In Section 8, the impacts to resources along the various route alternatives in each segment are assessed and discussed. Unlike Section 7, which discussed resources and potential impacts from an overview perspective, Section 8 provides details specific to each of the 62 route alternatives. Project impacts are quantified in this section, providing the reader with a means of evaluating the potential impacts associated with route alternatives, side-by-side. Most of the impact data in Section 8 is provided graphically, enabling a visual comparison of the route alternatives (see discussion below). Complete sets of data tables associated with impacts to resources for each route alternative are provided in Appendices H through J. General overview maps are present throughout Section 8; however, more detailed maps are provided in Appendix A.

Section 8 is divided into the five subsections:

- Section 8.1: Segment 1 - Hampton to North Rochester Substation 345 kV Line (Section 8.1)
- Section 8.2: Segment 2 - North Rochester Substation to Northern Hills Substation 161 kV Line (Section 8.2)
- Section 8.3: Segment 3 - North Rochester Substation to Mississippi River 345 kV Line (Section 8.3)
- Section 8.4 discusses the Kellogg crossing of the Mississippi River
- Section 8.5 discusses substations associated with the proposed project.

Map 8.0-1 shows an overview of the three segments, which include the following

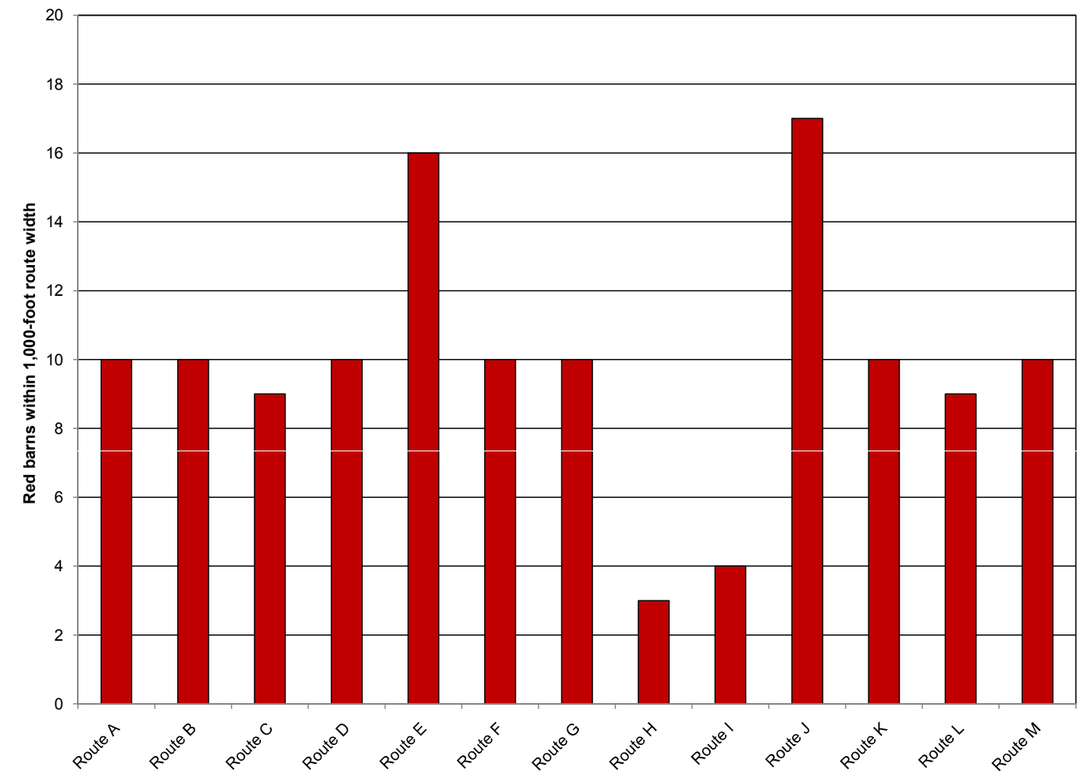
8.0.1 Interpreting Route Alternative Impact Numbers/Graphs

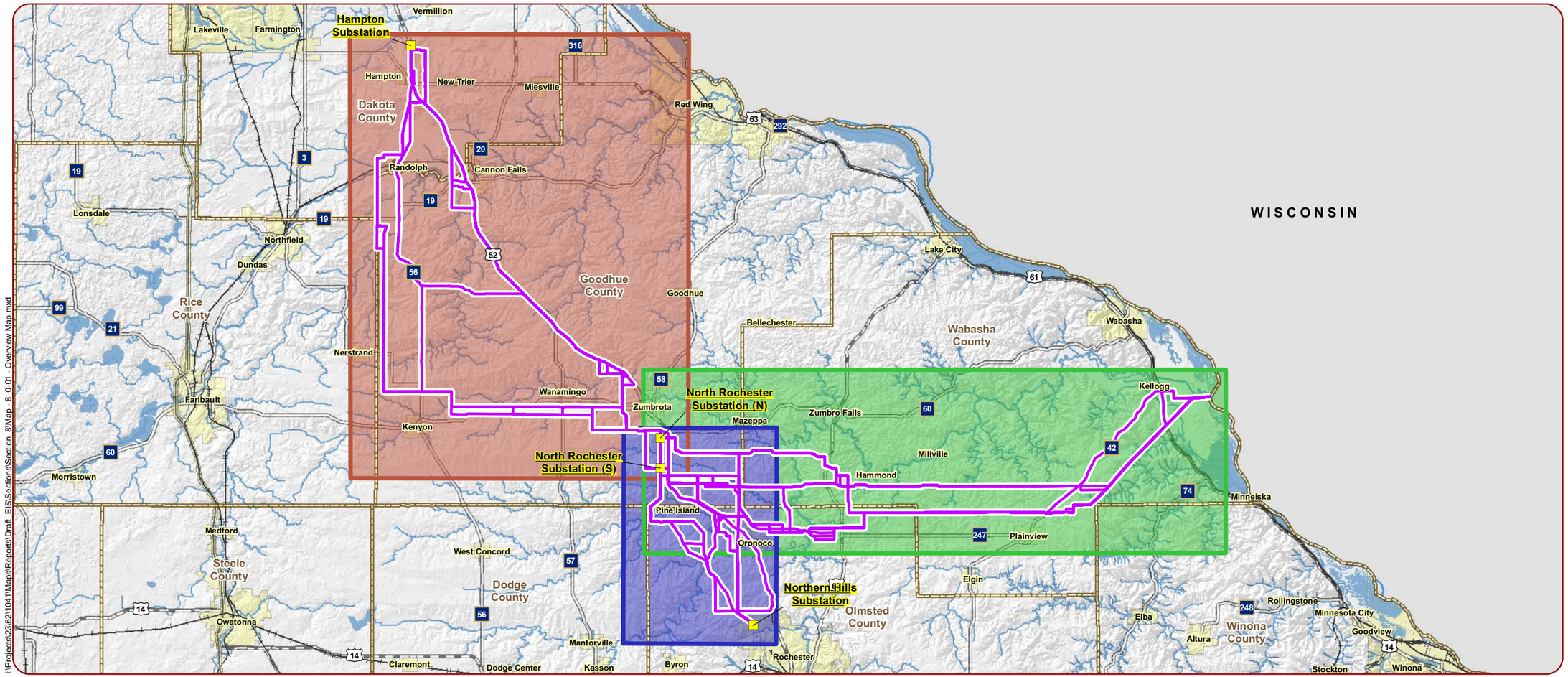
Impacts that each route alternative would have on a given resource have been quantified by route segment and are shown on bar graphs in Sections 8.1 through 8.3. Impacts have been quantified by either counting the number of times a resource occurs within a specified distance of the proposed centerline (point occurrences), or by totaling the acreage of a resource type within a specified distance of the proposed centerline (non-point occurrences). Based on this accounting, a value has been calculated for the purpose of comparing the impacts that the route alternatives would potentially generate within a resource. These values have been put into the bar graphs for a visual evaluation of similarities and differences between the route alternatives.

