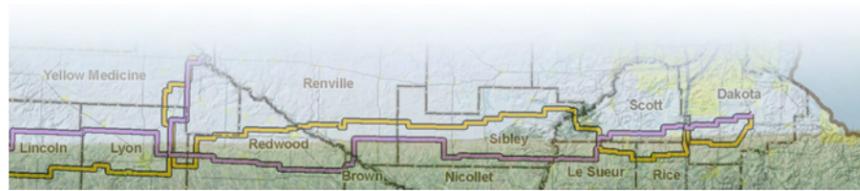


7.0 Environmental Impacts



The proposed transmission line has been divided into six segments to more easily convey the information about the Project. This section is organized into six sub-sections to reflect

the six segments of the proposed transmission line. The map below depicts the Preferred Route, shown in purple, and the Alternate Route in gold. A color code has been developed for each

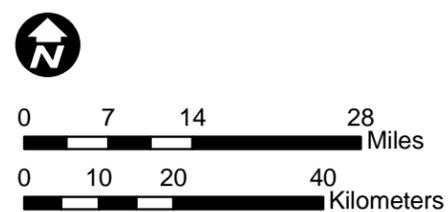
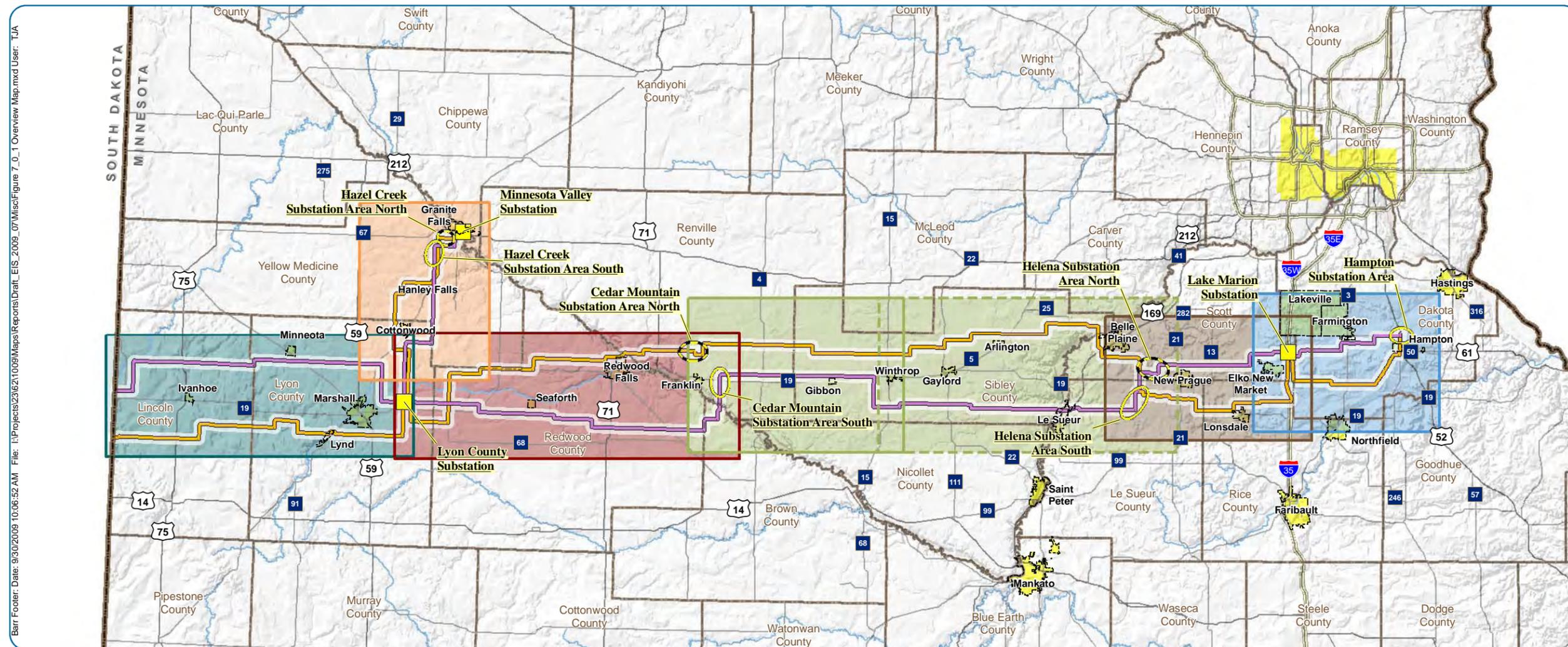
of the six segments to simplify navigation of the information. Note: Segment 4 is divided into Segment 4 East and West. Alignment alternatives are named using the methodology to the right.

Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

Route Variation:
P: Variation on Original Preferred Route
A: Variation on Original Alternate Route
B: Variation on Both



- Original Preferred
- Original Alternate
- Project Substations
- Proposed Substation Areas**
- Preferred
- Alternate
- Segment 1: Brookings County to Lyon County Substation
- Segment 2: Lyon County Substation to MN Valley Substation
- Segment 3: Lyon County Substation to Cedar Mountain Substation Area
- Segment 4W: Cedar Mountain Substation Area to Helena Substation Area (West)
- Segment 4E: Cedar Mountain Substation Area to Helena Substation Area (East)
- Segment 5: Helena Substation Area to Lake Marion Substation
- Segment 6: Lake Marion Substation to Hampton Substation

Map 7.0-1
Overview Map
Brookings to Hampton
Transmission Line

Source: Refer to Appendix B for information on data sources

7.1 Brookings County to Lyon County Substation

7.1.1 Description of Segment Alternatives

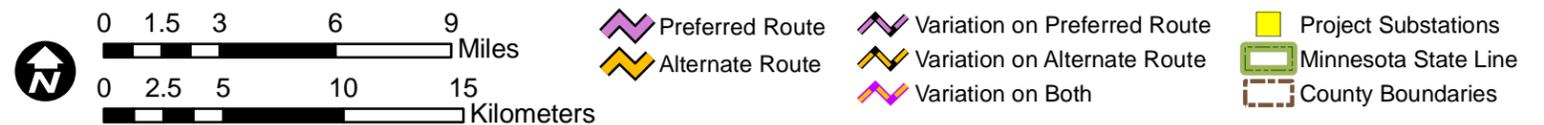
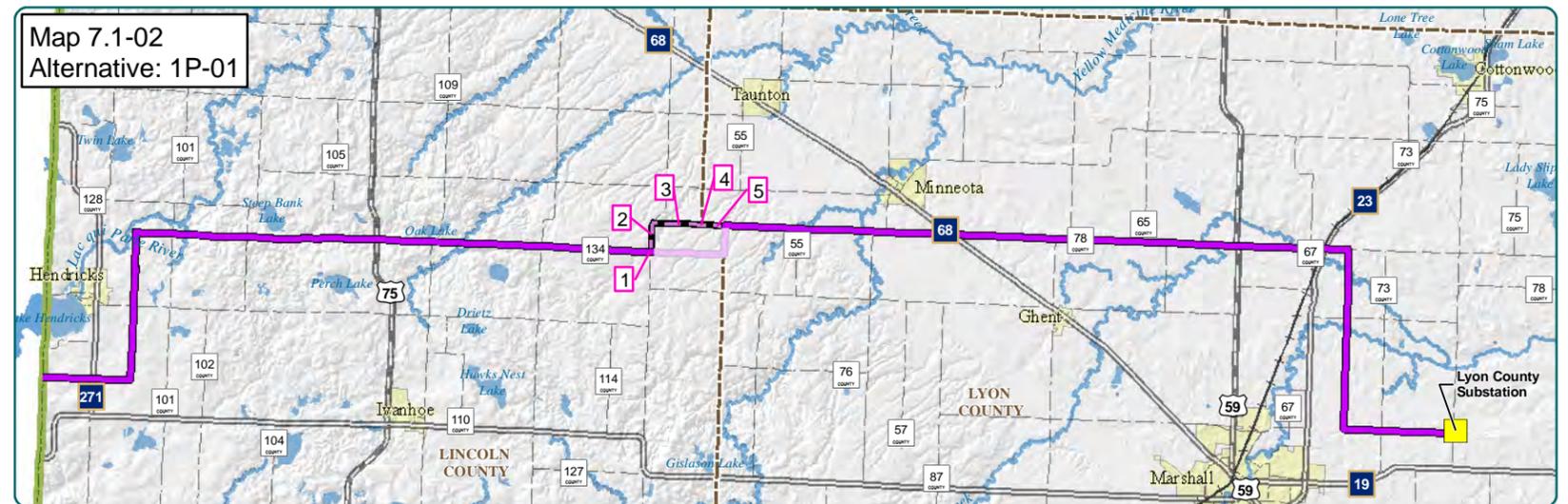
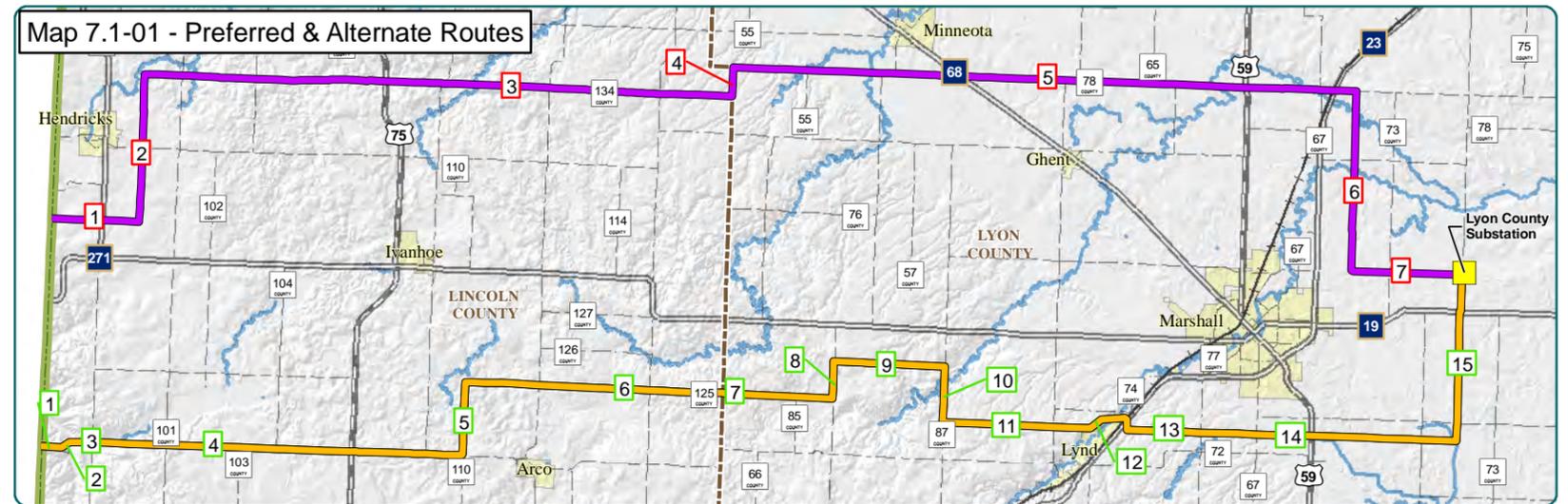
Segment 1 (Brookings County to Lyon County) begins at the South Dakota border and ends at the Lyon County Substation just east of Marshall. Within Segment 1 there are five route alternatives that were suggested during the public comment period. Two of the route alternatives (1P-01 and 1P-02) are variations on the Preferred Route and three of the route alternatives (1A-01 thru 1A-03) are variations on the Alternate Route. There are also three alignment alternatives within Segment 1 that were suggested during the public comment period.

The Preferred and Alternate Routes and all route alternatives and alignment alternatives are described in Section 7.1.1. Section 7.1.4 is an analysis and comparison of impacts by the Preferred and Alternate Routes and all suggested route alternatives.

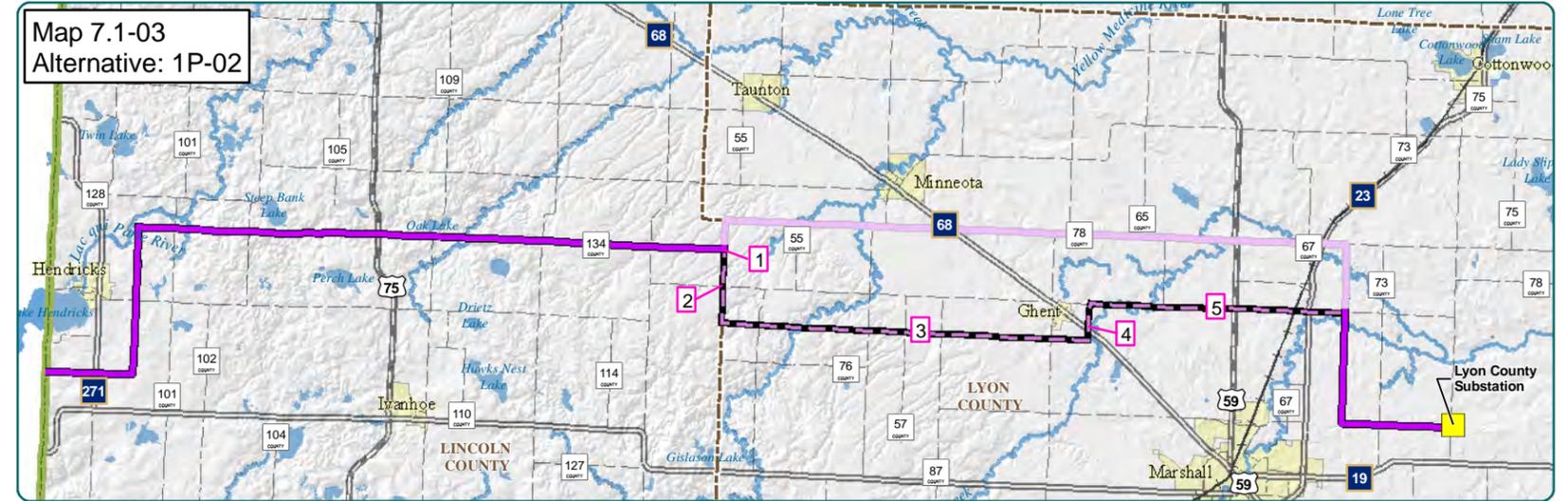
Brookings County to Lyon County (Preferred Route)			
	Turn by Turn	Distance (miles)	Comments
1	From SD border follow 290th St. east	2.3	Crosses MN Hwy 271
2	Turn north following 130th Ave.	4.0	
3	Turn east following Cnty Rd. 134	16.0	
4	Turn north following Lincoln-Lyon County border	0.9	
5	Turn east, following 340th St.	17.0	Crosses MN TH 68 and 23 and U.S. Hwy 59
6	Turn south following 280th Ave.	5.0	
7	Turn east following 290th St.	3.0	Enters the Lyon County Substation

Brookings County to Lyon County (Alternate Route)			
	Turn by Turn	Distance (miles)	Comments
1	From SD border follow existing 115 kV line and Cnty Rd 137 east	0.6	
2	Turn northeast across agricultural land	0.3	Continues to follow existing 115 kV line
3	Turn east following Cnty Rd. 137	0.7	Continues to follow existing 115 kV line
4	Continue east following Cnty Rd 15	10.0	
5	Turn north following Cnty Rd 110 to Cnty Rd 125	2.0	
6	Turn east following Cnty Rd 125	10.0	Crosses north edge of Coot and Thostenson WMAs
7	After entering Lyon County		Crosses the south edge of USFWS easement and Furgamme WMA
8	Turn north following Cnty Hwy 13	1.0	
9	Turn east following 260th St	3.0	
10	Turn south following Cnty Hwy 15	1.6	
11	Turn east following field lines	2.0	Route width expands to allow flexibility in crossing the Redwood River
12	Continue east	2.7	Crosses the river just south of 250th St.
13	Continue east	2.6	Crosses TH 23
14	Continue east along field lines	7.0	Route narrows back to 1000 ft at Cnty Hwy 9
15	Turn north following 310th Ave and existing 115 kV line right-of-way (ROW)	4.6	Enters the Lyon County Substation

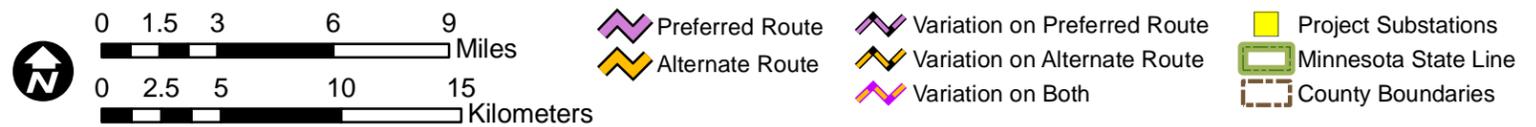
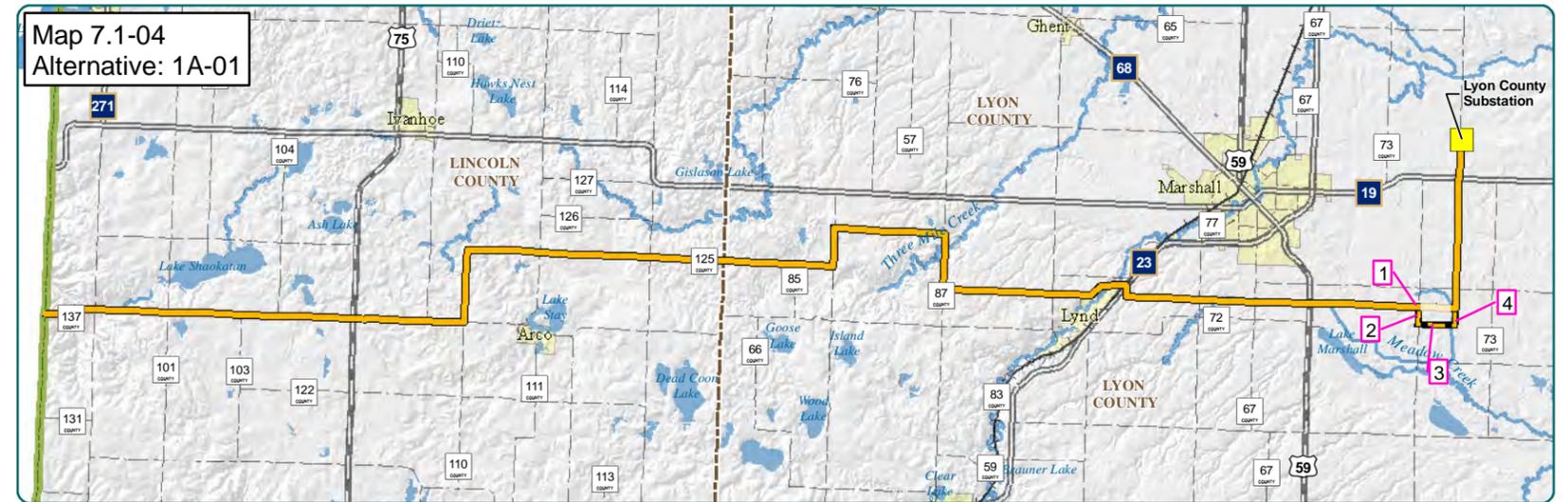
Brookings County to Lyon County (1P-01)			
	Turn by Turn	Distance (miles)	Comments
1	Follow the alternate route until Cnty Hwy 8		
2	Turn north following Cnty Hwy 8 to 340th St.	0.8	
3	Turn east cross-country	1.0	
4	Continue east on 340th St.	0.4	
5	Continue east cross-country	0.6	Connecting with the alternate route at Lyon Lincoln Rd.



