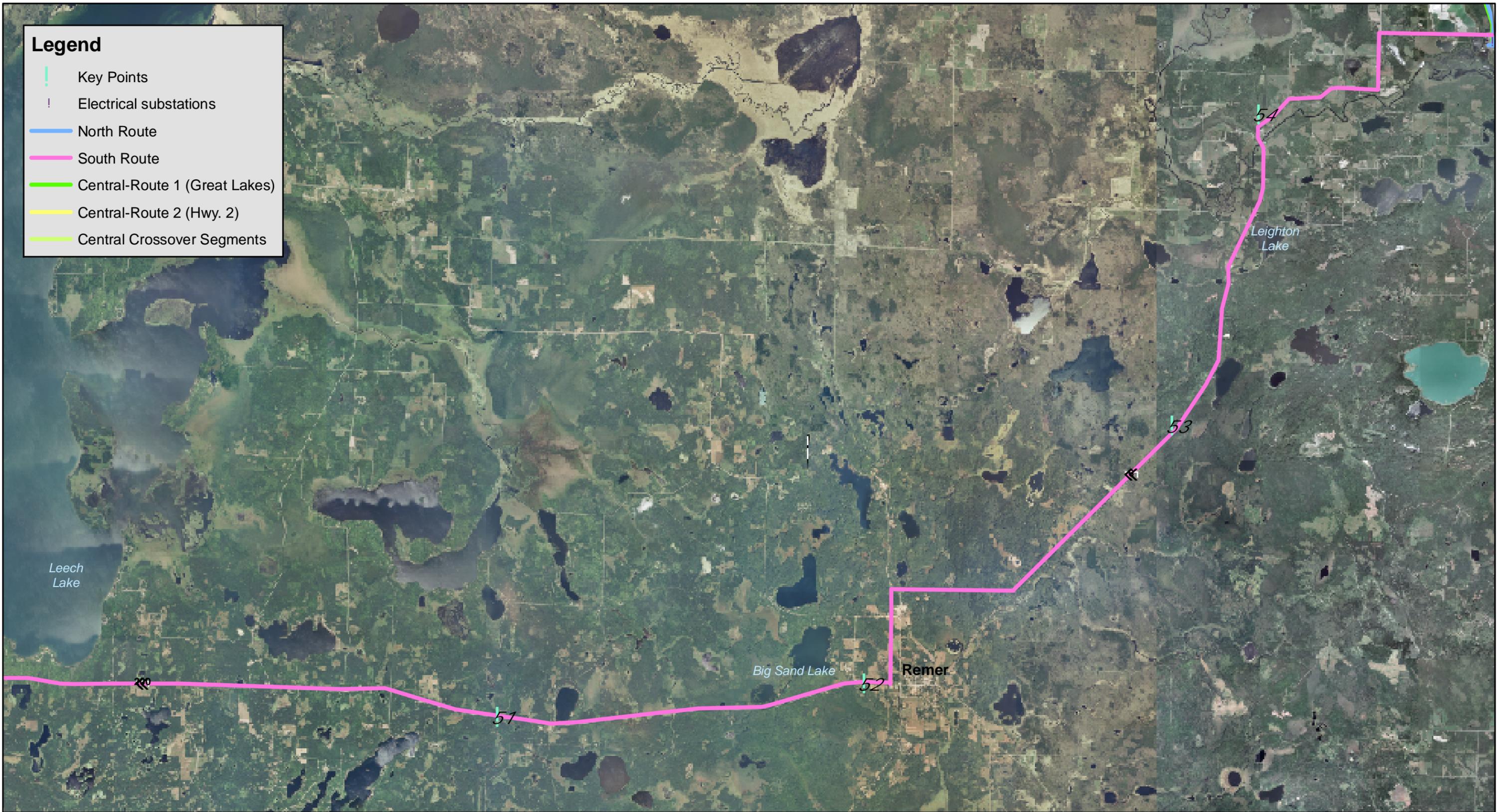
230 kV Bemidji-Grand Rapids
Transmission Line Project
MAP 5

South Route



Legend

- Key Points
- Electrical substations
- North Route
- South Route
- Central-Route 1 (Great Lakes)
- Central-Route 2 (Hwy. 2)
- Central Crossover Segments



230 kV Bemidji-Grand Rapids
Transmission Line Project
MAP 6

South Route





Legend

- - - Key Points
- ! Electrical substations
- Central-Route 1 (Great Lakes)
- Central-Route 2 (Hwy. 2)
- Central Crossover Segments
- North Route
- South Route

230 kV Bemidji-Grand Rapids
Transmission Line Project
MAP 7

East Area, Boswell Substation