As an example, Figure 8.0.1-1 shows a hypothetical bar graph of an imaginary resource, the number of red barns within the 1,000-foot route width of each route alternative. At first glance, it may appear that most of the values for the route alternatives are the same. There is a flat line that could be drawn across the tops of most of the bars. What does this tell the reader? It indicates that most of the route alternatives would result in the same or highly similar impacts to the resource. In the example, the graph tells the reader that most of the route alternatives would potentially affect about ten red barns. The graph also shows two of the route alternatives (route alternatives E and J) would have significantly higher impacts to the resource in the segment, and that two of the route alternatives (route alternatives H and I) would have significantly fewer impacts to the resource.

For most of the resource impact graphs, the reader will notice a high degree of similarity between route alternatives, as indicated graphically by the "flat line" appearance of the bars in the graph. Route alternatives that are notably different from most others will stand out as spikes or drops in the overall arrangement of the bars in the graph.

Figure 8.0.1-1 Example figure showing the number of red barns within the 1,000-foot route width of each route alternative





Route Alternatives Evaluated in EIS

Project Substations

Segment 1: Hampton Substation to North Rochester Substation

Segment 2: North Rochester Substation to Northern Hills Substation

Segment 3: North Rochester Substation to Mississippi River

0 1.5 3 6 9 12 Miles

0 2.5 5 10 15 20 Kilometers

Map 8.0-01
Overview Map
Hampton to La Crosse
Transmission Line

8.1 Segment 1 - Hampton Substation to North Rochester Substation

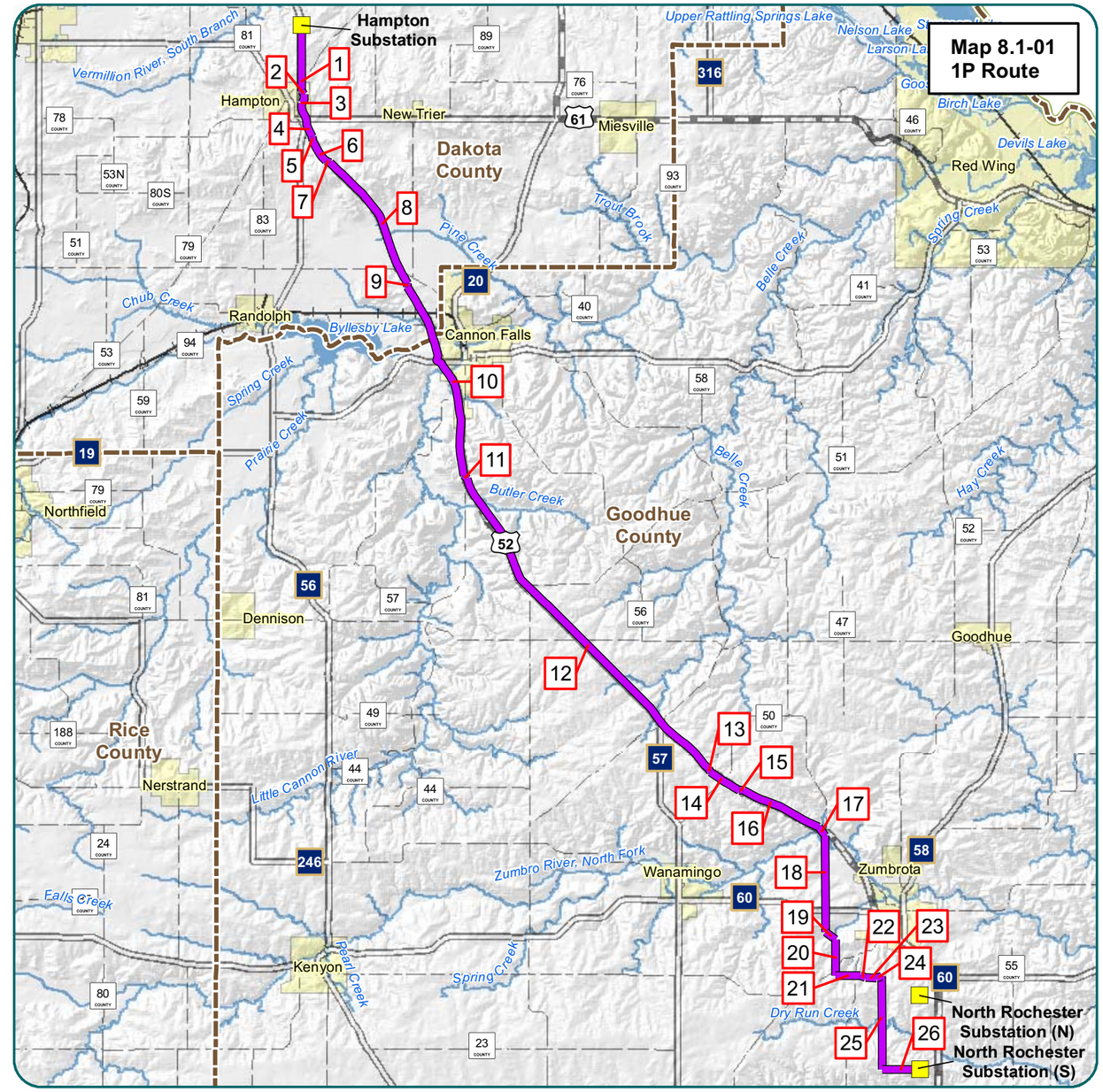
A total of 17 route alternatives are considered for Segment 1. The applicant's preferred and alternate route alternatives in this segment are labeled 1P and 1A, respectively. Naming of the remaining route alternatives is determined by whether the proposed route alternative is based on the applicant's preferred route, the applicant's alternate route, or a combination of the two.

The following are examples of route alternative names based on the naming convention described above:

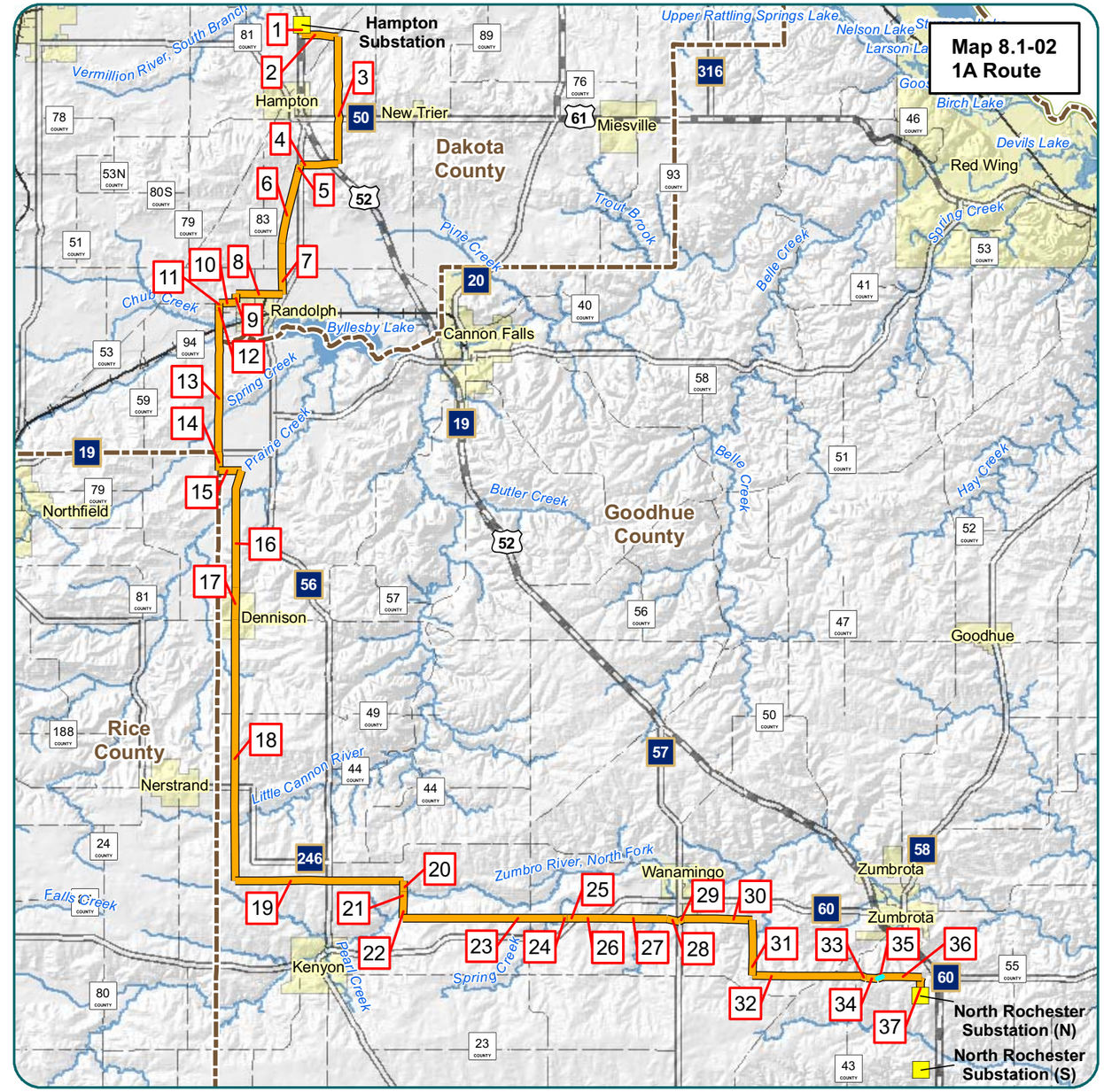
- 1P-002 – This refers to a route alternative in Segment 1 which is a variation on the applicant's preferred route. It is the second such variation proposed during scoping.
- 1A-004 – This is a route alternative in Segment 1 based on the applicant's alternate route. It is the fourth such variation proposed during scoping.
- 1B-001 – This is a route alternative in Segment 1 that initially follows the applicant's preferred route before switching to the applicant's alternate route or visa-versa. It is the first such variation proposed during scoping.