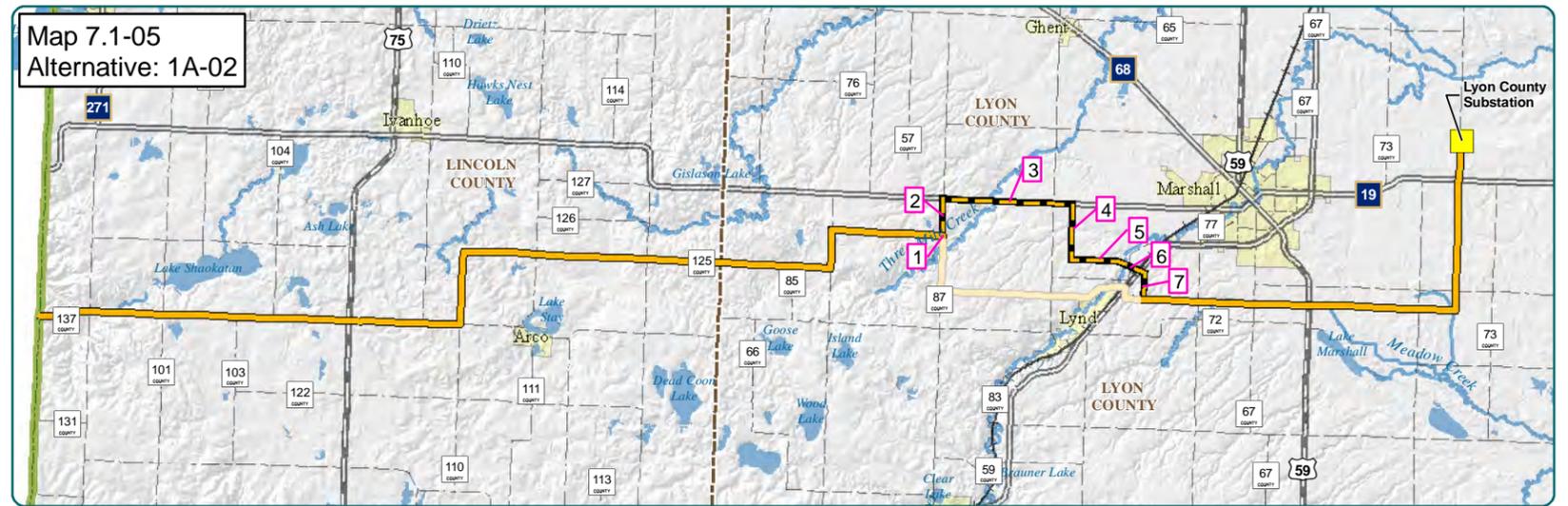
Brookings County to Lyon County (1P-02)		
Turn by Turn	Distance (miles)	Comments
1 Follow the alternate route until 290th Ave.		
2 Turn south following 290th Ave to 310th St.	2.0	
3 Turn east following 310th St. to 210th Ave.	10.0	
4 Turn north following 210th Ave to 320th St.	1.0	
5 Turn east following 320th St.	7.0	Connecting with the preferred route at 280th Ave.



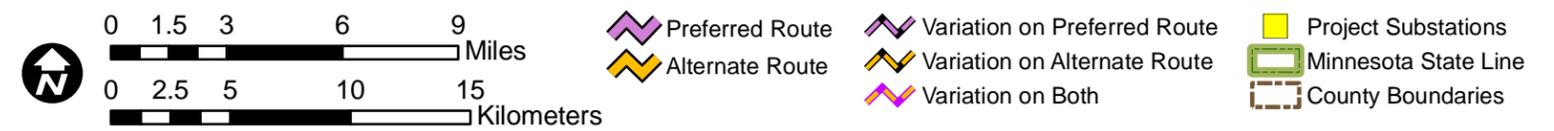
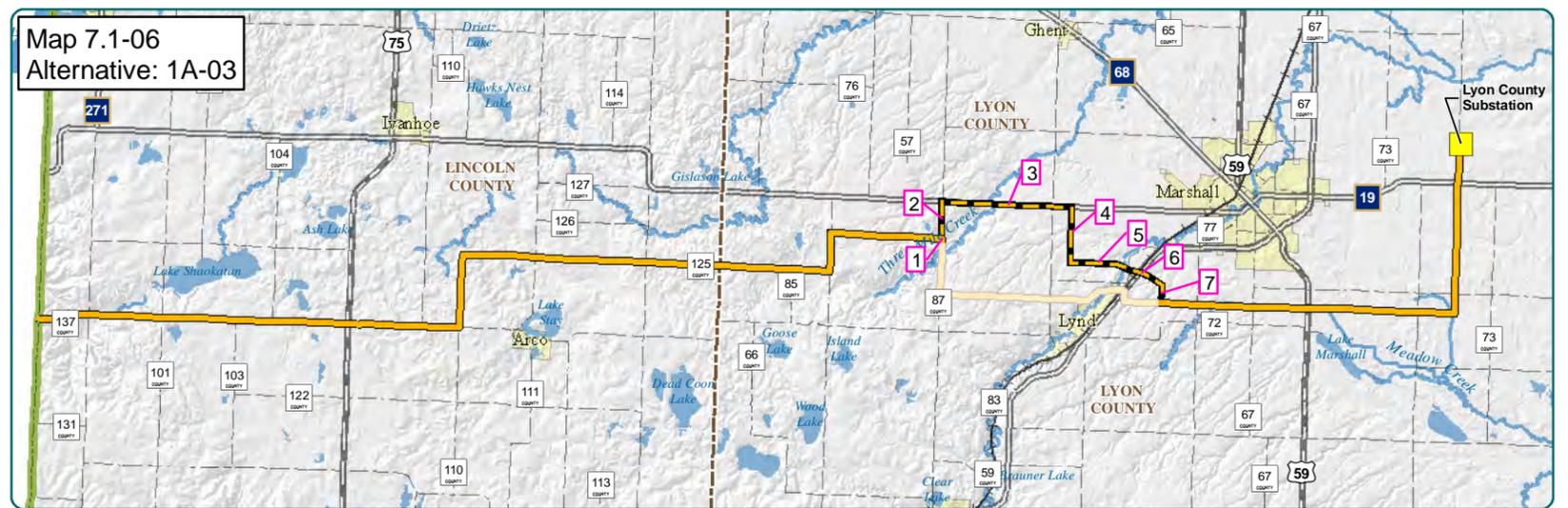
Brookings County to Lyon County (1A-01)		
Turn by Turn	Distance (miles)	Comments
1 Follow the alternate route until Cnty Hwy 9		
2 Turn south following Cnty Hwy 9 to 240th St.	0.5	
3 Turn east following 240th St. to 310th Ave.	1.0	
4 Turn north following 310th St.	0.5	Connecting with the alternate route



Brookings County to Lyon County (1A-02)			
Turn by Turn	Distance (miles)	Comments	
1	Follow the alternate route until 170th Ave		
2	Turn north following 170th Ave to TH 19	1.0	
3	Turn east following TH 19	3.5	
4	Turn south cross-country	1.5	
5	Turn east cross-country	1.3	
6	Turn east-southeast cross-country	0.8	Crosses Cnty Hwy 23
7	Turn south	0.7	Connecting with the alternate route



Brookings County to Lyon County (1A-03)			
Turn by Turn	Distance (miles)	Comments	
1	Follow the alternate route until 170th Ave		
2	Turn north following 170th Ave to TH 19	1.0	
3	Turn east following TH 19	3.5	
4	Turn south cross-country	1.5	
5	Turn east cross-country	1.3	
6	Turn east-southeast cross-country to 230th Ave.	1.4	Crosses Cnty Hwy 23
7	Turn south on 230th Ave.	0.5	Connecting with the alternate route



7.1.1.1 Alignment Alternatives

Segment 1 has three alignment alternatives that were suggested during the public comment period.

1) Route: Alternate (Inset #1)

Description: Run the line on the east side of the road for the one mile stretch as it goes north along County Hwy.

Purpose: to get the line on the opposite side of the street of a house.

2) Route: Preferred (Inset #2)

Description: Jog the line north of 340th St. and

continue east 3 miles in the field instead of along the road. Then jog back across 340th St. to the south side of 340th St and continue east 1.4 miles in the field instead of along the road.

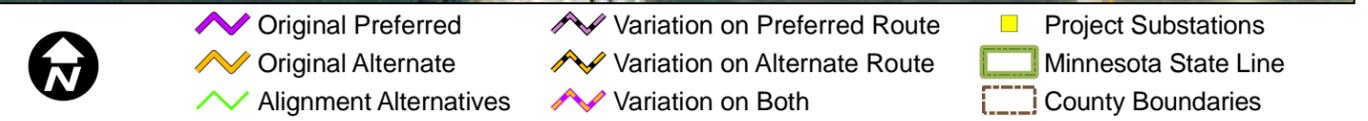
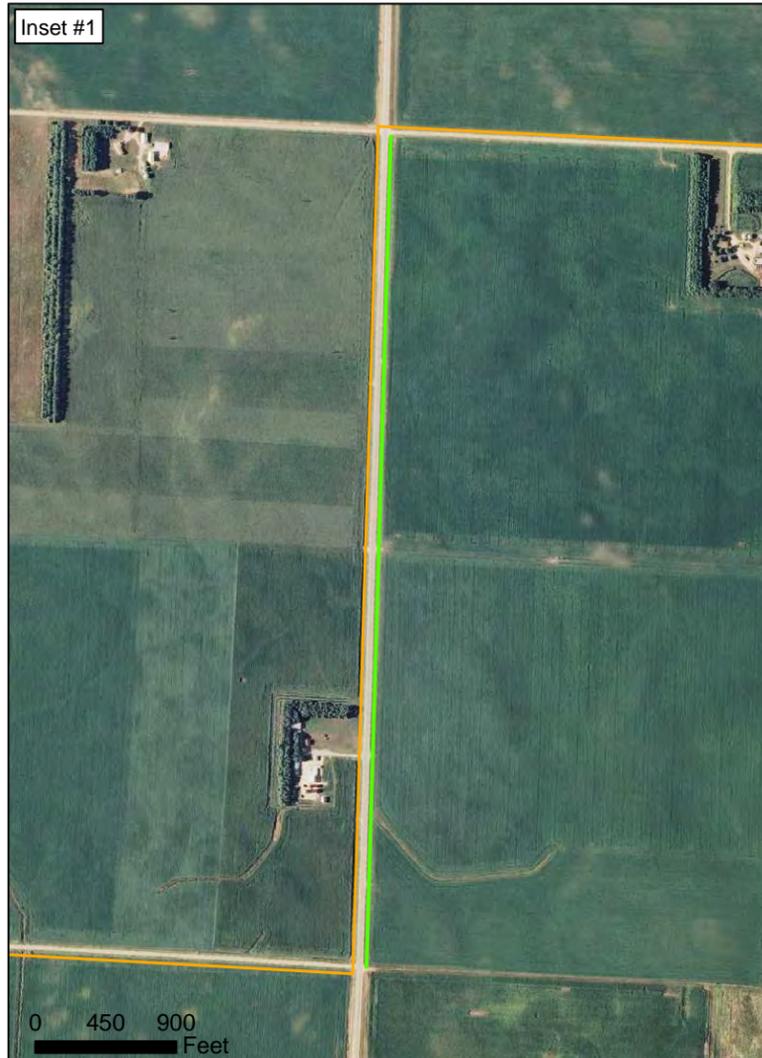
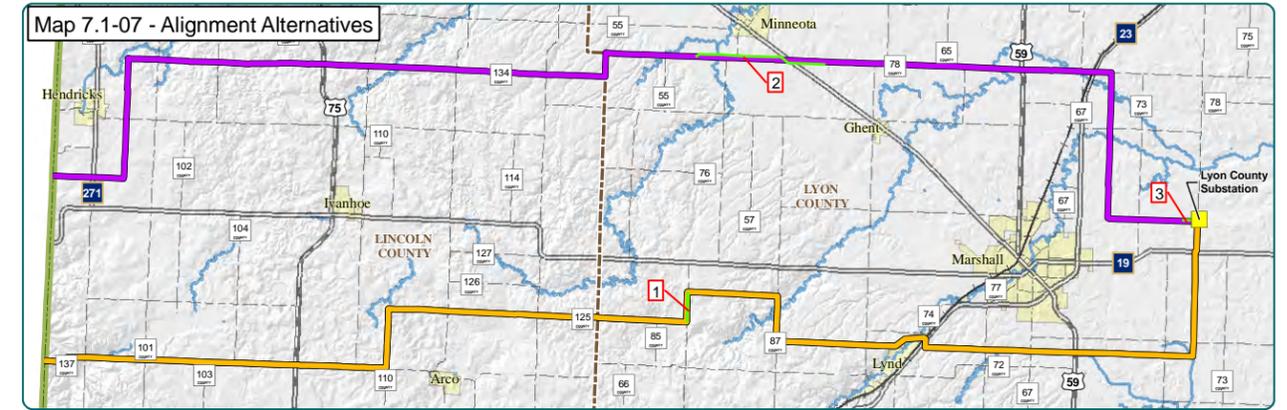
Purpose: to get further away from houses on 340th St. Wants to be 500 feet from houses.

3) Route: Preferred (Inset #3)

Description: Jog the line north of 290th St. and continue east 0.5 miles in the field to the Lyon County Substation. At a minimum run line on north side of 290th St.

Purpose: to get the line further from house.

Currently the proposed alignment would be 170 feet from the house and take out several trees on the homeowner's property.



7.1.2 Environmental Setting—Brookings County to Lyon County Substation

This segment of the route extends from the South Dakota border to an existing substation northeast of the city of Marshall. This Project section is located in Lincoln and Lyon Counties, Minnesota. According to the DNR (Department of Natural Resources) Ecological Classification System (ECS), the route lies within the Coteau Moraines and the Minnesota River Prairie subsections of the Prairie Parkland Province. The Coteau Moraines Subsection was formed by glacial erosion and deposition, and is characterized by gently rolling hills, streams, rivers, and shallow prairie lakes and wetlands. The Minnesota River Prairie landscape is dominated by large till plains on either side of the Minnesota River, and is characterized by gently rolling terrain, except where it is split by the broad Minnesota River Valley. The elevation along this segment of the route ranges from 1,080 feet above mean sea level (AMSL) in the east to 1,929 feet in the west. It is a steady decline in elevation from west to east.

Pre-settlement vegetation consisted primarily of tallgrass prairie with small islands of wet prairie. Wet prairies and wooded areas were restricted to in-stream margins and ravines adjacent to rivers. The primary present-day use of the land

along this segment of the route is agriculture; few remnants of native vegetation are present (DNR 2008). Many of the wetlands have been drained and most of the smaller watercourses have been channelized to increase the acreage of land available for agricultural production.

With the exception of Marshall, the majority of communities located within the Project area are small agriculture-based towns, including Hendricks Ivanhoe, Arco, Lynd, and Minneota. Marshall is a level two regional trade center or a secondary wholesale retail center, according to the 1999 Regional Trade Center of the Upper Midwest (Casey 1999).

7.1.3 Socioeconomic Setting—Brookings County to Lyon County Substation

This segment is located in a sparsely populated, rural portion of Minnesota and crosses parts of Lincoln and Lyon Counties. The primary industries for Lincoln and Lyon Counties include educational, health and social services, agriculture, manufacturing, and retail trade. Table 7.1.3-1 shows the differences in population, minority population percentage, and median age across the counties spanned by this segment of the Project.

Table 7.1.3-1 Socioeconomic stats in Lincoln and Lyon Counties

County	2008 Population	Total Minority Population	Minority Population Percentage	Median Age
Lincoln	5,837	111	1.9	45
Lyon	24,844	2,385	9.6	36

Source: U.S. Census Bureau

7.1.4 Analysis of Segment Alternatives for Brookings County to Lyon County Substation

The analysis of segment alternatives includes the following:

- Human settlement
- Public health and safety
- Air quality
- Interference
- Property values
- Archaeological and historic resources
- Land use compatibility
- Land based economics
- Transportation and public services
- Recreation
- Water resources
- Flora and fauna
- Rare and unique natural resources/critical habitat

See Section 6 for a general overview of the potential impacts to the resources listed above and a summary of the mitigation measures that would be utilized to minimize impacts to these resources. General overview maps are present throughout Section 7; however, more detailed maps are provided in Appendix A.

7.1.4.1 Human Settlement—Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

Impacts to human settlement have been assessed by looking at a variety of factors including noise, aesthetics, proximity to structures, displacement, tree groves and windbreaks, existing utilities, and domestic water well installation and maintenance. Section 6.1 provides detailed discussion of each of these potential impact areas.

