

4. ALTERNATIVES CONSIDERED AND REJECTED

This section addresses Minn. Rules pt. 4400.2100 (Alternative Permitting Process), which requires an applicant to identify any sites or routes rejected and the reasons for rejecting them.

4.1 Alternative Routes Considered

Alternatives to the proposed route evaluated by GRE are described below and shown on Figure 4-1. Additional routes outside of the project area were reviewed but dismissed due to exposure length, cost, and the presence of large bodies of water to cross or go around.

Alternative routes evaluated were reviewed and analyzed both in the field and using aerial photography and land-based maps that show natural features such as lakes, streams and wetlands. Routes that followed existing right of way corridors were preferred to cross-country routes. With the exception of the Double Circuit and the Mail Route Road alternatives, the use of some portions of STH 18 was unavoidable.

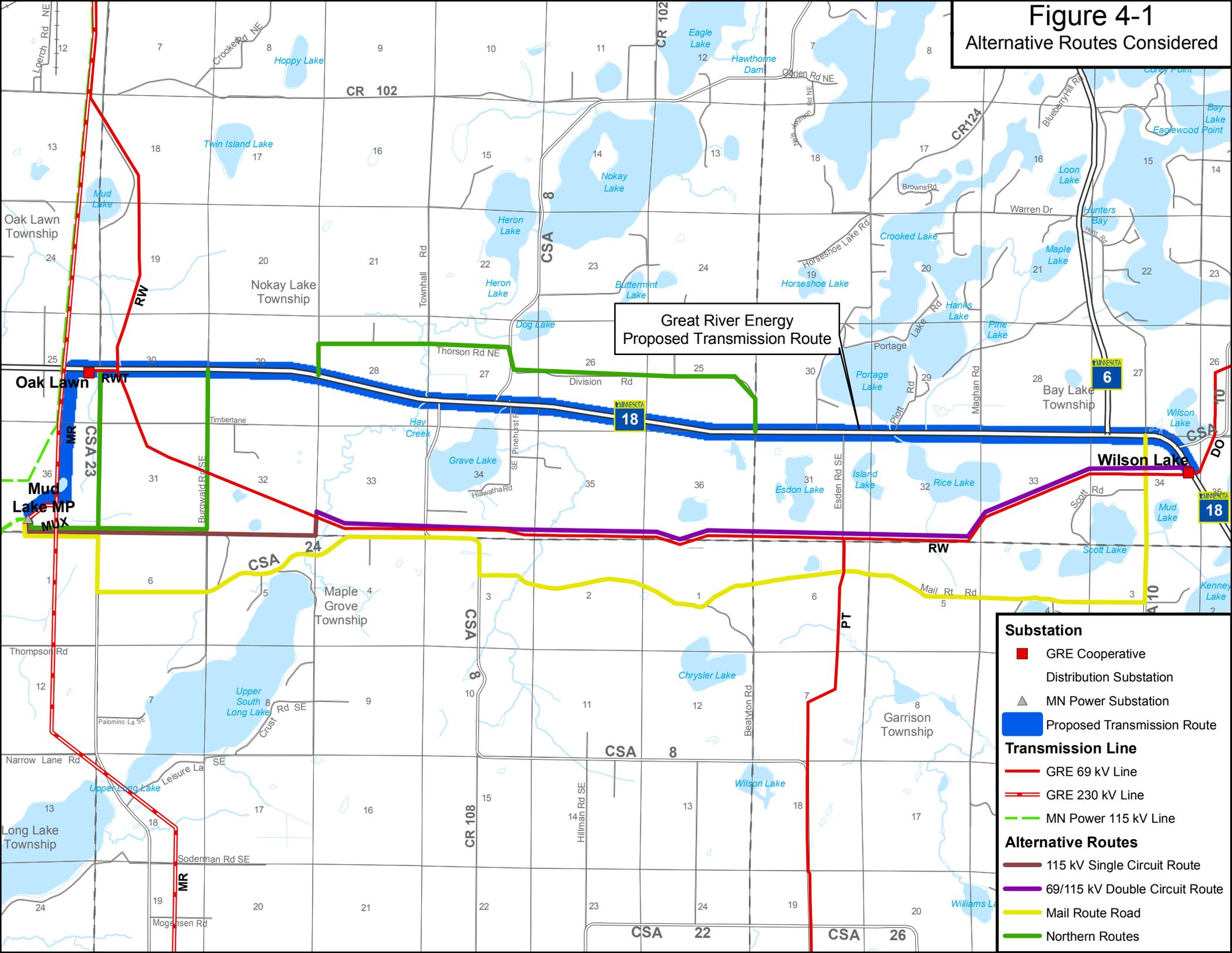
4.1.1 Double Circuit or Common Corridor

115/69 kV

This alternative would involve rebuilding GRE's existing 69 kV transmission line (south of the proposed route) to a double circuit 115/69 kV line or building the new 115 kV line parallel to the existing 69 kV system. This alternative is attractive in that it has existing right of way and would require minimal tree and vegetation removal. However, three factors eliminate this as a possible route:

- The existing 69 kV transmission line is the primary source into the Wilson Lake area and any outage on this line creates a critical contingency for the entire Lake Mille Lacs transmission system.
- The project's main goal is to add a second power source to improve the area's electric reliability. NERC/MAPP reliability standards consider an outage on a double circuit or common corridor line that exceeds one mile in length a single outage. This alternative would have about eight miles of double circuit or common corridor line. Therefore this alternative would not improve reliability in the region according to these standards.
- This alternative would cost approximately 2-3 times more than the proposed project, due to higher construction costs and the cost associated with accommodating an outage to build the line.