8.1.1 Description of Route Alternatives – Hampton to North Rochester Substation

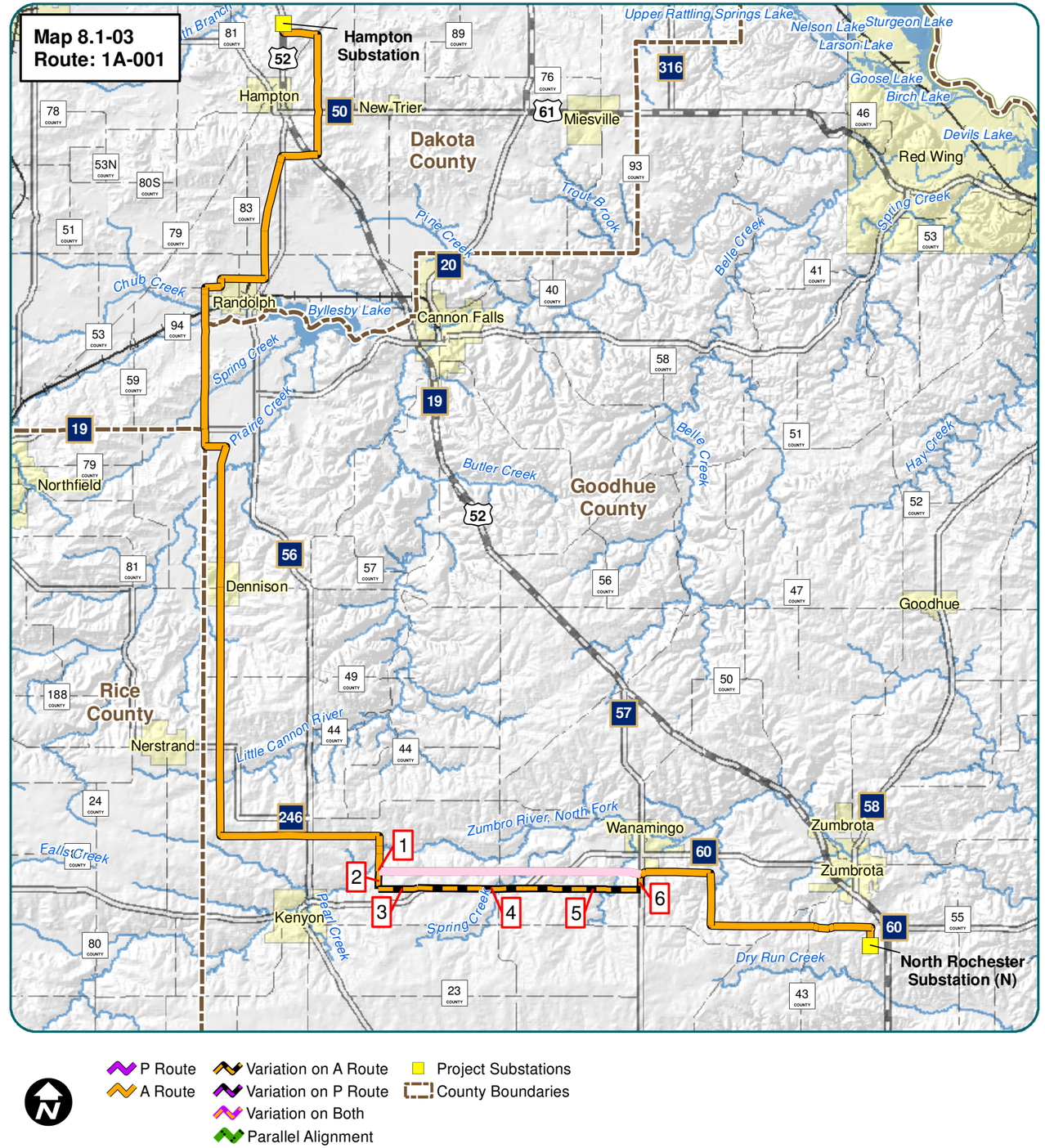
Hampton to North Rochester (1P)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	From the Hampton Substation go south following US Hwy 52	1.77	Major Hwy
2	Turn southeast cross-country	0.11	Cross-country
3	Turn south then southwest following field line/cross country to US Hwy 52	0.26	Field Line/Cross-country
4	Turn south/southeast following US Hwy 52	0.96	Major Hwy
5	Turn south crossing US Hwy 52	0.12	Major Hwy
6	Turn southeast following US Hwy 52	0.63	Major Hwy
7	Turn east/southeast crossing US Hwy 52	0.13	Major Hwy
8	Turn southeast following US Hwy 52	3.91	Major Hwy
9	Turn south crossing US Hwy 52	0.11	Major Hwy
10	Turn southeast following US Hwy 52	5.44	Major Hwy
11	Continue southeast crossing US Hwy 52	0.12	Major Hwy
12	Turn south/southeast following US Hwy 52/transmission line	10.23	Major Hwy/Transmission Line
13	Continue south/southeast crossing US Hwy 52	0.12	Major Hwy
14	Turn southeast following US Hwy 52	0.90	Major Hwy
15	Turn east crossing US Hwy 52	0.13	Major Hwy
16	Turn southeast following US Hwy 52/transmission line	2.25	Major Hwy/Transmission Line
17	Turn south/southeast crossing US Hwy 52 then cross-country	0.28	Major Hwy/Cross-country
18	Turn south following field line/cross country	2.58	Field Line/Cross-country
19	Turn south/southeast cross-country	0.32	Cross-country
20	Turn south following field line	0.98	Field Line
21	Turn east following field line	0.66	Field Line
22	Turn east/southeast cross-country	0.15	Cross-country
23	Turn east following field line	0.29	Field Line
24	Turn east/northeast cross-country	0.15	Cross-country
25	Turn south following transmission line	2.51	Transmission Line
26	Turn east following field line/cross-country and enters the proposed North Rochester Substation (S) area	1.01	Field Line/Cross-country