The extent to which particular route options may impact these features is primarily linked to the proximity of the proposed routes to human settlement areas. Aesthetic impacts to humans, for example, are expected to be greatest where the line is located nearest to human settlement features such as homes, businesses, schools, daycares, hospitals, churches, and cemeteries. If the transmission line is in close proximity to human settlement areas, other features of these areas could also be impacted. For example, tree groves and wind breaks are frequently established to protect homes and other structures. Therefore, the potential for impacts to tree groves and wind breaks may be closely correlated with the proximity of the line to homes.

Displacement impacts are also dependent upon the proximity of the transmission line to homes. For electrical safety code and maintenance reasons, utilities would not generally allow residences or other buildings within the actual right-of-way (ROW) easement for a high-voltage transmission line (HVTL).

Because of the close correlation between the extent to which particular route options may impact human settlement and the proximity of the proposed routes to homes and other human settlement features like schools, churches,

cemeteries, nursing homes and hospitals, this impact summary focuses on the proximity of the proposed routes to these features. For each alternative, pinch points, or narrow areas where human settlement impacts would be difficult to avoid, have also been identified.

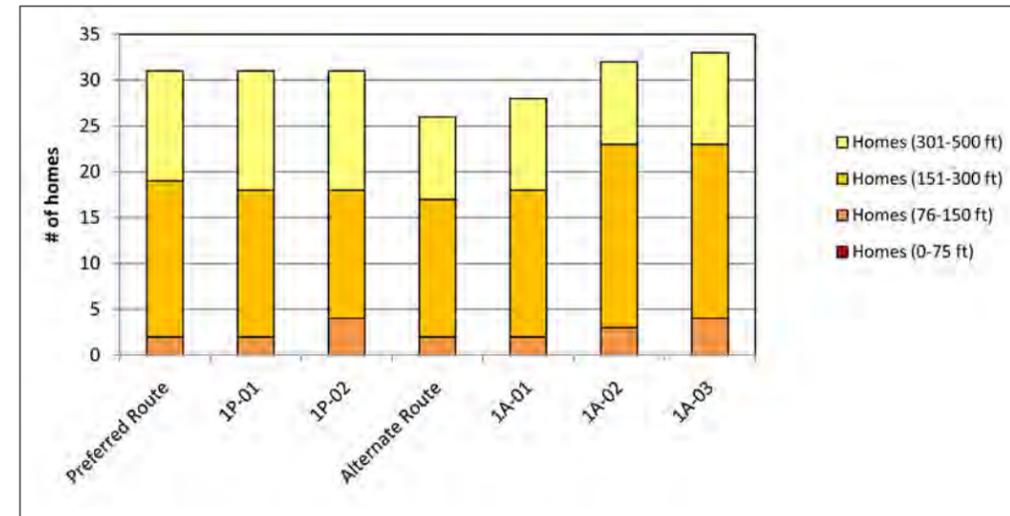
Proximity to homes, schools, churches, cemeteries, nursing homes and hospitals for each of the proposed alternatives for the route segment from Brookings County to the Lyon County Substation (shown in Map 7.1-08 and Appendix A) is summarized in Figures 7.1.4.1-1 to 7.1.4.1-2.

Figure 7.1.4.1-1 compares the number of homes within 75 feet, 150 feet, 300 feet, and 500 feet of the centerline of each route alternative in this segment.

The route segments in the western portion of the proposed Project are generally less densely populated than the route segments in the eastern portion of the Project. The number homes within 500 feet of the centerline for each route alternative in the Brookings County to the Lyon County Substation segment varies from 26 (Alternate Route) to 33 (1A-03). For each route alternative, between two and four houses are within 76-150 feet of the centerline of the proposed route. Along this entire segment no houses are located within the 150-foot ROW and no displacement impacts are anticipated.

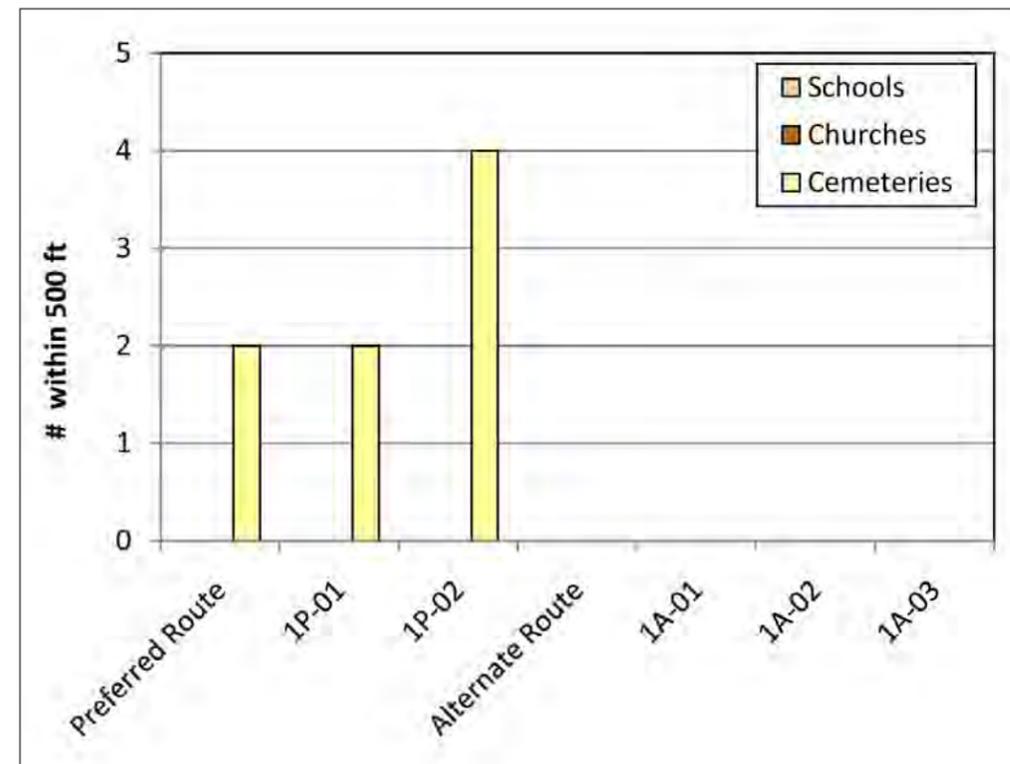
Along the Segment 1 Preferred Route and route alternative 1P-01 there are two areas northwest of Marshall, MN (Map 7.1-08 and Appendix A) where the avoiding impacts to houses and other structures may be challenging. In the westernmost “narrow area” identified in along

Figure 7.1.4.1-1. Proximity of homes along each route alternative



Source: Field survey observations, comments from Project public meetings and aerial photograph interpretation by HDR. 12/29/08, updated by Barr 7/21/09

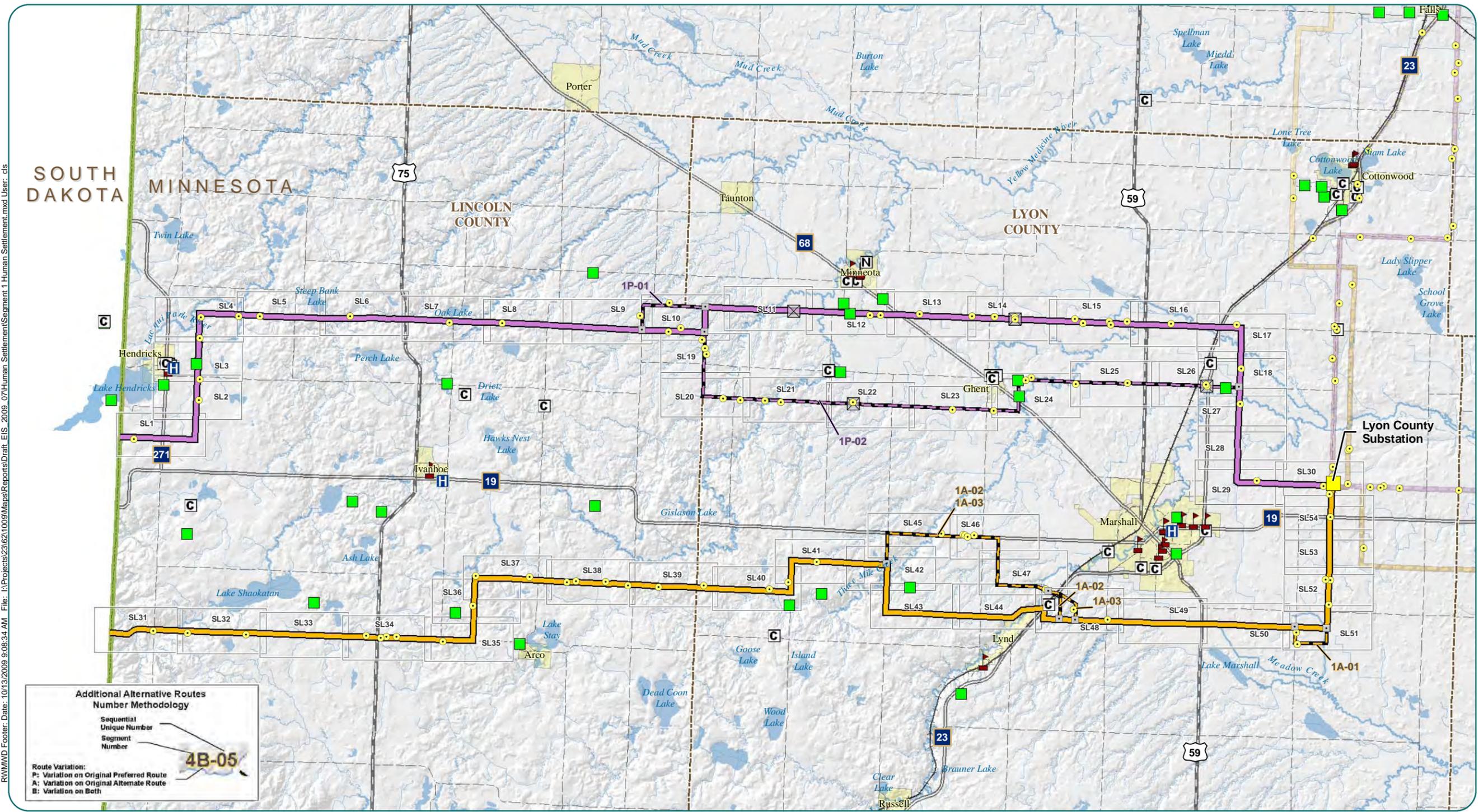
Figure 7.1.4.1-2. Proximity of other human settlement features along each route alternative



Source: Schools: Minnesota Department of Education 09/18/2008 (Published by LMIC)
Churches and Cemeteries: Field survey observations, comments from Project public meetings and aerial photograph interpretation by HDR. 12/29/08, updated by Barr 7/21/09

the Preferred Route Map 7.1-08 and Appendix A, a storage barn is located on the south side of the road within the ROW of the proposed route. A second “narrow area” along this segment of the Preferred Route has been noted where structures are present on both sides of the road

where the line is proposed. In this area, if the line were placed on the south side of the road a shed would be located approximately 65 feet from the centerline. If the line were to be placed on the north side of the road, a home would be located approximately 80 feet from the centerline.



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Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

Route Variation:
 P: Variation on Original Preferred Route
 A: Variation on Original Alternate Route
 B: Variation on Both

0 1.5 3 6 Miles
 0 2.5 5 10 Kilometers

For detailed maps refer to Appendix A.
 Refer to Appendix B for information on data sources.

- Original Alignments
- Preferred Route
- Alternate Route
- Additional Alternative Routes
- Variation on Preferred Route
- Variation on Alternate Route
- Variation on Both
- Project Substations
- Minnesota State Line
- County Boundaries
- Residences within 75 Feet of Alternatives
- Residences within 500 Feet of Alternatives
- Narrows
- Hospitals
- Nursing Homes
- Observed Day Cares
- Schools
- Churches
- Cemeteries
- Tribal Land

Map 7.1-08
Human Settlement Map
Segment 1
Brookings County to Lyon County Substation

Source: Refer to Appendix B for information on data sources

Along proposed alternative 1P-02 there are also two narrow areas that may require additional consideration. Just south and west of Ghent, the proposed route runs through an area where a house and a barn are located on the north side of the road. If the line were to run along the north side of the road, these structures would be just outside of the ROW. Where 1P-02 runs just north of Marshall, there is a house located on the south side of road that would be within the ROW if the proposed line were placed on the south side of the road. Directly across from this home, a propane tank would be within the ROW if the line were placed on the north side of road. The standard practice of the applicants is to prohibit propane tanks and other flammable material storage tanks from being located within the transmission line ROW unless the tank holds fewer than 1,000 gallons. Tanks that serve residences are typically smaller than 1,000 gallons and can be maintained within the ROW. However, any tank within the ROW must be adequately grounded to minimize the risk of the tank collecting a charge that could create a spark.

Figure 7.1.4.1-2 compares the number of schools, churches, and cemeteries for each of the proposed alternatives for the route segment. No nursing homes or hospitals are located within 500 feet of any proposed route centerline anywhere along this segment.

No schools or churches are located within 500 feet of any of the proposed route centerlines. Several cemeteries are located along the Preferred Route and the proposed variations on the preferred route.

Mitigation

General mitigation measures to minimize impacts to human settlement are discussed in Section 6.1. Within this route segment, impacts to human settlement can be managed through choosing a route that minimizes the proximity of the line to homes as well as minimizing the total number of homes located within the Project route width. In this route segment the Alternate Route and route alternative 3A-01 have the fewest homes within the 1,000-foot route width (Map 7.1-08).

In the narrow areas along the Preferred Route and route alternatives 1P-01 and 1P-02 (Map 7.1-08), careful consideration of alternate routes may help to reduce impacts to these human settlement features. In the first narrow area just northwest of Marshall, and both narrow areas along route alternative 1P-02, it may be possible to simply move the line to the opposite side of the road. Where obstacles exist on both sides of the road at the second narrow area just northwest of Marshall other options might be considered including routing the transmission line around the home or shed or compensation for structures that must be removed.

7.1.4.2 Public Health and Safety—Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

Public health and safety impacts associated with this Project are not anticipated. Any perceived risk of health impacts from electric and magnetic fields is likely to be correlated with the proximity of human dwellings to the proposed line. Information on the proximity of homes to each proposed route alternative within this route segment is provided in Section 7.1.4.1.

7.1.4.3 Air Quality—Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

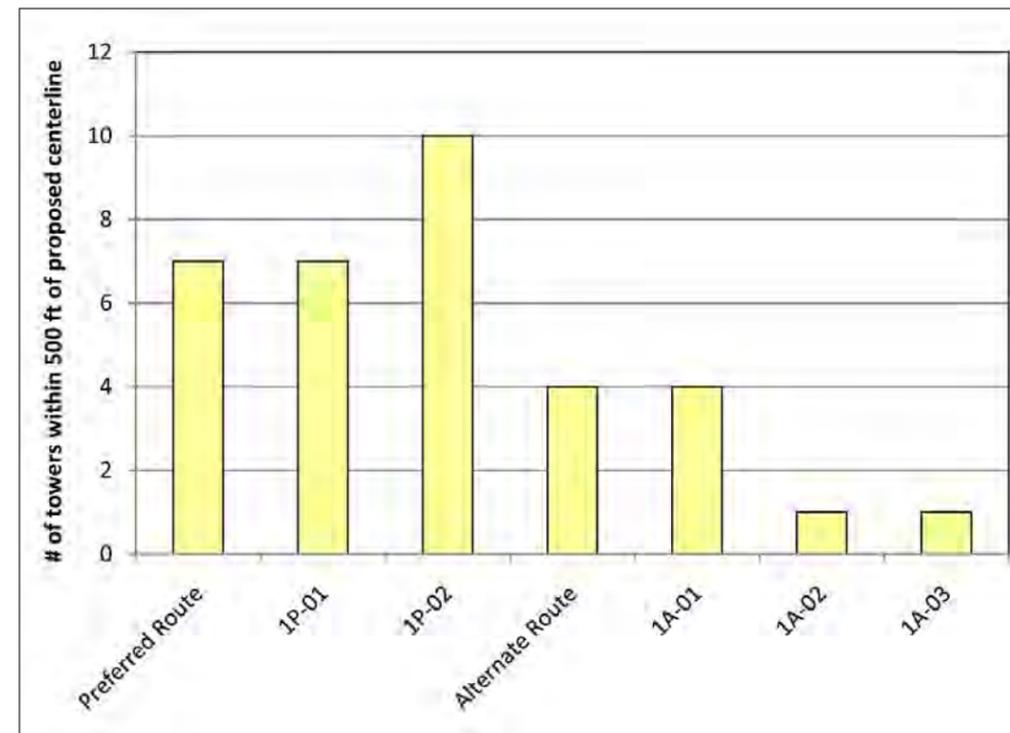
Detailed discussion of potential air quality impacts are provided in Section 6.3. Potential air quality impacts are primarily associated with the production of small amounts of ozone and oxides of nitrogen in the air surrounding transmission line conductors and the potential release of small amounts of SF₆ during operation and maintenance of certain electrical substation equipment. These features do not vary notably between the proposed routes in this segment. Thus, the nature of impacts to air quality are not expected to vary notably from one route alternative to the next. The operation of the proposed transmission line would not create any potential for the concentration of these pollutants to exceed existing air quality standards.

7.1.4.4 Interference—Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

The nature of impacts related to interference, are not likely to vary notably between route segments or route alternatives. Impacts are expected to be greatest very close to the line for AM radio reception and very minor for all other types of reception. The placement of structures may also result in interference. Structure placement would be coordinated so as not interfere with microwave communication corridors. Figure 7.1.4.4-1 shows the number of communication towers within 500 feet of the proposed centerline for each route alternative in the Brookings County Substation to Lyon County Substation segment.

Section 6.4 provides an overview of potential impacts from interference and outlines general steps that would be taken to mitigate impacts from interference.