Figure 4-1
Alternative Routes Considered



Great River Energy
Proposed Transmission Route

Substation

- GRE Cooperative
- ▲ Distribution Substation
- ▲ MN Power Substation

Proposed Transmission Route

- Proposed Transmission Route

Transmission Line

- GRE 69 kV Line
- GRE 230 kV Line
- MN Power 115 kV Line

Alternative Routes

- 115 kV Single Circuit Route
- 69/115 kV Double Circuit Route
- Mail Route Road
- Northern Routes

Oak Lawn

Mud Lake

Wilson Lake

18

6

18

CSA 24

CSA 8

CSA 8

CSA 22

CSA 26

Oak Lawn Township

Nokay Lake Township

Maple Grove Township

Garrison Township

Long Lake Township

RWT

MR

CSA 23

MUX

MR

CSA 24

MR

CSA 23

RWT

MR

CSA 23

MUX

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230/115 kV

GRE also explored the alternative of double circuiting within the existing GRE 230 kV line corridor, which would involve rebuilding about 1.5 miles of 230 kV line to 230/115 kV double circuit line. With this option, the regional power grid would be reduced to critical levels and major power transfers between northern and southern Minnesota could be greatly impacted. If the 230 kV line were out of service, the Riverton-Brainerd 115 kV line would have to be opened to prevent overload failure, and service to the cities of Brainerd and Baxter would be down to one source. GRE is in the process of providing another source to the Brainerd area; however, it is uncertain if this would be available in the timeframe in which the 230 kV line would have to be rebuilt.

With the critical nature of the 230 kV line as one of three bulk transmission lines connecting northern Minnesota with the Twin Cities region, taking this line out of service would be very difficult to schedule with MISO, resulting in construction timing issues. Finally, the double circuit 230 kV line would result in a sizeable increase in cost. Construction of this 1.5 mile segment as a double circuit 230/115 kV line would be 2.5 to 4 times more costly, not including any potential financial losses due to market constraints in moving power between northern and southern Minnesota.

4.1.2 Mail Route Road

This route is a winding, narrow, and heavily-wooded gravel road that is south of GRE's existing 69 kV transmission line. There are multiple homes, both permanent and seasonal, located along this corridor. The transmission design would require many specialty poles to follow the road, and tree and vegetation removal would be extensive. This route was dismissed due to its impact on the existing terrain, design concerns, its proximity to the existing 69 kV line, and the cost of construction (angle structures cost approximately 1.5 to 2 times more than a regular 115 kV structure).

4.1.3 Northern Routes

There are several possible alternative routes in the first three miles exiting the Mud Lake Substation. One option exits the substation east along the section line to County State Aid Highway (CSAH) 23, and then turns north along CSAH 23 to STH 18. A second option again exits to the east along the section line crossing CSAH 23 for an additional mile to Burgwald Road, then north to STH 18. The route options north of STH 18 were limited due to the multiple lakes in this area; however, one route was considered. This route would avoid the STH 18 corridor for four miles by following Thorson Road and Division Road, but would again return to the STH 18 corridor. This variation does avoid the narrow commercial area at the intersection of STH 18 and CSAH 8. These options could be modified to follow other existing roadways or corridors.

4.1.4 Summary

The overriding factor that favors the STH 18 route over these alternatives is the cooperatives need to upgrade their STH 18 distribution system. Combining the needed distribution upgrade and the new transmission line on one centerline would utilize a single existing utility corridor for both systems. This factor and the alternative routes higher construction costs favor the proposed route over the alternatives studied.

4.2 Alternative Transmission Plans

As documented in Section 3 of the Certificate of Need Application (Docket No. ET-2/CN-06-367) submitted simultaneously with this Application, GRE evaluated two alternative transmission plans to the proposed project. These alternatives are summarized below.

4.2.1 Upgrade Existing Lines

This alternative would require upgrading the majority of the existing 69 kV system in the area to 115 kV. This would involve potentially 128 miles of 115 kV line and a new 230/115 kV transformer at the Milaca Substation. The mileage could be reduced to 71 miles if 115/69 kV transformers were added at Wilson Lake and Onamia, although this would basically duplicate the preferred option in a more robust system. The distribution cooperatives would have a major expense, as many distribution substations would need to be converted to 115 kV. Upgrading the lines to 115 kV would cause concerns because the critical lines would be out of service to be rebuilt. This would put the system in a weak condition that could result in an extended outage if another line fails or the load reaches a level that causes a voltage collapse. In that case current flow could cause overloading of transmission facilities. This alternative is cost prohibitive and causes unacceptable risk during construction.

4.2.2 Establish New 69 kV Line from New Kimberly 115/69 kV Substation

GRE investigated establishing a northern 69 kV line from a new Kimberly 115/69 kV substation to the Glen Substation. This would require about 13.3 miles of new 69 kV line and expansion of the existing Kimberly distribution site to include a 115/69 kV transformer and line termination. The advantage of this option is that a 69 kV line could be built to Palisade north of the Kimberly Substation. The Palisade system is on a long radial from the Cromwell area, thus it would be desirable to eliminate this radial transmission system. However, looking out further into the future, the northwest portion of the Lake Mille Lacs region is growing such that a Kimberly source would not be able to support the system voltage. The Kimberly 69 kV alternative would provide a source that would be too weak to benefit the Wilson Lake area for the long-term, and the proposed project would still be needed in about 10 years.