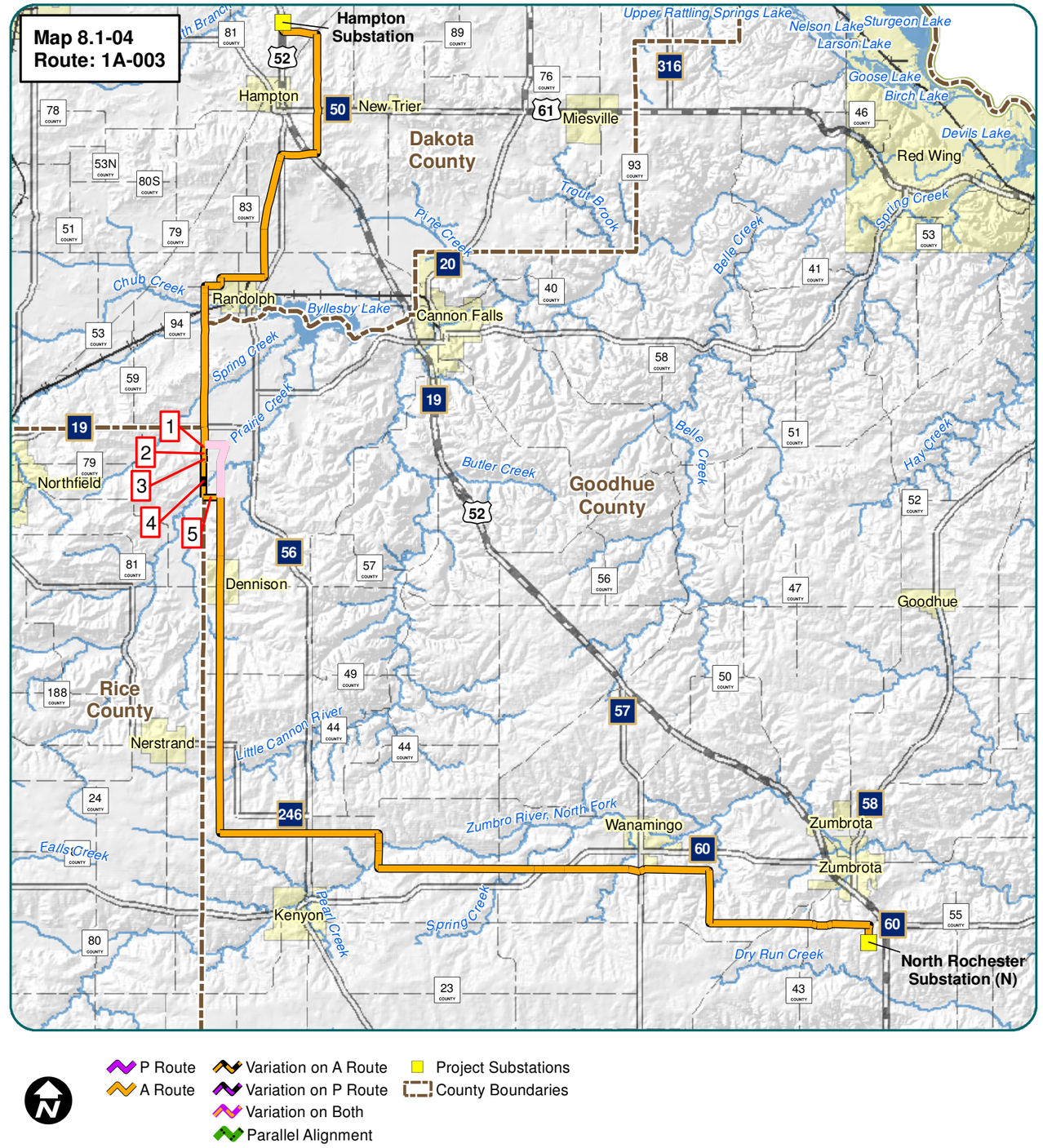
Hampton to North Rochester (1A)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	From the Hampton Substation go south following US Hwy 52	0.27	Major Hwy
2	Turn east following field line/cross-country	0.97	Field Line/Cross-country
3	Turn south following field line/cross-country	3.40	Field Line/Cross-country
4	Turn west following field line/cross-country	1.03	Field Line/Cross-country
5	Turn southwest cross-country to Douglas State Trail	0.18	Cross-country
6	Continue southwest then south following Douglas State Trail	1.98	Trail
7	Continue south following field line	1.36	Field Line
8	Turn west following field line	1.24	Field Line
9	Turn south following field line	0.23	Field Line
10	Turn west following field line	0.45	Field Line
11	Turn south following field line	0.06	Field Line
12	Continue south following 290th St. SE	0.14	Cty or Twp Road
13	Continue south following field line/cross-country to Goodhue Ave.	3.79	Field Line/Cross-country
14	Continue south following Goodhue Ave.	0.50	Cty or Twp Road
15	Turn east following field line	0.61	Field Line
16	Turn southwest then south following field line/cross-country to 5th Ave. Way	3.17	Field Line/Cross-country
17	Continue south following 5th Ave. Way	0.84	Cty or Twp Road
18	Continue south following field line/cross-country	7.00	Field Line/Cross-country
19	Turn east following field line/cross-country to 50th Ave.	4.49	Field Line/Cross-country
20	Turn south following 50th Ave.	0.28	Cty or Twp Road
21	Continue south cross-country	0.22	Cross-country
22	Continue south following 50th Ave.	0.51	Cty or Twp Road
23	Turn east following field line/cross-country to local road	4.27	Field Line/Cross-country
24	Continue east following local road	0.12	Local Road
25	Continue east following transmission line	0.25	Transmission Line
26	Continue east following MNTH 60/transmission line	0.62	Major Hwy/transmission line
27	Continue east following field line/cross-country	1.80	Field Line/Cross-country
28	Turn east/southeast cross-country	0.32	Cross-country
29	Turn northeast cross-country	0.16	Cross-country
30	Turn east following field line/cross-country	1.83	Field Line/Cross-country
31	Turn south following field line/cross-country	1.50	Field Line/Cross-country
32	Turn east following field line/cross-country	2.91	Field Line/Cross-country
33	Turn east/southeast cross-country	0.15	Cross-country
34	Turn east following field line	0.29	Field Line
35	Turn east/northeast cross-country	0.15	Cross-country
36	Turn east following field line	1.05	Field Line
37	Turn southwest then south following transmission line and enters the Proposed North Rochester Substation (N)	0.49	Transmission Line