Figure 7.1.4.4-1. Number of towers within 500 feet of proposed centerline for each proposed route alternative



Source: Federal Communications Commission. Data added by HDR based on public comments 12/29/08, updated by Barr September 2009

7.1.4.5 Property Values—Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

Impacts to property values are a concern of many residents near existing or proposed transmission lines. Research assessing the relationship between property value and proximity to transmission lines suggests that the presence of a transmission line is one of several factors that interact to affect the value of a particular property. Since property value is influenced by many other factors that may vary widely from one property to the next and that may vary over time and across different regions, the results of current research is limited. Current studies have been unable to provide detailed quantitative assessments of how transmission lines may impact property values at the scale necessary to provide insight in comparing property value impacts across proposed routes within this section or across this Project.

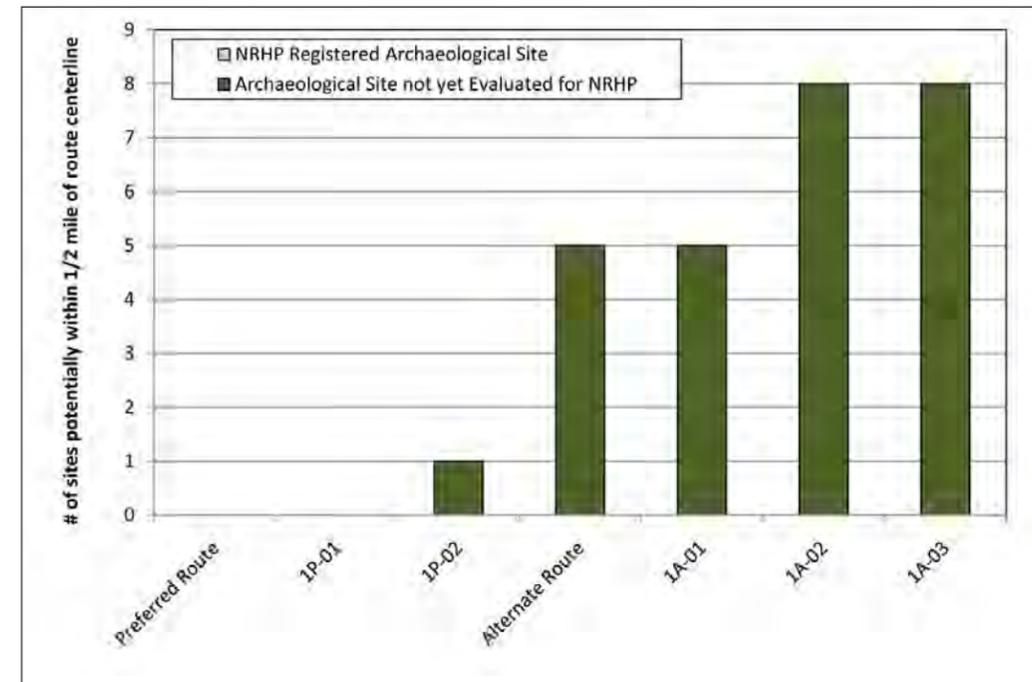
7.1.4.6 Historical and Archaeological Resources—Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

Within the Brookings County to Lyon County Substation segment, available State Historic Preservation Office (SHPO) records have been used to identify known archaeological resources, historical structures, and historic landscapes within one half mile on either side of the proposed centerline for each route alternative. In order to protect information about the specific location of certain resources that may be vulnerable to unauthorized removal of artifacts or other unauthorized disturbances, SHPO records only provide a township, range and section for certain resources. If any part of one of these identified areas is within one half mile of a proposed route centerline, it has been assumed that the resource is potentially within the relevant area. Due to the uncertainty about the exact location of certain SHPO identified resources, total impacts have been characterized in terms of the total number of sites potentially within one half mile of the route centerline.

Within the SHPO records, particular consideration is given to historical and archaeological resources listed on the National Park Service’s National Register of Historic Places (NRHP) as these locations have been identified as critical national resources and are protected by the *National Historic Preservation Act of 1966*.

Potential historical and archaeological resource impacts for each of the proposed alternatives for the route segment from Brookings County to the Lyon County Substation (shown in Map 7.1-09 and Appendix A) are summarized in Figures 7.1.4.6-1 to 7.1.4.6-2.

Figure 7.1.4.6-1. Number of archaeological sites along proposed route alternatives



Source: State Historic Preservation Office (SHPO)

Figure 7.1.4.6-1 compares the number of archaeological sites potentially within one-half mile on either side of the proposed centerline for each route alternative in this segment.

No NRHP registered archaeological sites are located within one half mile of any route alternative in this segment. None of the archaeological sites potentially located within the one half mile of the route have been evaluated for eligibility for listing on the NRHP and thus, these sites have not been evaluated for significance. No archaeological sites were identified within one half mile of the Preferred Route and route alternative 1P-01. Route alternatives 1A-02 and 1A-03 have the greatest number of potentially impacted archaeological resource areas, with eight sites located within one half mile of the route centerlines.

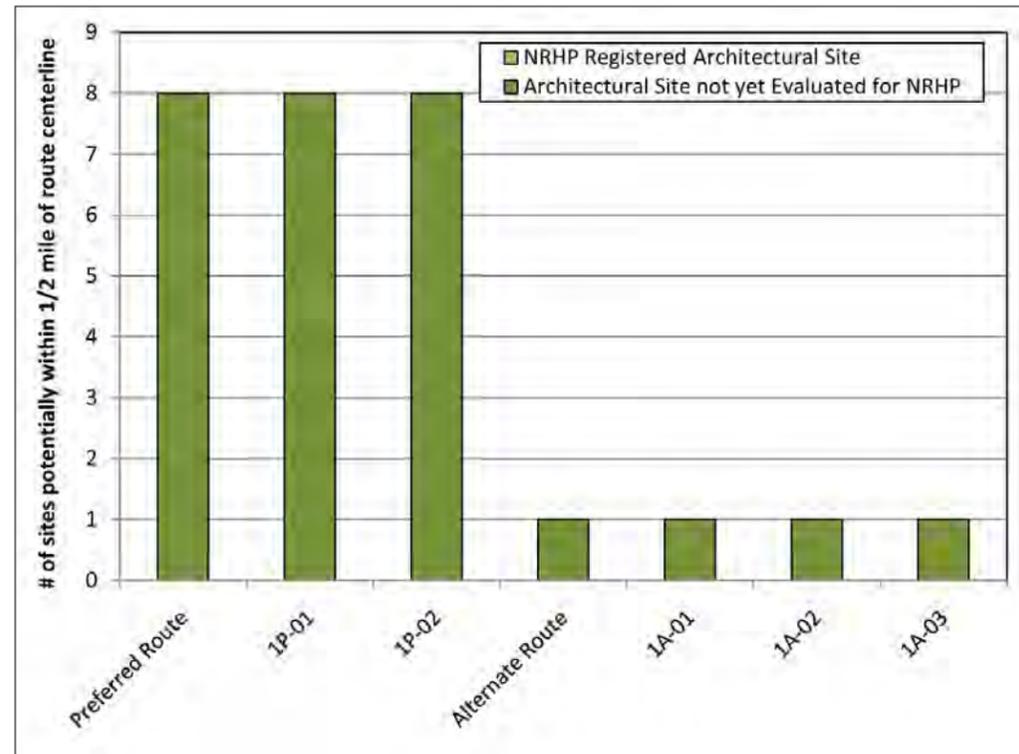
Figure 7.1.4.6-2 compares the number of historical sites within one-half mile on either side of the proposed centerline for each route alternative in this segment.

No NRHP registered historical architectural sites are located within one half mile of any route alternative in this segment. All historical architectural sites potentially located within the one half mile of the route have not been evaluated for eligibility for listing on the NRHP and thus, have not been evaluated for significance. For the Alternate Route and proposed routes A-1A-01, 1A-02 and 1A-03, one site was identified within one half mile of the route centerline. The Preferred Route and proposed routes 1P-01 and 1P-02 have the greatest number of potentially impacted archaeological resource areas, with eight sites located within one half mile of the centerline.

Mitigation

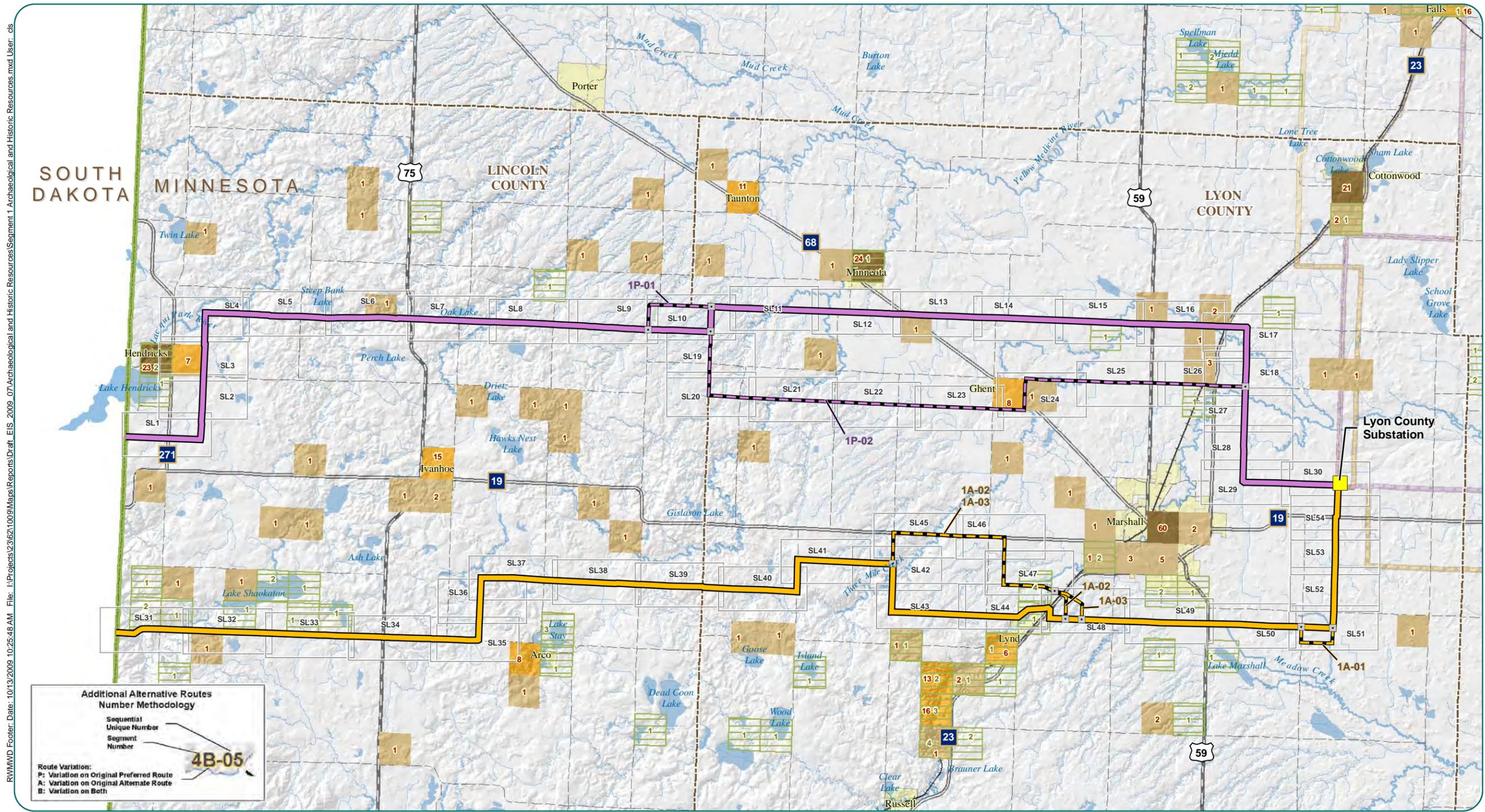
Project planning and engineering efforts would strive to avoid any sites within the proposed route width for each alternative. Route alternative 1P-01 and the Preferred Route have the fewest archaeological sites potentially within one half mile of the route centerline. The Alternate Route and route alternatives 1A-01, 1A-02 and 1A-03 have the fewest historical architectural sites potentially within one half mile of the route centerline. At this time it is not clear which route would have the fewest actual impacts on archaeological or historical resources or what the magnitude of the impacts since a complete assessment of all sites for NRHP status has not been completed. Specific mitigation plans cannot be made until a complete assessment of these sites has been made. For any resources within the route width, once the Project ROW is accessible, the applicants, as indicated in the Route Permit Application (RPA), would sponsor an archaeological investigation to locate these sites and provide a report to the Office of Energy Security (OES) and SHPO on the existing conditions, site management recommendations, and efforts, if known, to avoid, minimize, or treat impacts related to construction and maintenance of the Project. Planning specific mitigation measures would entail compensating for the losses of properties that are eligible for listing on the NRHP. The applicants have also indicated that they may invite other parties (particularly Native American tribes and other state and federal permitting or land management agencies) to assist in the development of the avoidance, minimization, or treatment measures.

Figure 7.1.4.6-2. Number of historical architectural sites along proposed route alternatives



Source: State Historic Preservation Office (SHPO)

Section 6.6 provides an overview of potential impacts to archaeological and historical resources and outlines general steps that would be taken to mitigate impacts to these resources. Specific mitigation plans cannot be made until the steps described above have been completed.



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Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

Route Variation:
P: Variation on Original Preferred Route
A: Variation on Original Alternate Route
B: Variation on Both

For detailed maps refer to Appendix A.
Refer to Appendix B for information on data sources.

Original Alignments

- SL1 Appendix A Map Index
- Preferred Route
- Alternate Route

Additional Alternative Routes

- Variation on Preferred Route
- Variation on Alternate Route
- Variation on Both

Project Substations

- Minnesota State Line
- County Boundaries

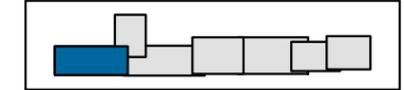
Archaeological Sites

- 1 - 5
- 6 - 10
- 11 - 15

Historical Sites

- 1 - 5
- 6 - 20
- >20

Map 7.1-09
Archaeological & Historic Resources Map
Segment 1
Brookings County to Lyon County Substation



Source: Refer to Appendix B for information on data sources

7.1.4.7 Land-Use Compatibility—Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

Impacts to current land use can be caused by activities associated with transmission line development. These impacts may range from temporary construction impacts to permanent impacts introduced where structure and line placement disturb current land uses or future land use plans. Current land use and zoning and available plans for future development have been evaluated in order to assess the compatibility of the proposed routes with these land uses.

Current land cover types along the 150-foot ROW for each route alternative in this route segment have been reviewed and are summarized in Figure 7.1.4.7-1.

All route alternatives are located on or adjacent to agricultural land in crop, pasture, or grassland use within this route segment (Map 7.1-10, Appendix A). The land crossed in Lyon County is zoned as agricultural land under the Agricultural District classification of the Lyon County Zoning Ordinance.

Some route alternatives run adjacent to wildlife management areas. No commercial or industrial land uses are located adjacent to any of the route alternatives. Rural residences and farmsteads along these route alternatives are relatively dispersed. The Alternate Route cuts through a golf course-housing development in Lynd; future development is anticipated in this area. Some agribusiness industrial activities occur near the proposed route alternatives; however, the transmission lines are not anticipated to disrupt these businesses.

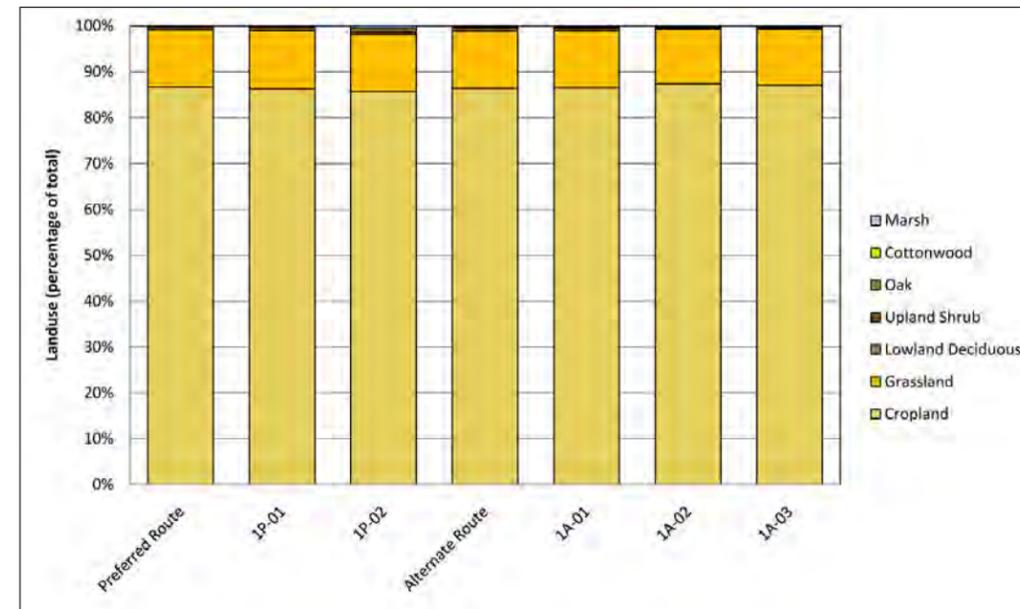
Transmission lines may affect agricultural land use in this segment by the amount of land removed from productive use by the footprint of each tower. Tower placement may also affect the operation of irrigation equipment if present as well as crop spraying operations. Stray voltage and cattle may be a compatibility concern.

Single pole towers would be the primary tower type used for the Project and they use relatively little land compared to other tower types. Transmission towers and lines also change the visual quality of views within the agricultural landscape, however, due to the relatively low population densities and small numbers of travelers along most route alternatives, this potential impact would not affect many people. Impacts during tower construction may include the potential for destruction of crops within the grading/construction zoning and the compacting of soils by construction equipment and activities.

The major impact on residential areas, such as the Lynd golf course development may include changes to viewsheds for some properties and potential minor noise impacts during construction for properties in close proximity to the transmission line. Individual property values may be negatively affected depending on proximity to, and views of, the proposed transmission line.

Impact on property values varies depending on a range of other factors including current market conditions, proximity, and access to open space, commercial services, and community services such as schools. Land used for pole structures may change or reduce the current and future functionality of the property depending on its size as well as its current and future use.

Figure 7.1.4.7-1. Land cover types along each route alternative

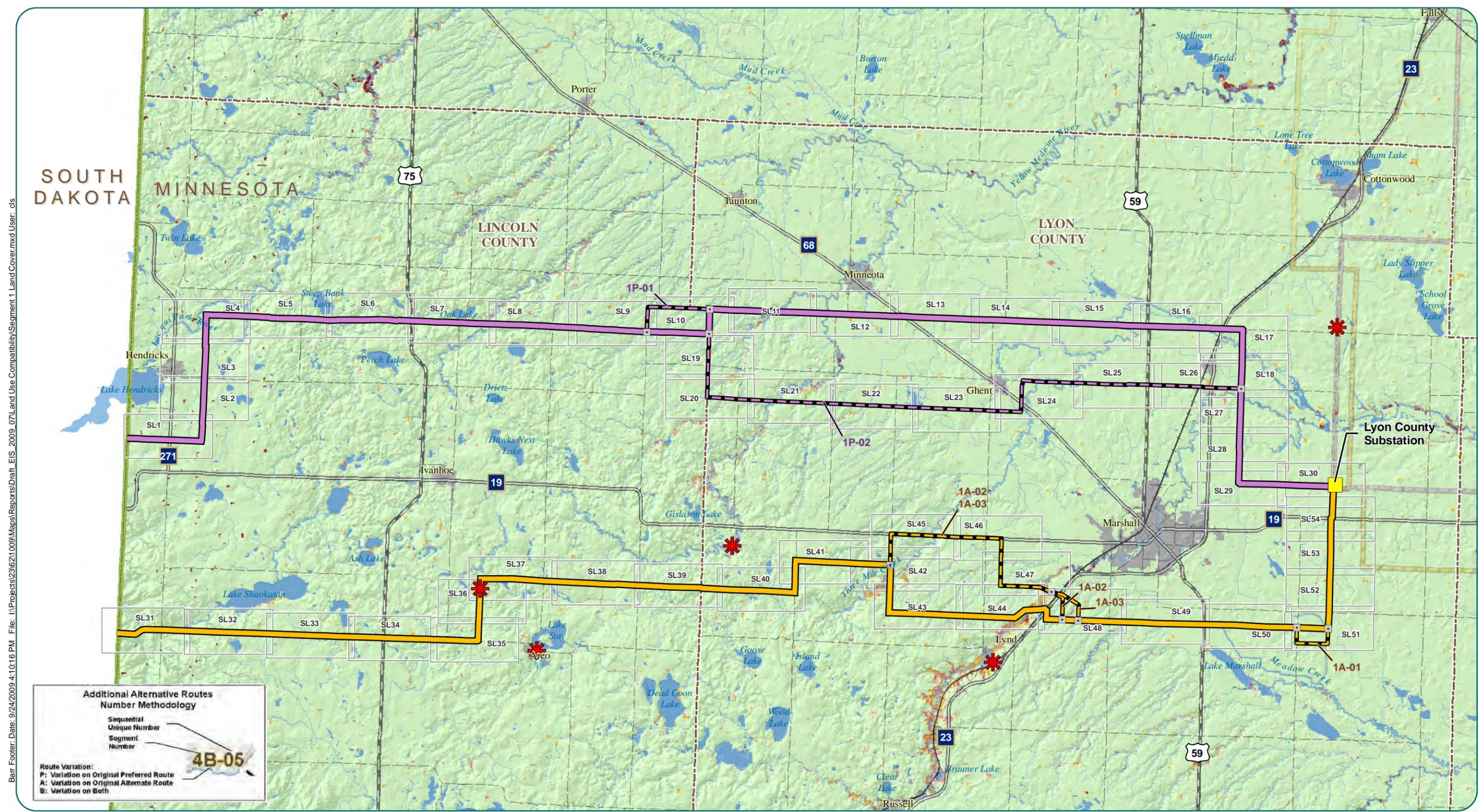


Source: DNR, Department of Forestry, 06/06/2002

The height of vegetation allowed within the transmission line easement is generally limited to 25 feet which may conflict with the property owner’s desire for landscaping. Maintenance activities within the easement may pose temporary and periodic conflicts with use and enjoyment of the property.

Mitigation

General measures to minimize impacts to land-use compatibility are discussed in Section 6.7. Within this route segment impacts to land use compatibility would be addressed primarily through best management practices (BMPs) to reduce impacts to agricultural areas during construction, operation, and maintenance.



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Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

Route Variation:
 P: Variation on Original Preferred Route
 A: Variation on Original Alternate Route
 B: Variation on Both

SL1 Appendix A Map Index

0 1.5 3 6 Miles

0 2.5 5 10 Kilometers

For detailed maps refer to Appendix A.
Refer to Appendix B for information on data sources.

Original Alignments	Project Substations	Land Cover	Upland Conifer-Deciduous mix
Preferred Route	Minnesota State Line	Upland Conifer Forest	Aquatic Environments
Alternate Route	County Boundaries	Upland Deciduous Forest	Crop/Grass
Additional Alternative Routes	Organic Farms	Lowland Deciduous Forest	Non-Vegetated
Variation on Preferred Route	Center Pivot Irrigation	Lowland Conifer Forest	Shrubland
Variation on Alternate Route			
Variation on Both			

Map 7.1-10
Land Use Compatibility Map
Segment 1
Brookings County to Lyon County Substation

Source: Refer to Appendix B for information on data sources

7.1.4.8 Land Based Economies—Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

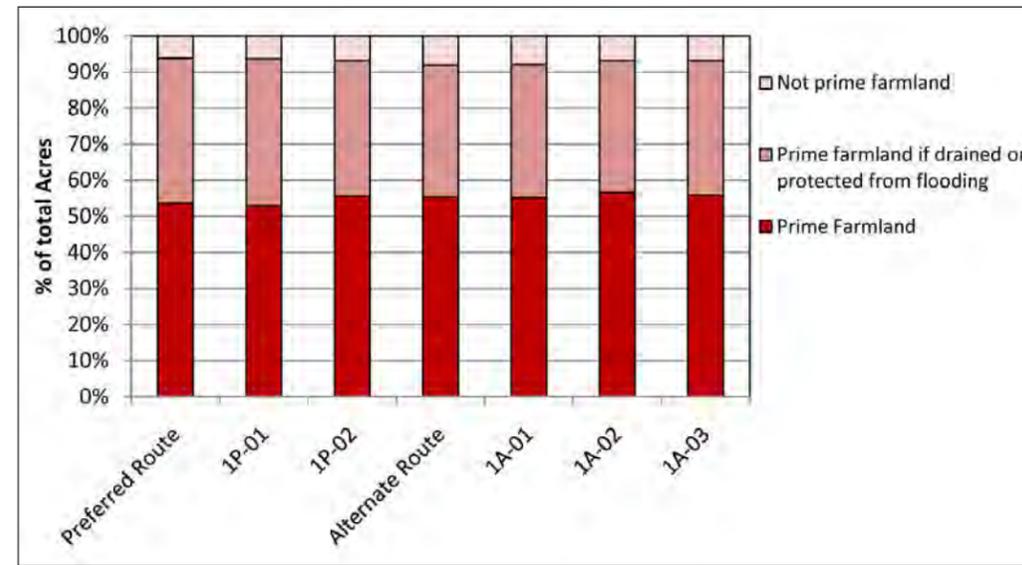
The primary land based economies along this route segment are agriculture based. Agricultural economies in the area may include livestock and dairy farms as well as bee-keeping. No mining or forestry operations are expected to be impacted by the Project.

The highest yield agricultural activities include cultivation of corn, soybeans and oats as well as raising cattle. Much of the agricultural land is designated as “prime farmland,” indicating that this land is most desirable for agricultural production. The Project would result in permanent and temporary impacts to farmland. Permanent impacts would occur as a result of structure placement along the route centerline. It is estimated that the permanent impacts in agricultural fields would be 1,000 square feet per pole. During construction, temporary impacts, such as soil compaction and crop damage within the ROW, are possible. Temporary impacts in agricultural fields are estimated to be one acre per pole for construction activities.

The percentage of prime farmland within the ROW does not change notably from one route alternative to the next along this route segment.

The locations of organic farms are shown in Map 7.1-10 and Appendix A. While certain proposed routes are in closer proximity to organic farms than other proposed routes, the implementation of mitigative measures described below would prevent impacts to organic farm status.

Figure 7.1.4.8-1 Farmland and non-farmland within ROW of proposed route alternatives



Source: U.S. Department of Agriculture, Natural Resources Conservation Service

Figure 7.1.4.8-1 shows the amount of prime farmland within the ROW of each of the proposed route alternatives in this segment.

Mitigation

While the presence of an HVTL near an organic agricultural area does not directly impact organic status, special procedures must be followed during the construction and maintenance activities associated with HVTLs to avoid impacts to organic farms. The applicant has worked with the Minnesota Department of Agriculture (MDA) to develop an Agricultural Impact Mitigation Plan (AIMP) for this Project. The overall objective of this AIMP is to identify measures the Utilities would take to avoid, mitigate, repair and/or provide compensation for impacts that may result from transmission line construction projects on agricultural land in Minnesota. The AIMP includes an appendix that outlines mitigation measures and procedures specific to construction and maintenance

procedures near Organic Agricultural Land as described in the National Organic Program Rules, 7 CFR Parts 205.100, 205.202, and 205.101. By following the procedures outlined in the AIMP, impacts to Agricultural land based economies due to construction and maintenance of the line can be eliminated or mitigated.

7.1.4.9 Transportation and Public Services— Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

Roadways, Railroads and Emergency Services

The nature of impacts to roadways, railroads and emergency services are not expected to vary notably from one route segment to the next or from one route alternative to the next. Impacts are expected to be limited to temporary impacts along roads and railroad corridors due to construction and maintenance of the line. Section 6.9 provides an overview of potential impacts to transportation and emergency services.

Airports and Landing Strips

Potential impacts to airports and landing strips are expected to vary by route depending on the proximity of the line to the airport and the particular characteristics of the airport in question. Map 7.1-11 shows the location of airports along this section of the route.

Within this route segment no impacts to the protected air space associated with airports or landing strips have been identified. Consideration has been given to several private or unregistered air strips including West Johnson Field, and larger airports including Mulder Field and the Southwest Minnesota Regional Airport (Ryan Field).

West Johnson Field and Mulder Field are private non-public use airports which are located outside of the area of concern for the proposed routes.

Southwest Minnesota Regional Airport is a public use facility located in Marshall. The two runways located on the facility grounds include a primary runway (Runway 12/30) aligned northwest to southeast and a second runway

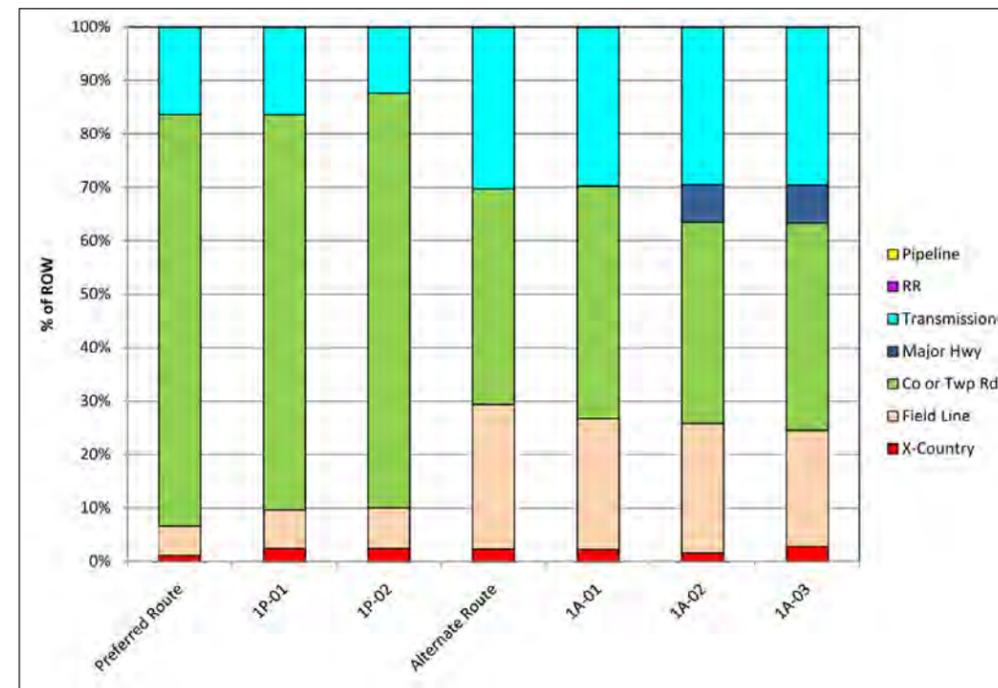
(Runway 02/20) heading north-south. Runway 12/30 is an asphalt runway that is 7,220 feet long and 100 feet wide. Runway 2/20 is an asphalt runway that is 4,000 feet long and 75 feet wide. The Alternate Route is 2.25 miles from the southern end of the primary surface of Runway 2/20. The current approach slope for Runway 2/20 is 20:1. Future airport planning supports the extension of this runway, with an approach slope of 34:1. Where the Alternate Route and associated route alternatives cross the Redwood River between the cities of Marshall and Lynd, the routes would pass along the edge of the 10,000 foot horizontal zone radius surrounding the airport. Due to this constraint, pole structure height in this area would be limited to less than 150 feet. In addition to these runways, a Very High Frequency Omnidirectional Radio Range (VOR) air navigation station is located on the airport grounds. Federal Aviation Administration (FAA) and Minnesota Department of Transportation (DOT) metallic structure height distance requirements specify that structures at 170 feet must be 8,115 feet from a VOR station. By complying with the 10,000 foot horizontal zone radius, the Project would also meet FAA and DOT metallic structure height distance requirements.

Right of Way Sharing

Sharing ROW with existing infrastructure can minimize the ROW needed for the transmission line, minimizing impacts to adjacent property. In Map 7.1-11, areas where the ROW for the proposed route alternatives would share existing transportation, transmission line or pipeline infrastructure have been identified.

Figure 7.1.4.9-1 shows the percentage of total line distance where ROW is shared with existing

Figure 7.1.4.9-1 Shared ROW types along each route alternative



Source: Field survey observations, comments from Project public meetings and aerial photograph interpretation by HDR. 12/29/08, updated by Barr 9/01/09

infrastructure under each route alternative in this segment. Areas where proposed routes follow field lines (survey lines, natural division lines and agricultural field boundaries), or cut cross-country through fields, pastures, and forests have been highlighted. In these areas there is no opportunity to minimize impacts to property by sharing existing ROW area.

All of the proposed route alternatives within this segment share at least 70 percent of their right of way with other infrastructure, primarily county or township roads or existing transmission lines. The Preferred Route has the greatest amount of shared ROW and each variation on the Proposed Route shares 90 percent or more of its ROW with existing transmission line or county or township roads. The Alternate Route has the least shared ROW. Variations on this route cut across field lines or cross country for 25 percent or more of the route.

Mitigation

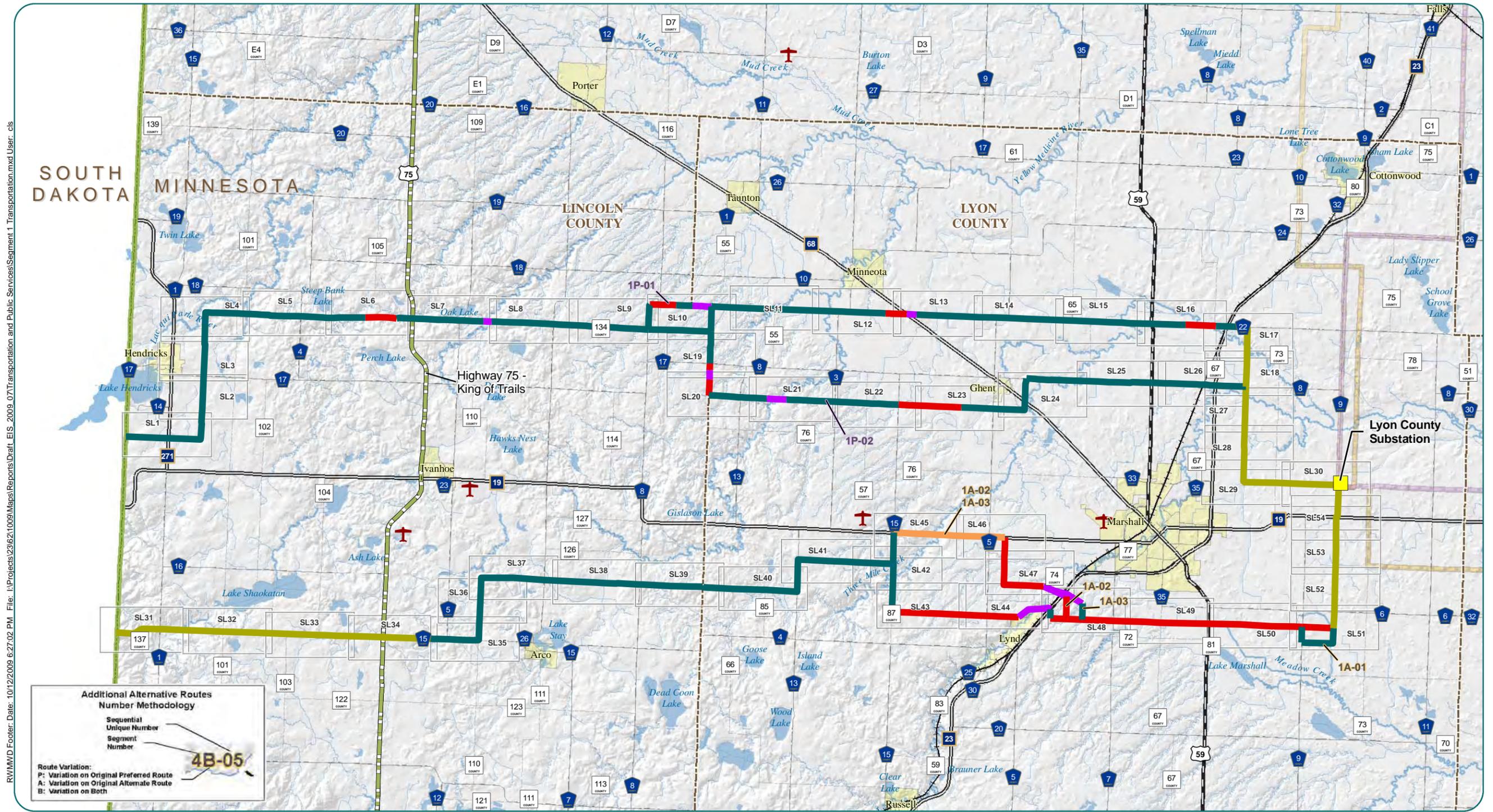
General mitigation measures to minimize impacts to Transportation and Public Services are discussed in Section 6.9. Within this route impacts to transportation are expected to be limited to airports. The only airport within this route segment where potential impacts exist is the Southwest Minnesota Regional Airport. The Alternate Route and associated route alternatives

The Alternate Route would cut cross country across this field south of Franklin, Minnesota.