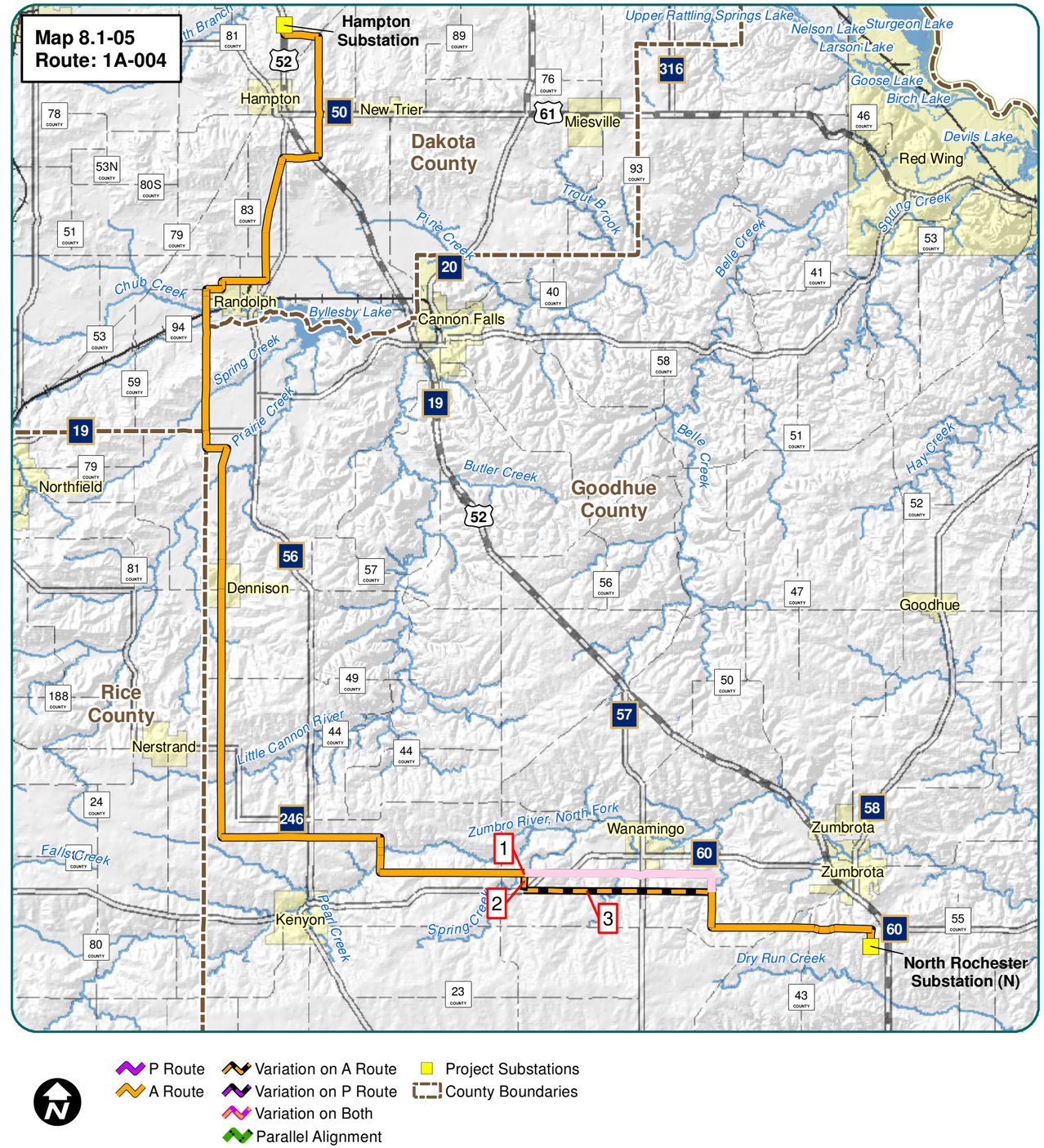
Hampton to North Rochester (1A-001)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's alternate route until 50th Ave.		
2	Continue south following 50th Ave.	0.50	Cty or Twp Road
3	Turn east following field lines to MN Hwy 60	1.10	Field Line
4	Continue east following MN Hwy 60 along existing transmission line	2.97	Major Hwy/Transmission Line
5	Continue east following 460th Street	3.31	Cty or Twp Road
6	Turn north following TH 57	0.44	Returns to applicant's alternate route - Major Hwy/Transmission Line



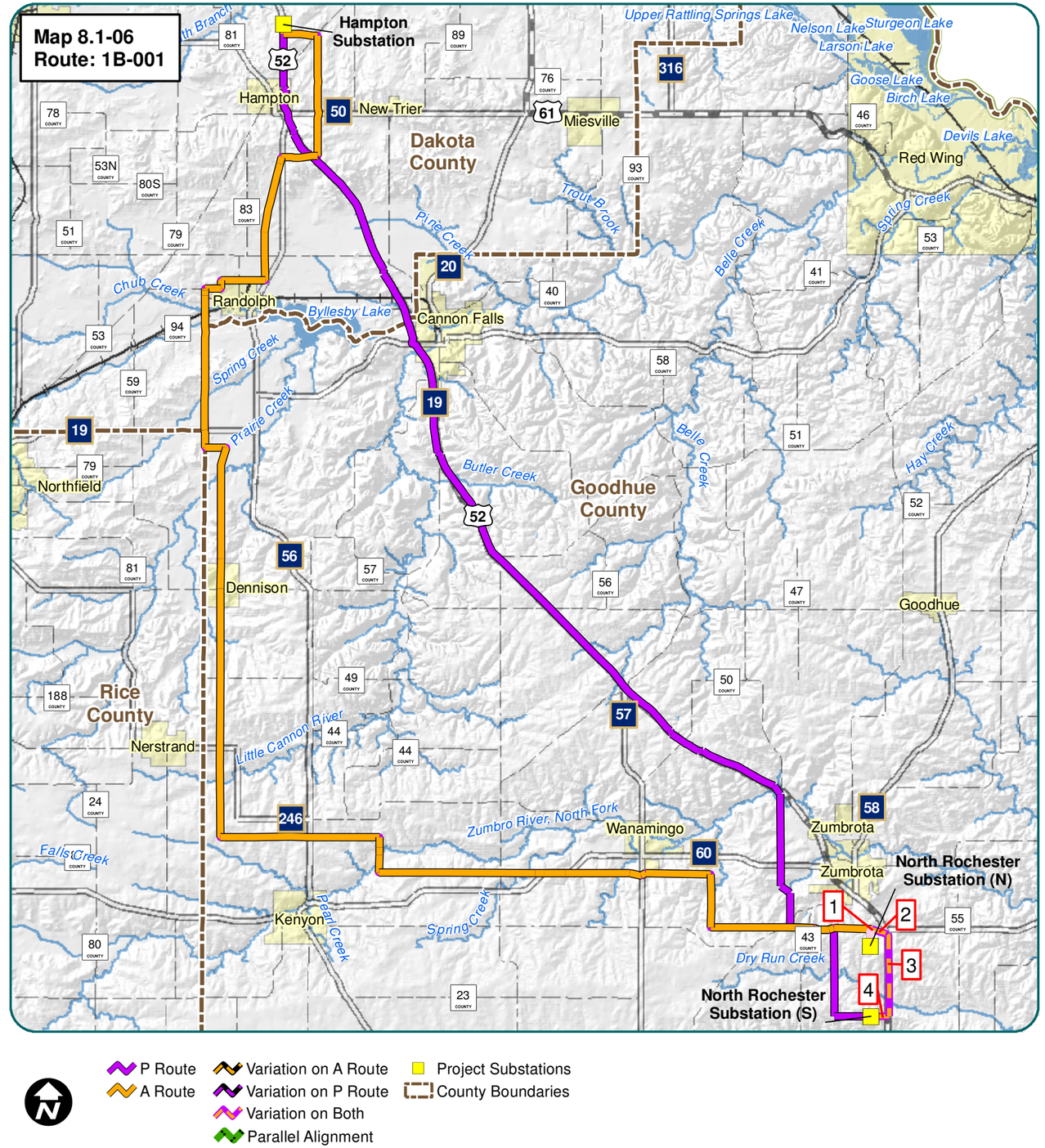
Hampton to North Rochester (1A-003)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's alternate route until Goodhue Ave.		
2	Continue south following Goodhue Ave. to 350th St.	0.33	Cty or Twp Road
3	Continue south X-Country	0.17	X-Country
4	Continue south following Goodhue Ave. to 350th St.	1.01	Cty or Twp Road
5	Turn east following 350th St.	0.49	Returns to applicant's alternate route - Cty or Twp Road