Source: Barr photograph, 2009

Section 7.1
Brookings County to Lyon County Substation



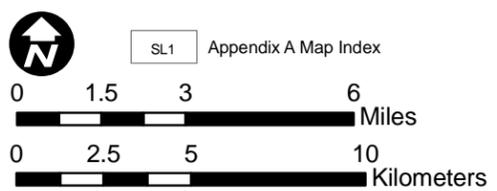
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Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

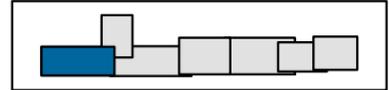
Route Variation:
P: Variation on Original Preferred Route
A: Variation on Original Alternate Route
B: Variation on Both



For detailed maps refer to Appendix A.
Refer to Appendix B for information on data sources.

- Project Substations
- Minnesota State Line
- County Boundaries
- Airport
- Scenic Byway
- ROW Sharing
- Pipeline
- County or Township Road
- Major Highway
- Municipal Street
- Railroad
- Transmission
- Non-ROW Sharing
- Field Line
- Cross-Country

Map 7.1-11
Transportation Map
Segment 1
Brookings County to Lyon County Substation



Source: Refer to Appendix B for information on data sources

are all located within the 10,000 foot horizontal zone radius surrounding the airport. Impacts to this airport could be avoided by using pole structures in this area with a height limited to less than 150 feet

It should also be noted that by choosing routes that maximize the amount of shared ROW with existing roads, transmission lines, pipeline, or railroad can mitigate impacts to surrounding land. Within this segment the Preferred Route has the greatest amount of shared ROW.

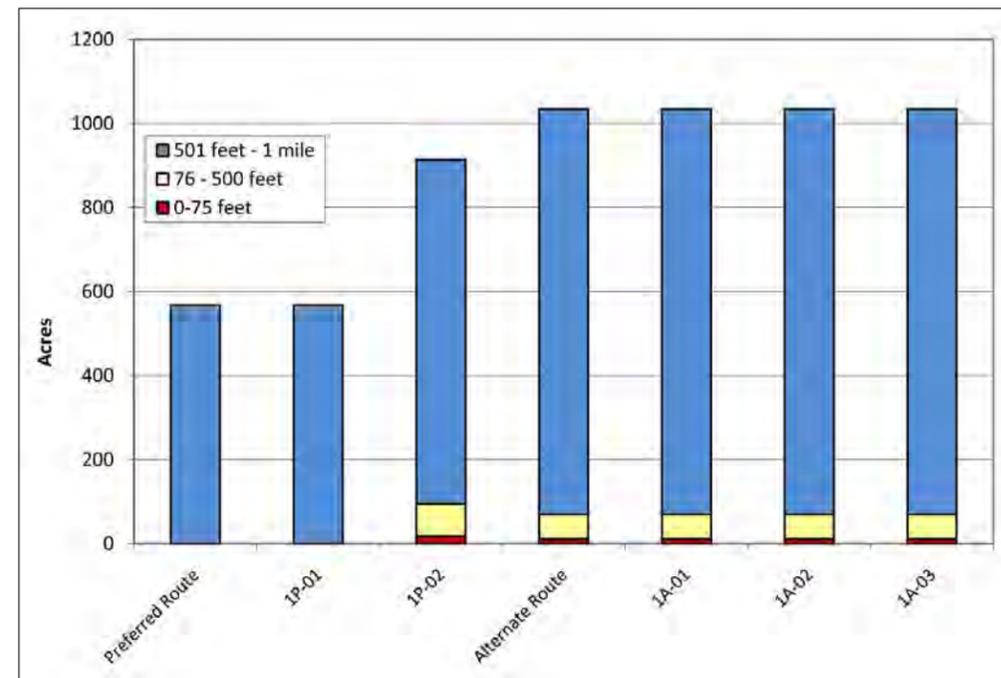
7.1.4.10 Recreation—Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

The proposed Project has the potential to impact recreational resources in areas where pole placement may result in temporary construction related disturbances or even permanent impacts. In some areas, viewshed impacts from the transmission line may affect recreators. In order to capture the range of potential impacts to recreation in the region, recreational features within various distances of the line have been evaluated.

Within this segment, no impacts to scientific and natural areas (SNAs), state parks, and federal parks are expected. SNAs, state parks, and federal parks are beyond the range where any direct impacts may occur and all of these features are outside the range where viewshed effects are possible.

One notable resource within this route segment is Highway 75, also called the King of Trails. The King of Trails provides an opportunity to view the Minnesota landscape and visit local communities along the highway. All of the proposed route alternatives in this segment intersect Highway 75 in Lincoln County.

Figure 7.1.4.10-1. WMAs along each route alternative



Source: DNR, Division of Fish and Wildlife 02/14/2006

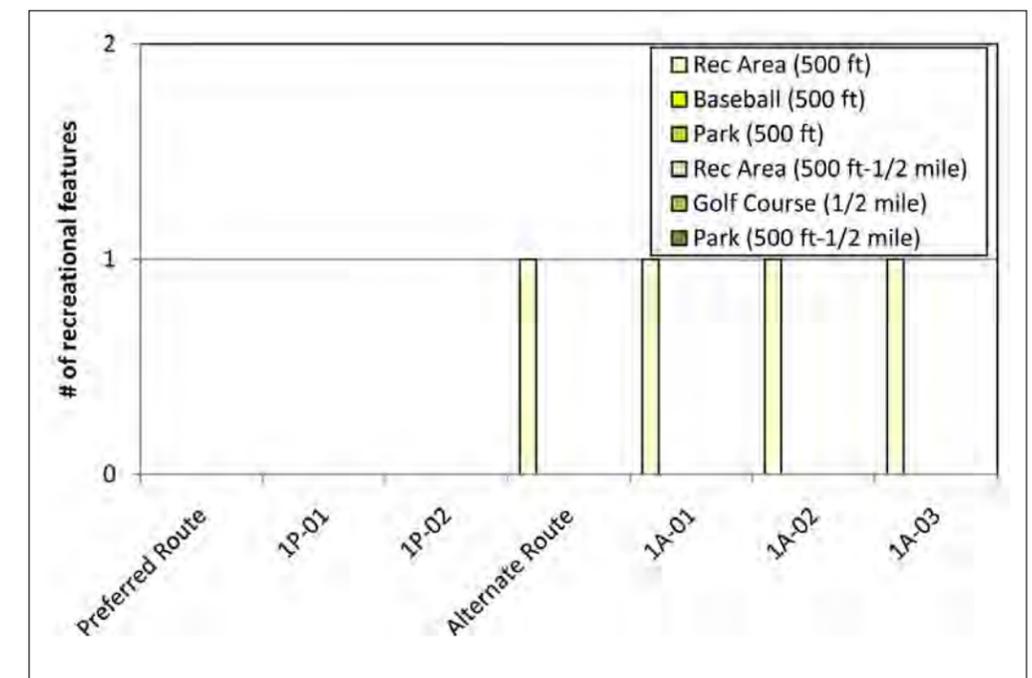
Potential recreational resource impacts for each of the proposed route alternatives for the route segment from Brookings County to the Lyon County Substation (shown in Map 7.1-12 and Appendix A) are summarized in Figures 7.1.4.10-1 to 7.1.4.10-3.

Figure 7.1.4.10-1 compares the proximity to Wildlife Management Areas (WMAs) under each route alternative in this segment. WMAs play a large role in Minnesota’s outdoor recreation system as they offer opportunities for hunting.

Impacts to WMAs within the various route alternatives are discussed further in Section 7.1.4.12.

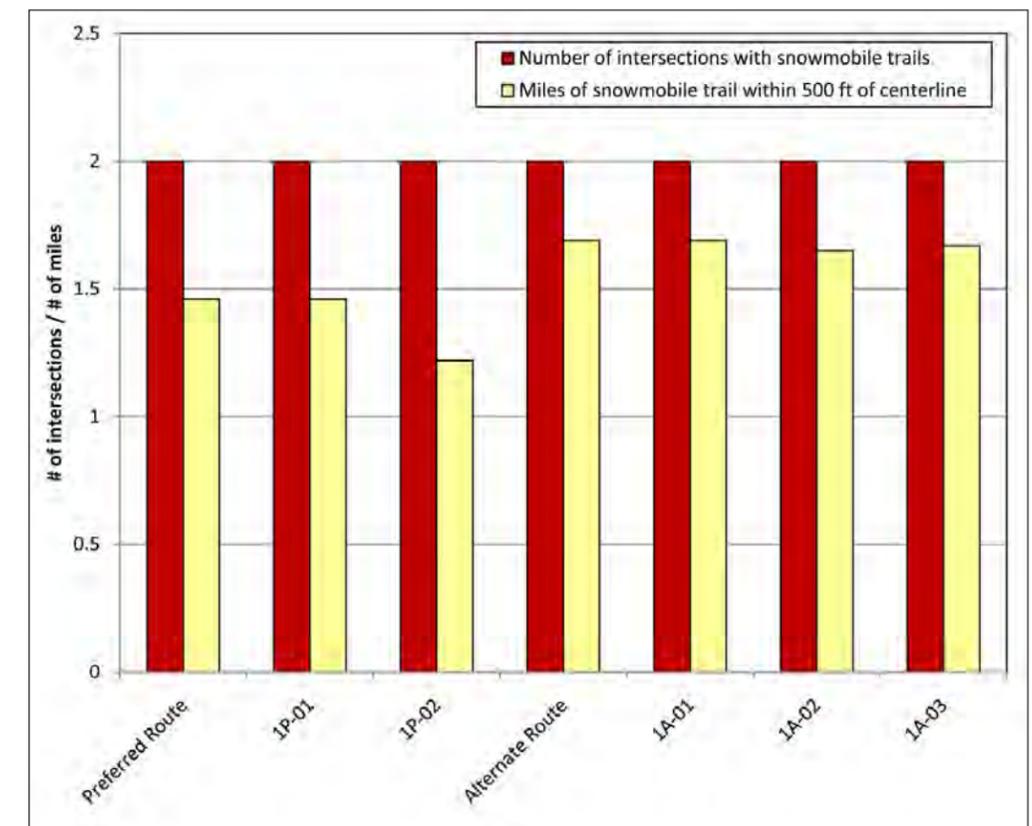
Figure 7.1.4.10-2 compares the proximity to a variety of recreational resources including local parks and recreation areas and areas used for sporting activities under each route alternative in this segment.

Figure 7.1.4.10-2. Recreational resource areas along each route alternative



Source: Field survey observations, comments from Project public meetings and aerial photograph interpretation by HDR. 12/29/08

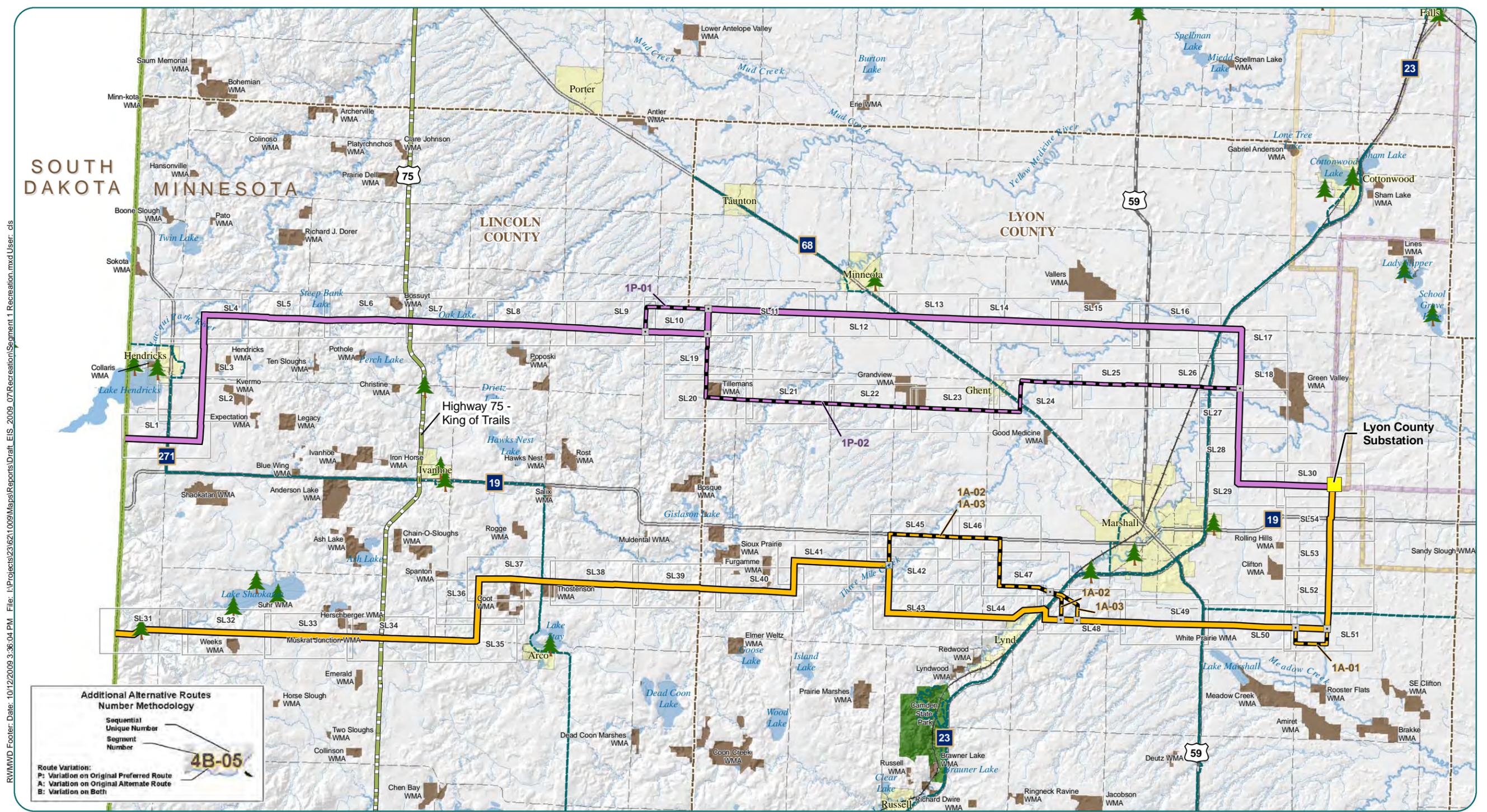
Figure 7.1.4.10-3. Snowmobile trails along each route alternative



Source: DNR, Division of Trails and Waterways 06/01/2003

Section 7.1

Brookings County to Lyon County Substation



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Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

Route Variation:
P: Variation on Original Preferred Route
A: Variation on Original Alternate Route
B: Variation on Both

Appendix A Map Index

0 1.5 3 6 Miles

0 2.5 5 10 Kilometers

For detailed maps refer to Appendix A.
Refer to Appendix B for information on data sources.

Original Alignments	Project Substations	Regional Existing Trail	Regional Park
Preferred Route	Minnesota State Line	Regional Planned Trail	Scientific and Natural Area
Alternate Route	County Boundaries	Regional Proposed Trail	State Park
Additional Alternative Routes	Recreation Area	State Existing Trail	State Recreation Area
Variation on Preferred Route		Snowmobile Trail	State Wayside
Variation on Alternate Route		Scenic Byway	Wildlife Management Area
Variation on Both			Wildlife Refuge

Map 7.1-12
Recreation Map
Segment 1
Brookings County to Lyon County Substation

Source: Refer to Appendix B for information on data sources

No recreational areas, parks, or sporting facilities are expected to be impacted within the Preferred Route and associated route alternatives. Only one recreational area was identified within 500 feet of the Alternate Route and associated route alternatives.

Minnesota’s state, county, and local trail systems offer recreational opportunities ranging from snowmobiling to cycling. Figure 7.1.4.10-3 compares potential snowmobile trail impacts across the various route alternatives in this route segment. Project impacts to trail systems may range from temporary construction impacts on trails immediately adjacent to the line to visual impacts for recreators in areas where the line is visible from the trail.

Impacts to snowmobile trails and total number of trail crossings do not vary notably from one route to the next.

Mitigation

General mitigation measures to minimize impacts to recreation are discussed in Section 6.10. Because the impacts to recreational areas are primarily visual, impacts to recreational resources can be managed through choosing a route that minimizes the proximity of the line to recreational resources. Each proposed route impacts different recreational resources to a different degree, so minimizing impacts to certain resources may involve a tradeoff that results in greater impacts to other recreational resources. Within this route segment, the Preferred Route and route alternative 1P-01 have the fewest WMA areas within the route width. It should be noted that for WMAs that are directly adjacent to the proposed routes, placing poles so that they span WMA areas can help to reduce temporary and permanent impacts related to construction

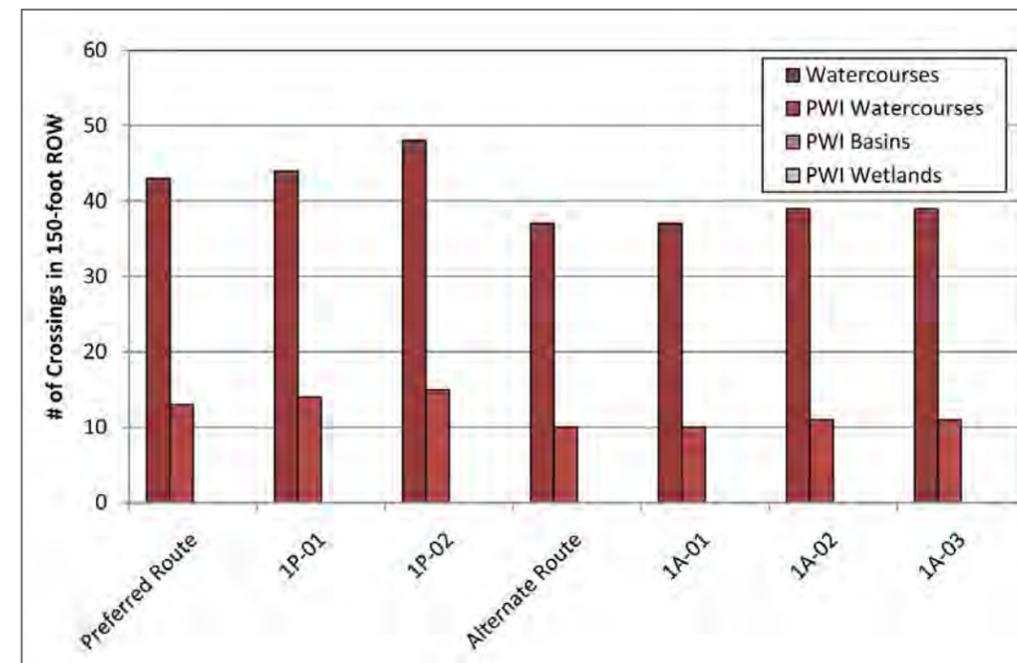
and pole placement. The Preferred Route and associated route alternatives have the fewest impacts to parks and sporting areas and all routes have fairly similar impacts to snowmobile trails.

7.1.4.11 Water Resources—Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

A variety of data sources (see Appendix B) were used to identify water resources within the 150-foot ROW and 1,000-foot route width of each route alternative within the Brookings County to Lyon County Substation segment. Map 7.1-13 and Appendix A identify the water resources within the vicinity of each route alternative; see Map 7.1-14 for wetlands present beyond the 150-foot ROW of each route alternative. Several rivers, streams, and ditches (collectively referred to “watercourses” below) would be crossed by the route alternatives within this segment. The major rivers running through this segment include the Redwood River and the Yellow Medicine River. The Redwood River crosses through each of the route alternatives within this segment, while the Yellow Medicine River only crosses through the Preferred Route and associated route alternatives (Map 7.1-13).

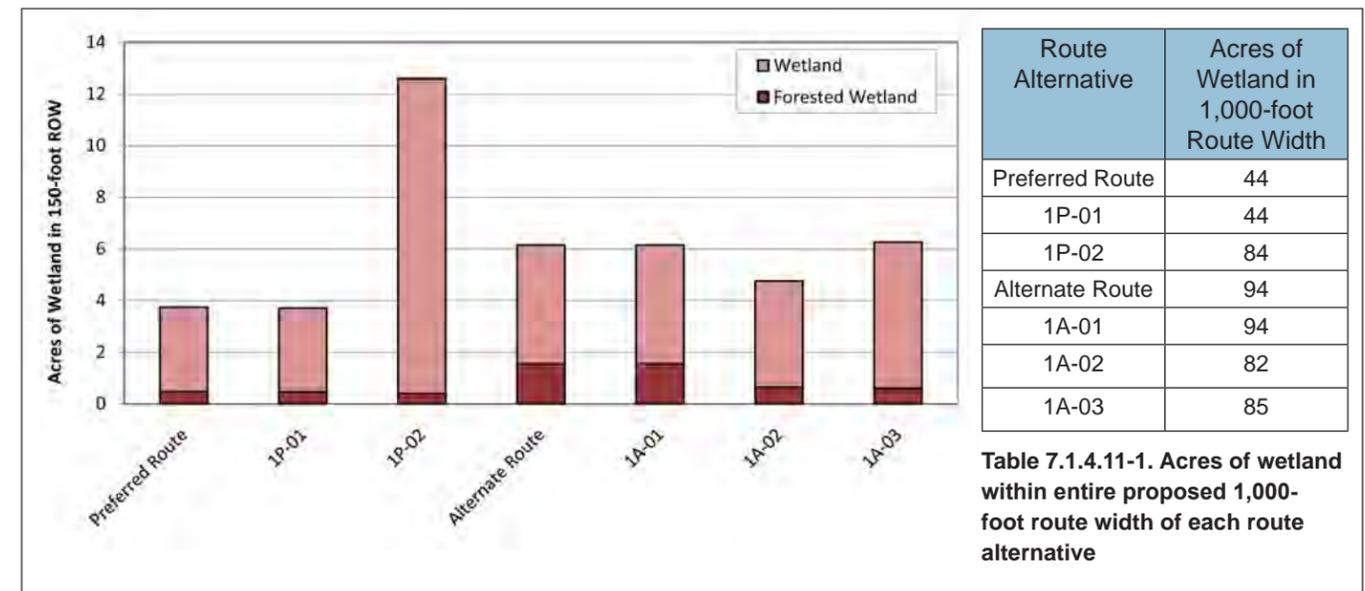
Figure 7.1.4.11-1 summarizes the number of watercourse and Public Waters Inventory (PWI) crossings that would occur within each route alternative in this segment. The route alternatives within this segment have between 37 and 48 watercourse crossings within their 150-foot ROW, with the Preferred Route and associated route alternatives having a few more watercourse crossings relative to the Alternate Route and associated route alternatives (Figure 7.1.4.11-1). In addition, the Preferred Route and associated route alternatives have between 13 and 15 PWI

Figure 7.1.4.11-1. Number of watercourse and PWI crossings within the proposed 150-foot ROW of each route alternative



Source: DNR, Division of Waters 07/31/2008

Figure 7.1.4.11-2. Acres of wetland and forested wetland within the proposed 150-foot ROW of each route alternative

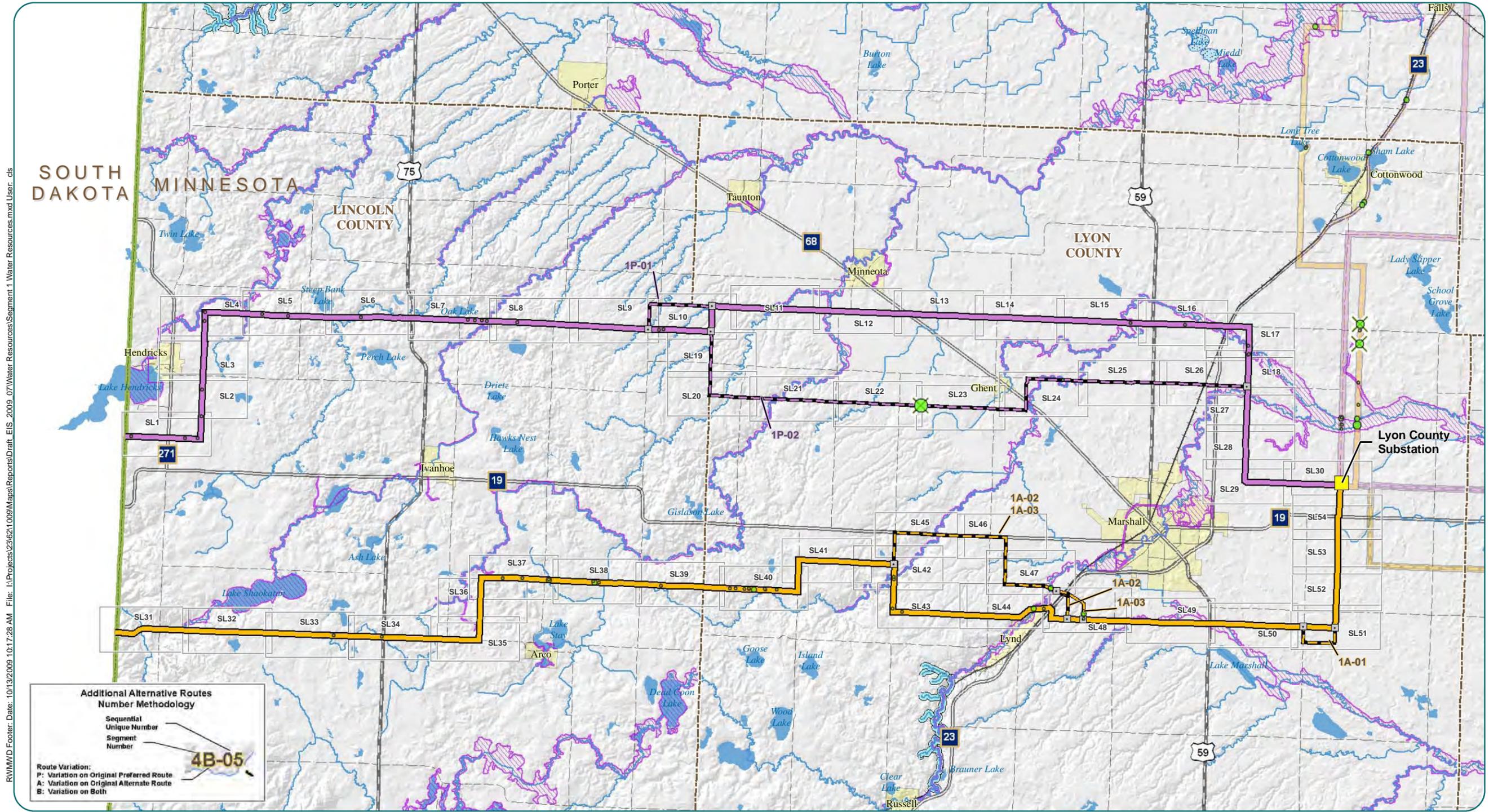


Source: U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation

watercourse crossings, while the Alternate Route and associated route alternatives only have between 10 and 11 PWI watercourse crossings. There are no PWI basins or wetlands, designated trout streams, or Wild and Scenic Rivers located within the 150-foot ROW or the 1,000-foot

width of any of the route alternatives within this segment.

Watercourse data includes all rivers, streams, ditches, and other linear water. On maps PWI basins and PWI wetlands are referred to collectively as PWI Basins.



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Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

Route Variation:
 P: Variation on Original Preferred Route
 A: Variation on Original Alternate Route
 B: Variation on Both

SL1 Appendix A Map Index

0 1.5 3 6 Miles

0 2.5 5 10 Kilometers

For detailed maps refer to Appendix A
 Refer to Appendix B for information on data sources

Original Alignments

- Preferred Route
- Alternate Route

Additional Alternative Routes

- Variation on Preferred Route
- Variation on Alternate Route
- Variation on Both

- Project Substations
- Minnesota State Line
- County Boundaries
- Q3 FEMA Floodplain
- Trout Streams
- Wild and Scenic Rivers
- Wetland Crossings > 1,000 Feet

Wetland Area (acres) within 150-foot ROW

- 0.0 - 0.5
- 0.6 - 2.5
- 2.6 - 5.0
- 5.1 - 10.0
- 10.1 - 20.4

- Designated Wildlife Lakes
- Public Waters Inventory Basins
- Public Water Inventory Watercourse

Map 7.1-13
Water Resources Map
Segment 1
Brookings County to Lyon County Substation

Source: Refer to Appendix B for information on data sources

Wetlands within the vicinity of the route alternatives in this segment consist mostly of small scattered freshwater emergent wetlands, with a few freshwater ponds, riverine wetlands, and forested and shrub dominated wetlands also present. Figure 7.1.4.11-2 summarizes the total acres of wetland and forested wetland that are located within the 150-foot ROW of each route alternative within this segment. The 1P-02 route alternative has the most acres of wetland within the 150-foot ROW. The segment 1 Preferred Route and the 1P-01 route alternative have the fewest acres of wetland within their 150-foot ROW and within their entire 1,000-foot route width (Figure 7.1.4.11-2, Table 7.1.4.11-1). In addition, the Preferred Route and the associated route alternatives have the fewest acres of forested wetlands within their 150-foot ROW (Table 7.1.4.11-1).

Although wetlands would be spanned to the extent possible, there is one wetland within the 1P-02 segment that is wider than 1,000 and may require placement of one or more poles within it. However, following detailed route planning, it is possible that this wetland could be spanned or avoided.

Mitigation

General mitigation measures that would be employed to minimize impacts to water resources are discussed in Section 6.11. Within this route segment, impacts to water resources can be managed by choosing a route alternative that minimizes the proximity of the line to watercourses, lakes, and wetlands. Because all watercourses and lakes would be spanned, no structures would be placed within these features and no direct impacts to watercourses and lakes are anticipated. Potential indirect impacts to these resources, such as increases in turbidity, may be minimized through use of BMPs and by choosing the Alternate Route or one of the associated route alternatives to the Alternate Route, which have the fewest number of watercourse and PWI crossings.

Temporary impacts to wetlands may occur if they need to be crossed during construction. Utilizing BMPs and choosing the Preferred Route or the 1P-01 route alternative, which have the least acres of wetland within the 150-foot ROW and 1,000-foot route width would minimize temporary impacts to wetlands. Permanent impacts to wetlands may occur if structures need

to be placed within wetland boundaries; the only route alternative within this segment that has a wetland wider than 1,000 feet within the 150-foot ROW is 1P-02; choosing any of the other route alternatives would minimize these impacts. Permanent impacts to wetlands may also occur if the wetlands within the 150-foot ROW are currently forested. Forested wetlands may undergo a conversion to non-forested wetlands because vegetation maintenance procedures under transmission lines may prohibit trees from establishing. Choosing the Preferred Route or the 1P-01 route alternative, which have the fewest acres of forested wetland within the 150-foot ROW, would minimize these impacts. Route alternative 1P-02 also has relatively few acres of forested wetlands within the 150-foot ROW; however this route alternative has the most total acres of wetland within the 150-foot ROW.

7.1.4.12 Flora and Fauna—Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

Flora

Vegetation communities on this segment were evaluated using Gap Analysis Program (GAP) Level 3 data and DNR Natural Heritage Information System (NHIS) data (Maps 7.1-10 and 7.1-15 and Appendix A). The GAP database provides information on general vegetative cover; details on GAP data are provided in Section 6.12. The NHIS database identifies unique and/or native plant community types. Native plant community types are discussed in detail in Section 6.13.

Figure 7.1.4.12-1 and Map 7.1-14 summarize the GAP vegetation data within the 150-foot ROW of each route alternative within this segment. There is little variation in vegetation cover between the route alternatives. Cropland is the dominant vegetation type across all of the route alternatives within this segment, with grasslands representing most of the remaining vegetation cover within each route alternative (Figure 7.1.4.12-1). Other types present include upland shrublands, oak and cottonwood woods, marshes, and wet forested areas.

Several DNR-designated unique native plant community types are located within the route alternatives within this segment; these include southern dry hill prairies, southern mesic prairies, and southwestern calcareous fens. The Alternate Route and 1A-01 route alternatives have a southern dry hill prairie community and two calcareous fens within one mile of their centerline. All route alternatives within this segment except 1P-02 have at least one southern mesic prairie within one mile of their centerline. See Appendix D for details on the number of occurrences of these communities within one

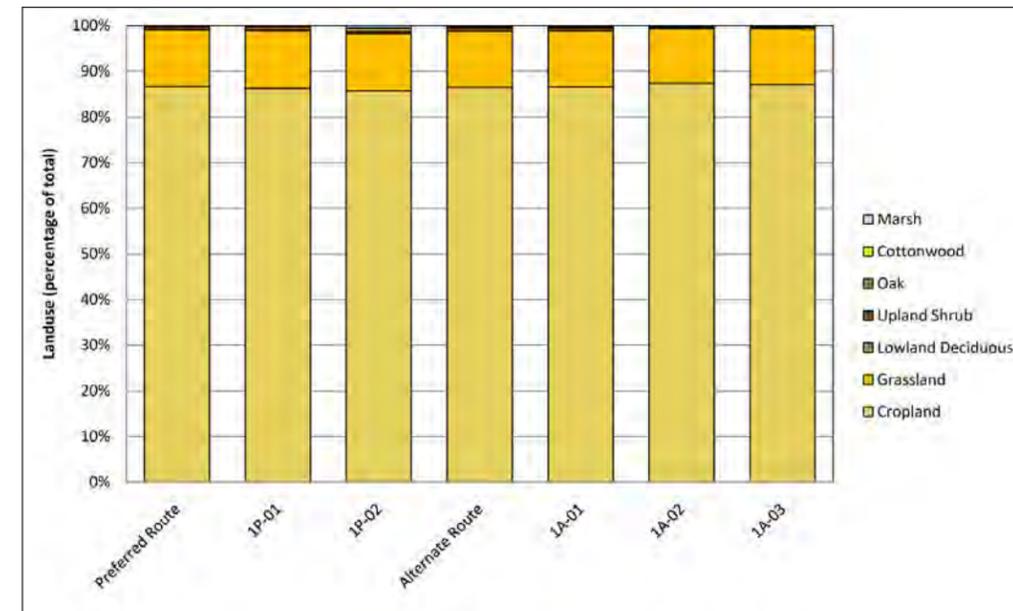
mile of the centerline and within the 150-foot ROW of each route alternative.

Fauna

The presence of wildlife species and wildlife habitat on this segment was evaluated using GAP Level 3 data and information on WMAs, Waterfowl Production Areas (WPAs), and U.S. Fish and Wildlife Service (USFWS) National Wildlife Refuges (Map 7.1-14 and Appendix A). GAP information provides an overview of the vegetation communities present, and hence the availability of forage, cover and reproductive habitats for various wildlife species (see Section 6.12 for further details on GAP data). WMA, WPA, and wildlife refuge data pinpoint locations where wildlife species may be more prevalent and/or diverse. WMAs, WPAs, and wildlife refuges within the 150-foot ROW, the 1,000-foot route width and within one mile of the route alternatives in this segment were included in the evaluation. WMAs within or adjacent to the ROW are discussed in Section 7.1.4.10.