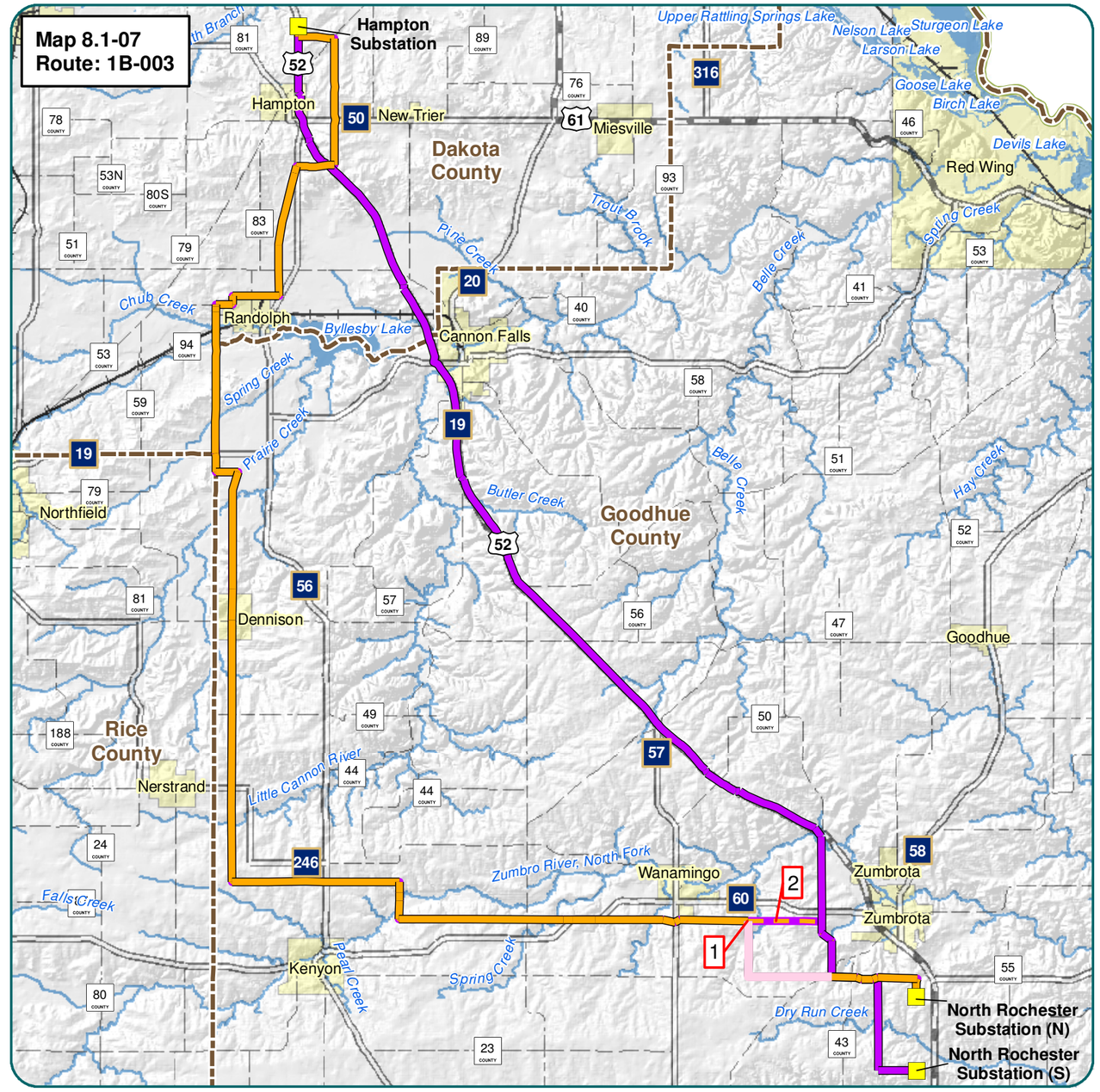
Hampton to North Rochester (1A-004)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's alternate route until 0.5 miles north of intersection MN Hwy 60 and 460th St.		
2	Turn south following existing transmission line	0.50	Transmission Line
3	Turn east following 460th St.	5.30	Returns to applicant's alternate route - Cty or Twp Road



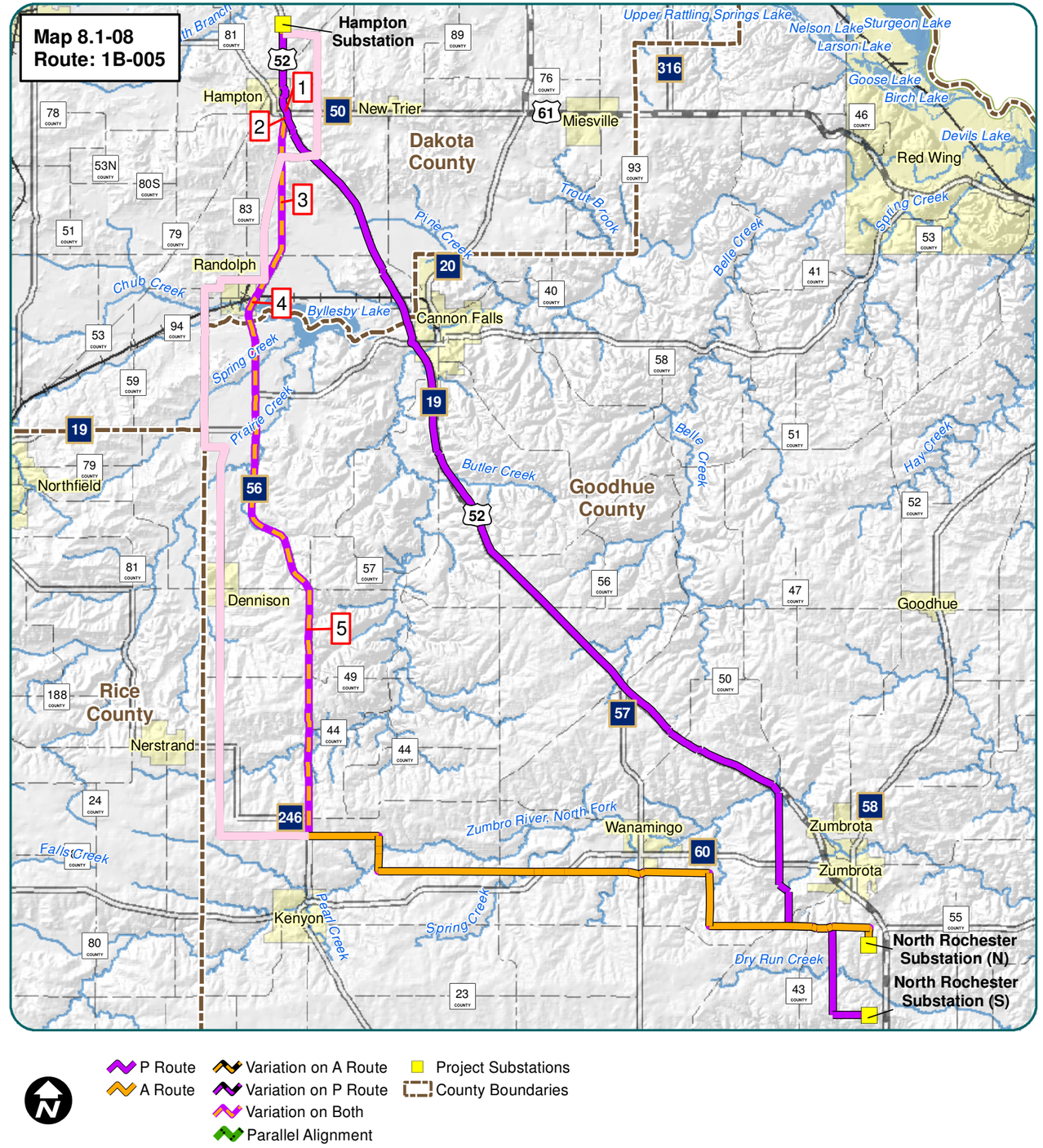
Hampton to North Rochester (1B-001)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's alternate route until 0.5 miles west of intersection MN Hwy 60 and US Hwy 52		
2	Continue east cross-country to US Hwy 52	0.50	Cross-country
3	Turn south following US Hwy 52	2.32	Major Hwy
4	Turn west following field line	0.52	Connects to North Rochester Substation (S) - Field Line



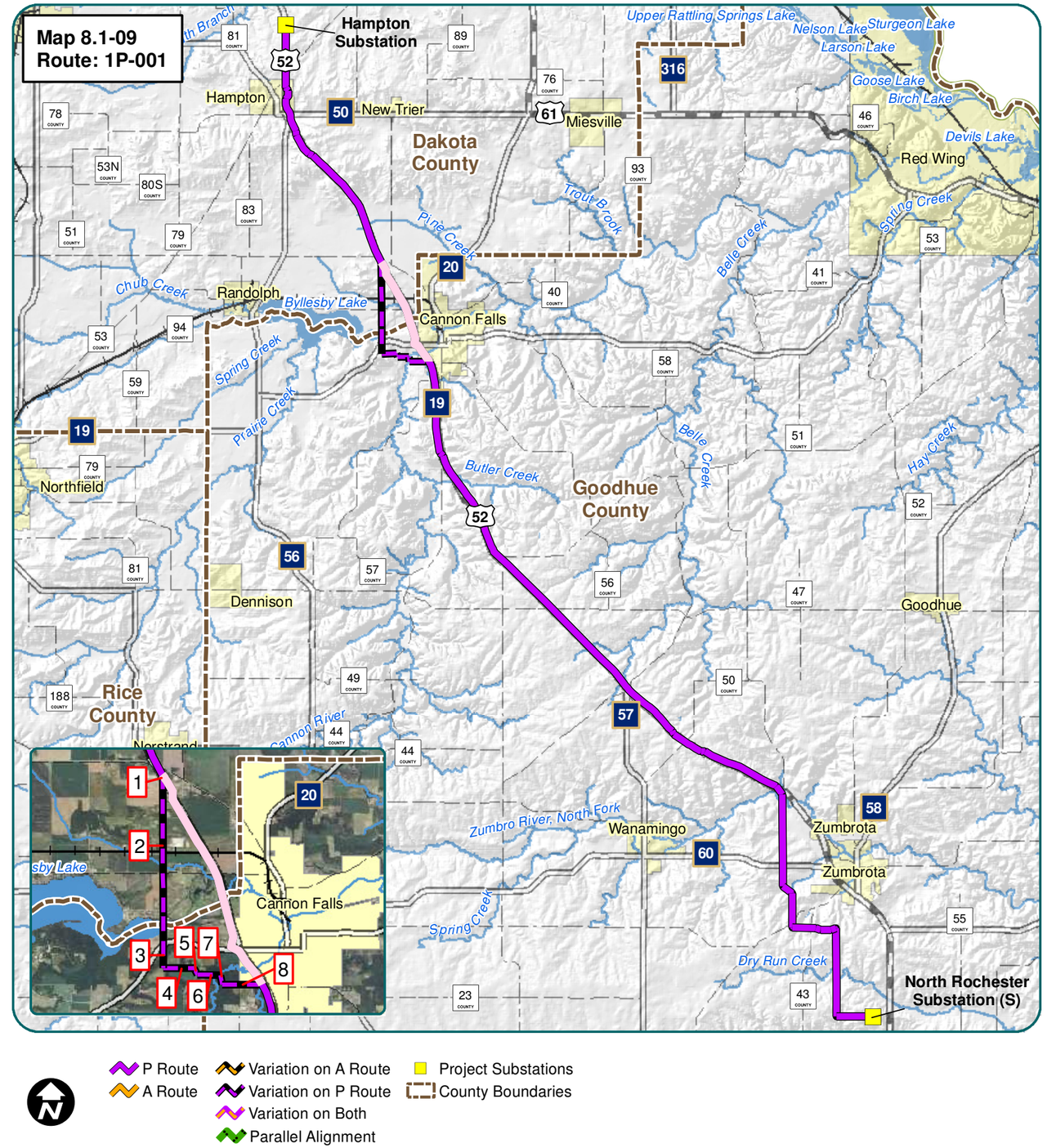
Hampton to North Rochester (1B-003)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's alternate route until 0.5 miles south of intersection 140th Ave Way and MNTH 60		
2	Continue east cross-country and following field lines	1.99	Returns to applicant's preferred route - Cross-country/field lines



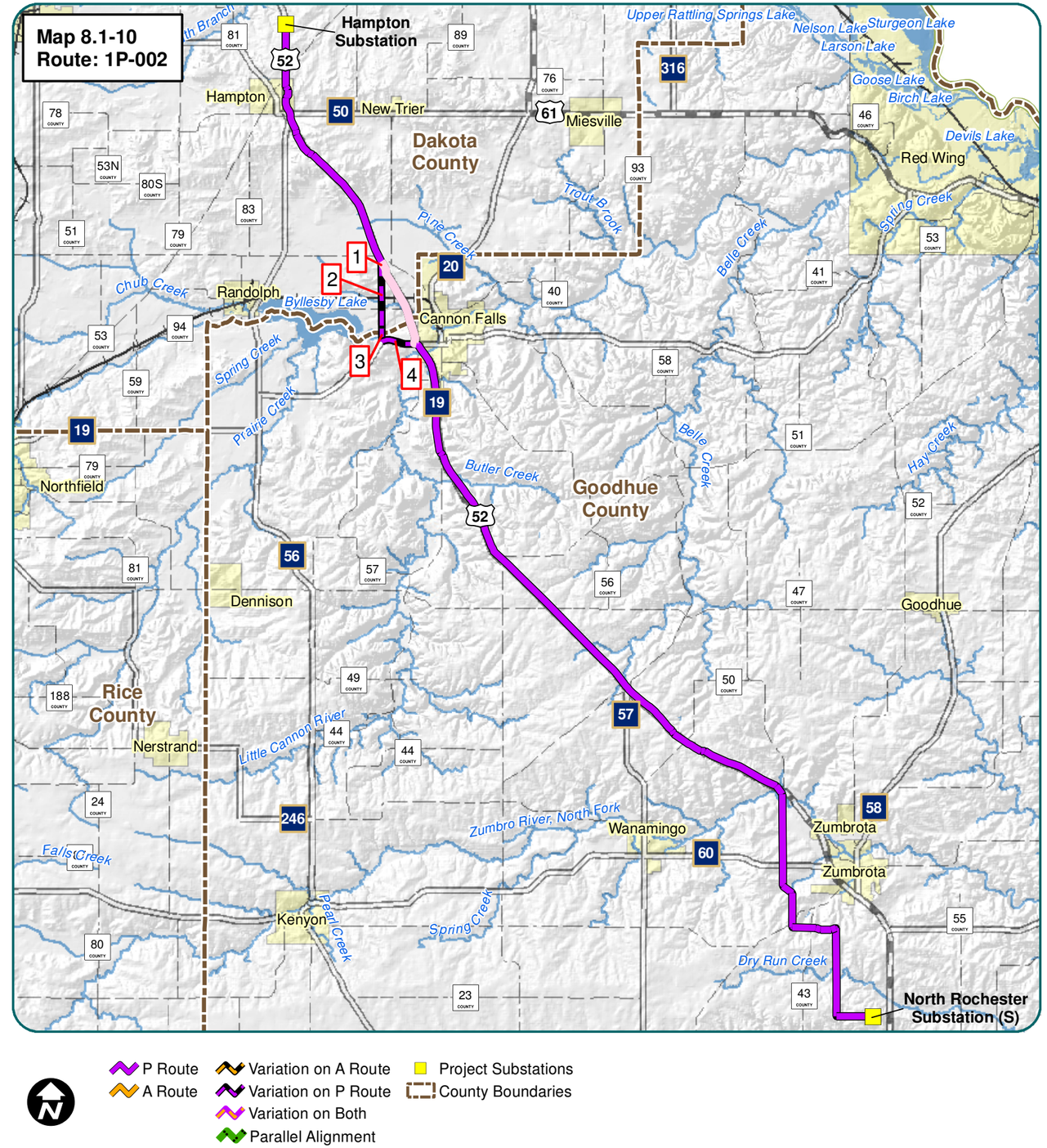
Hampton to North Rochester (1B-005)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's preferred route until the intersection of Emery Ave. and Rochester Blvd.		
2	Turn west cross-country to Emery Ave.	0.14	Cross-country
3	Turn south following Emery Ave. (MNTH 56)	3.75	Major Hwy
4	Continue southwest following Randolph Blvd.(MNTH 56)	2.14	Major Hwy
5	Continue south following MN Hwy 56	15.29	Returns to applicant's alternate route - Major Hwy