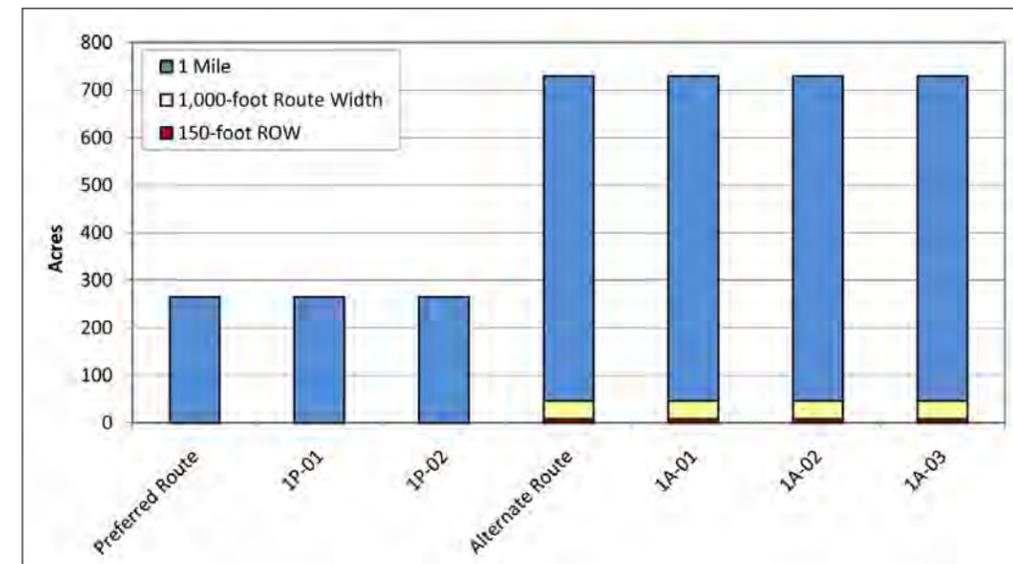
The Alternate route and associated route alternatives in this segment (Alternate Route, 1A-01, 1A-02, 1A-03) have more than twice the acreage of WPAs within the 1000-foot route width and within one mile as the Preferred Route and associated route alternatives. This suggests that wildlife habitat is more prevalent and diverse near the Alternate Route and associated route alternatives in this segment. Waterfowl habitat is also more abundant in the Alternate route and associated route alternatives in this segment. There are no wildlife refuges within the 150-foot ROW or 1,000-foot route width for any of the route alternatives within this segment. However, the Northern Tallgrass Prairie National Wildlife Refuge is located within one mile of the Preferred Route and associated route alternatives (Map 7.1-14).

Figure 7.1.4.12-1. Summary of GAP vegetation data within 150-foot ROW for each route alternative



Source: DNR, Department of Forestry 06/06/2002

Figure 7.1.4.12-2. Acres of WPAs within one mile, and within 150-foot ROW of each route alternative



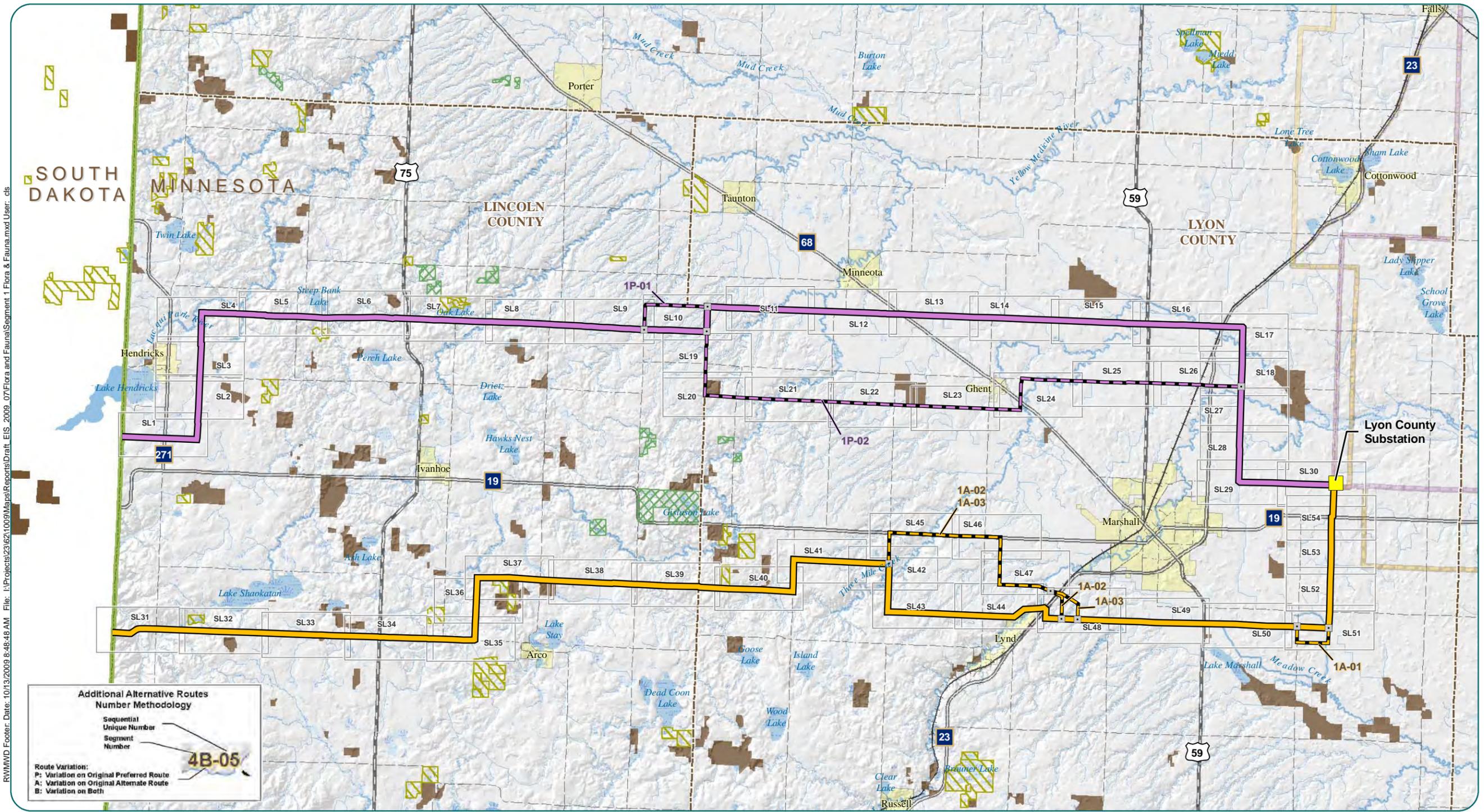
Source: United States Fish and Wildlife Service 05/11/2009

Mitigation

General temporary and permanent impacts to vegetation and wildlife resources for this segment are described in Section 6.12. Habitats where native prairie remnants, other unique plant communities, and rock outcrops have been

recorded or are likely to occur would be spanned as feasible.

Construction impacts to most vegetation cover types may be mitigated with seeding of disturbed areas with native plant species, unless the area is to be returned to agricultural use. Removal of



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Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

Route Variation:
 P: Variation on Original Preferred Route
 A: Variation on Original Alternate Route
 B: Variation on Both

SL1 Appendix A Map Index

0 1.5 3 6 Miles

0 2.5 5 10 Kilometers

For detailed maps refer to Appendix A.
Refer to Appendix B for information on data sources.

Original Alignments	Project Substations	Fish Technology Center	Scientific and Natural Area
Preferred Route	Minnesota State Line	Fisheries Research Station	Wildlife Management Area
Alternate Route	County Boundaries	National Fish Hatchery	Wildlife Refuge
Additional Alternative Routes		National Wildlife Refuge	Wetland (NWI)
Variation on Preferred Route		Waterfowl Production Area	
Variation on Alternate Route			
Variation on Both			

Map 7.1-14
Flora & Fauna Map
Segment 1
Brookings County to Lyon County Substation

Source: Refer to Appendix B for information on data sources

trees would be minimized; however, in order to safely operate the transmission line, trees removed from beneath or immediately adjacent to the line cannot be replaced.

Avian collisions with the transmission line may also occur in this segment. The applicant would work with DNR and USFWS to identify areas that may require marking transmission line shield wires, bird flight diverters, or using alternate structures to reduce the likelihood of collisions.

7.1.4.13 Rare and Unique Resources— Analysis of Segment Alternatives for the Brookings County to Lyon County Substation

Rare and unique resources were identified within one mile of each route alternative within the Brookings County to Lyon County Substation segment using the DNR NHIS, DNR state-designated railroad prairies, and Minnesota County Biological Survey (MCBS) databases (see Appendix B). The following discussions focus on federal and state protected species and rare and unique communities located within one mile of each route alternative. Data on rare communities, animal assemblages, railroad prairies, and MCBS sites are summarized in this section; however, complete data sets for each route alternative are available in Appendix D. There is no legal protection for state special concern and non-status species within the State of Minnesota. These data are outside the focus of this discussion and are available in Appendix D. In addition, all waterbodies and watercourses would be spanned; therefore it is anticipated that impacts to threatened and endangered aquatic species would be avoided. Because of this, aquatic species are mentioned but are not the focus of discussion.

Table 7.1.4.13-1 and Map 7.1-15 summarize the rare and unique resources documented within one mile of the route alternatives within this segment (see Appendix A for more detailed maps). However, in order to protect rare resources from exploitation or destruction, Map 7.1-15 and Appendix A do not indicate the names of species or communities identified within the NHIS database.

Two state-threatened species have been documented within one mile of various route alternatives within this segment; these include the ottoe skipper (*Hesperia ottoe*) and the loggerhead shrike (*Lanius ludovicianus*). The ottoe skipper, which has been found within one mile of all of the alternatives to the Alternate Route in this segment, is a butterfly that typically inhabits native dry-mesic to dry prairies (DNR 2009). The loggerhead shrike, which has been found within one mile of all of the alternatives to the Preferred Route in this segment, is a migratory song bird that inhabits relatively open land with some shrub cover (DNR 2009).

Rare communities have been documented within one mile of all route alternatives within this segment except 1P-02 (Table 7.1.4.13-1, Map 7.1-15; see Appendix D for community types). However, only the alternatives to the Alternate Route have rare communities located within their 150-foot ROW (Table 7.1.4.13-1). There are two state-designated railroad prairies within one mile of the segment 1 Preferred Route and the 1P-01 route alternative (Table 7.1.4.13-1). There are no animal assemblages or MCBS sites located within one mile of the route alternatives within this route segment (Table 7.1.4.13-1).

Mitigation

General mitigation measures that would be employed to minimize impacts to rare and unique resources are discussed in Section 6.13. See Section 6.12 for a discussion of the measures that would be utilized to minimize the impacts of avian collisions with transmission lines. Within this route segment, threatened and endangered species are found within one mile of each route alternative. Impacts to the ottoe skipper would be minimized by avoiding or spanning native prairie remnants or by choosing the Preferred Route or one of the route alternatives associated with the Preferred Route. Impacts to the loggerhead shrike would be minimized by avoiding or spanning open areas with some shrub component or by choosing the Alternate Route or one of the route alternatives associated with the Alternate Route. If the rare species is unavoidable, a takings permit from the DNR may be required along with other conditions.

There are DNR-listed rare natural communities within one mile of each route alternative within this segment except 1P-02. The placement of structures within rare communities would be avoided or minimized by spanning them to the extent possible. Where structure placement cannot be avoided in these sensitive communities, rare species associated with these habitats could be affected. Choosing route alternative 1P-02 would minimize impacts to rare communities.

Table 7.1.4.13-1. Summary of rare and unique resources within one mile of each route alternative

Common Name	Scientific Name	Type	MN Status	U.S. Status	Route Alternatives						
					Preferred	1P-01	1P-02	Alternate	1A-01	1A-02	1A-03
Ottoe Skipper	<i>Hesperia ottoe</i>	Zoological	THR	None				X	X	X	X
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Zoological	THR	None	X	X	X				
Rare Communities		Ecological	na	na	1	1		2/5	2/5	2/2	2/2
Animal Assemblages		Zoological	na	na							
State-Designated Railroad Prairies			na	na	2	2					
MCBS Sites			na	na							

Source: Natural Heritage Information System Rare Features Data Copyright 2009 State of Minnesota, Department of Natural Resources

An "X" indicates the presence of that particular species within 1 mile of centerline, while a blank cell indicates that a particular species, community, or site is not within 1 mile of the centerline.

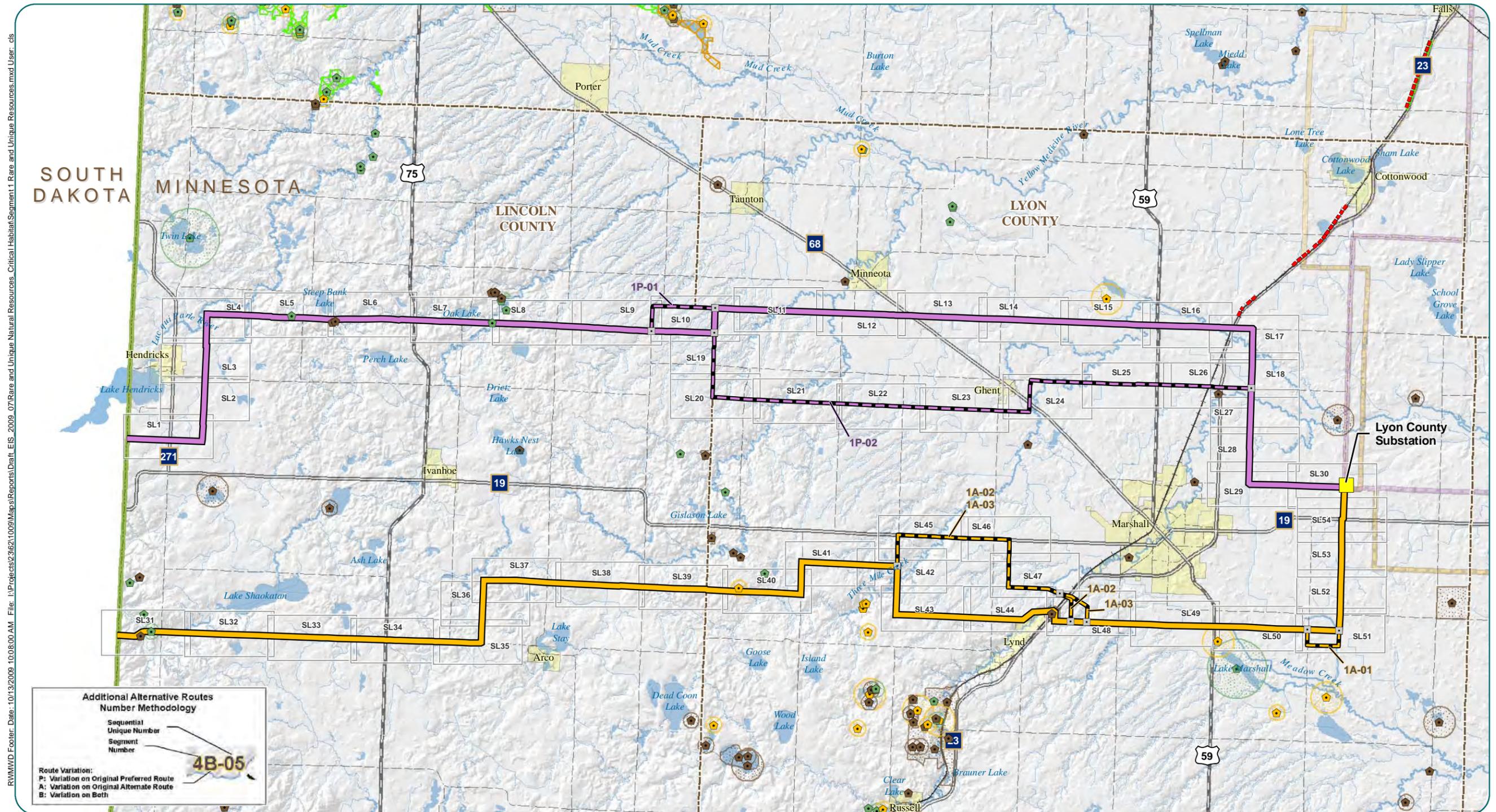
Rows in tan indicate non-aquatic state and/or federally-threatened or endangered species and rows in blue indicate aquatic state and/or federally-threatened or endangered species.

Cells in red indicate if and how many of the sites are located within the 150-foot ROW (e.g. 1/2 means that one of two total sites is located in the ROW).

"MCBS" = Minnesota County Biological Survey - data includes sites classified as outstanding, high, and moderate biodiversity significance.

Animal Assemblages includes colonial waterbird nesting sites and/or mussel sampling sites.

"END" = Endangered, "THR" = threatened, "None" = no federal status, "na" = not applicable.



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Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

Route Variation:
 P: Variation on Original Preferred Route
 A: Variation on Original Alternate Route
 B: Variation on Both

0 1.5 3 6 Miles
 0 2.5 5 10 Kilometers

For detailed maps refer to Appendix A.
 Refer to Appendix B for information on data sources.

Original Alignments	Project Substations	MN DNR Natural Heritage	State-Designated RR Prairie
Preferred Route	Minnesota State Line	Botanical	MCBS Biodiversity Significance
Alternate Route	County Boundaries	Ecological	Moderate Significance
Additional Alternative Routes		Zoological	High Significance
Variation on Preferred Route		Botanical	Outstanding Significance
Variation on Alternate Route		Ecological	
Variation on Both		Zoological	

Map 7.1-15
 Rare & Unique Resources/Critical Habitat Map
 Segment 1
 Brookings County to Lyon County Substation



Source: Refer to Appendix B for information on data sources