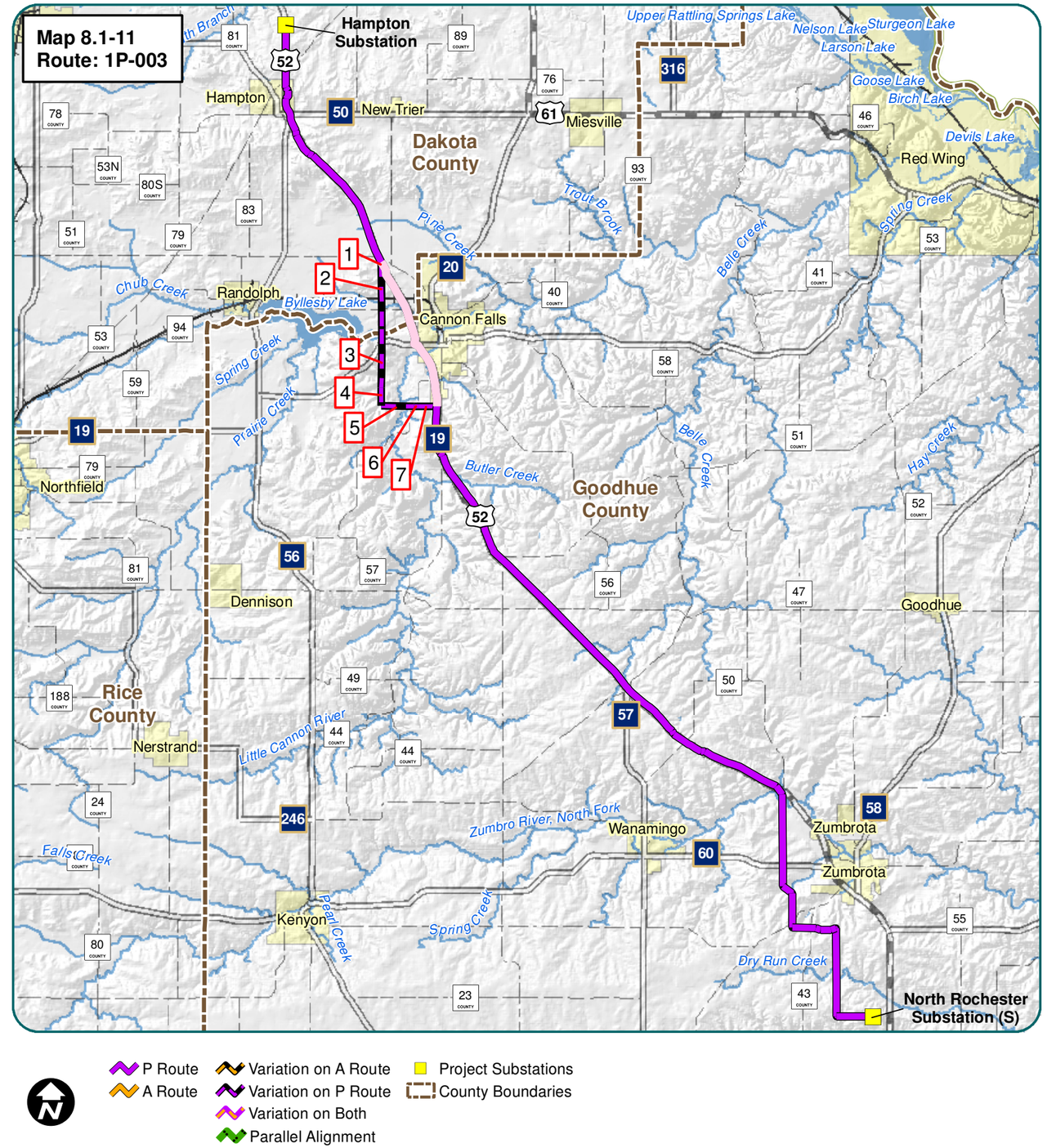
Hampton to North Rochester (1P-001)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's preferred route until the intersection of US Hwy 52 and Harry Ave.		
2	Turn south following Harry Ave.	1.90	Cnty or Twp Road
3	Continue south cross-country	0.69	Cross-country
4	Turn east following field line	0.41	Field Line
5	Turn southeast cross-country	0.10	Cross-country
6	Turn east cross-country	0.31	Cross-country
7	Turn southeast cross-country	0.13	Cross-country
8	Turn east cross-country/field lines	0.53	Returns to applicant's preferred route - Cross-country/field lines



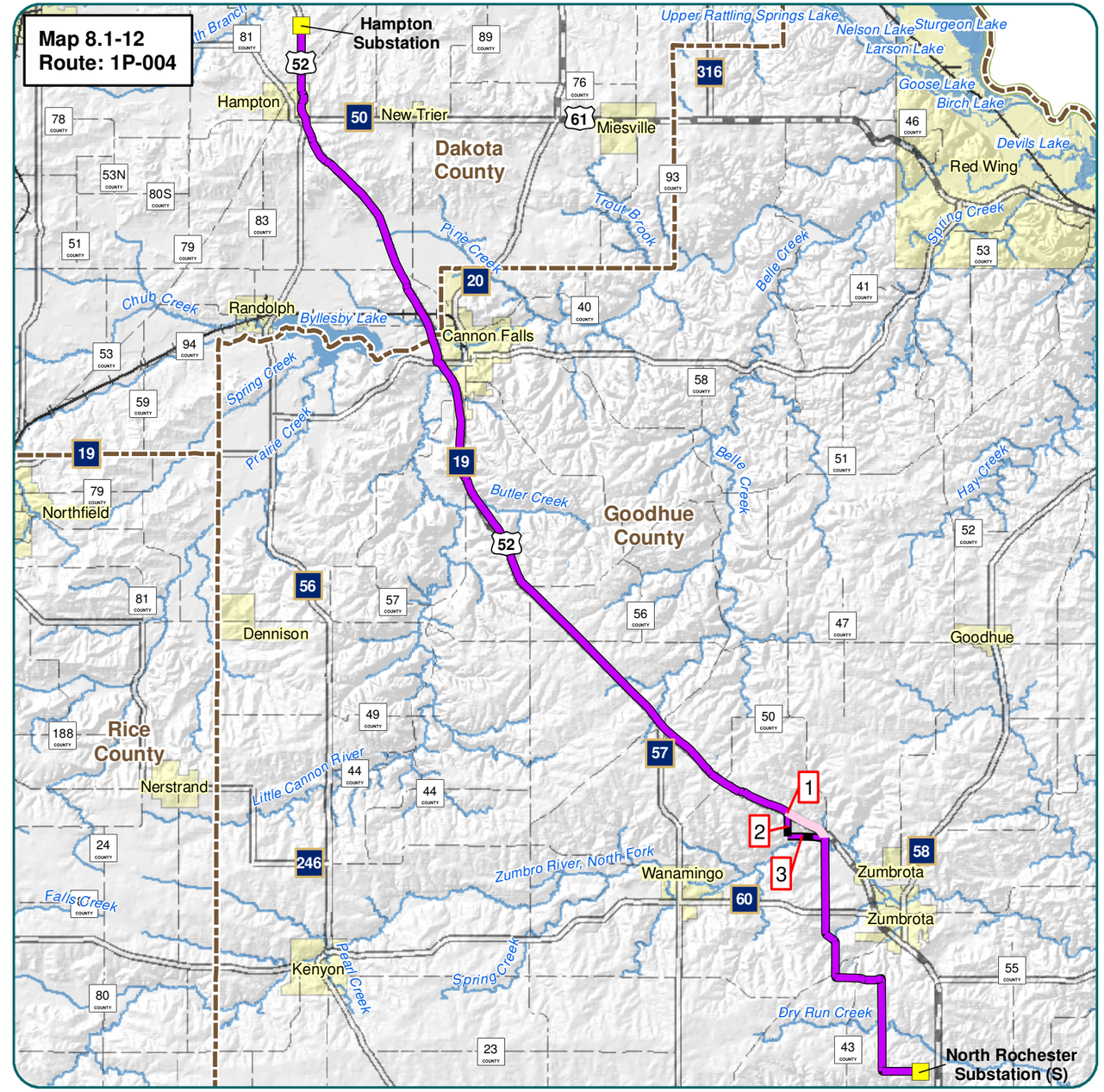
Hampton to North Rochester (1P-002)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's preferred route until the intersection of US Hwy 52 and Harry Ave.		
2	Turn south following Harry Ave.	1.90	Cnty or Twp Road
3	Continue south following existing transmission line/cross-country to MN Hwy 19	0.37	Transmission Line
4	Turn east following MN Hwy 19	0.98	Returns to preferred route - Major Hwy



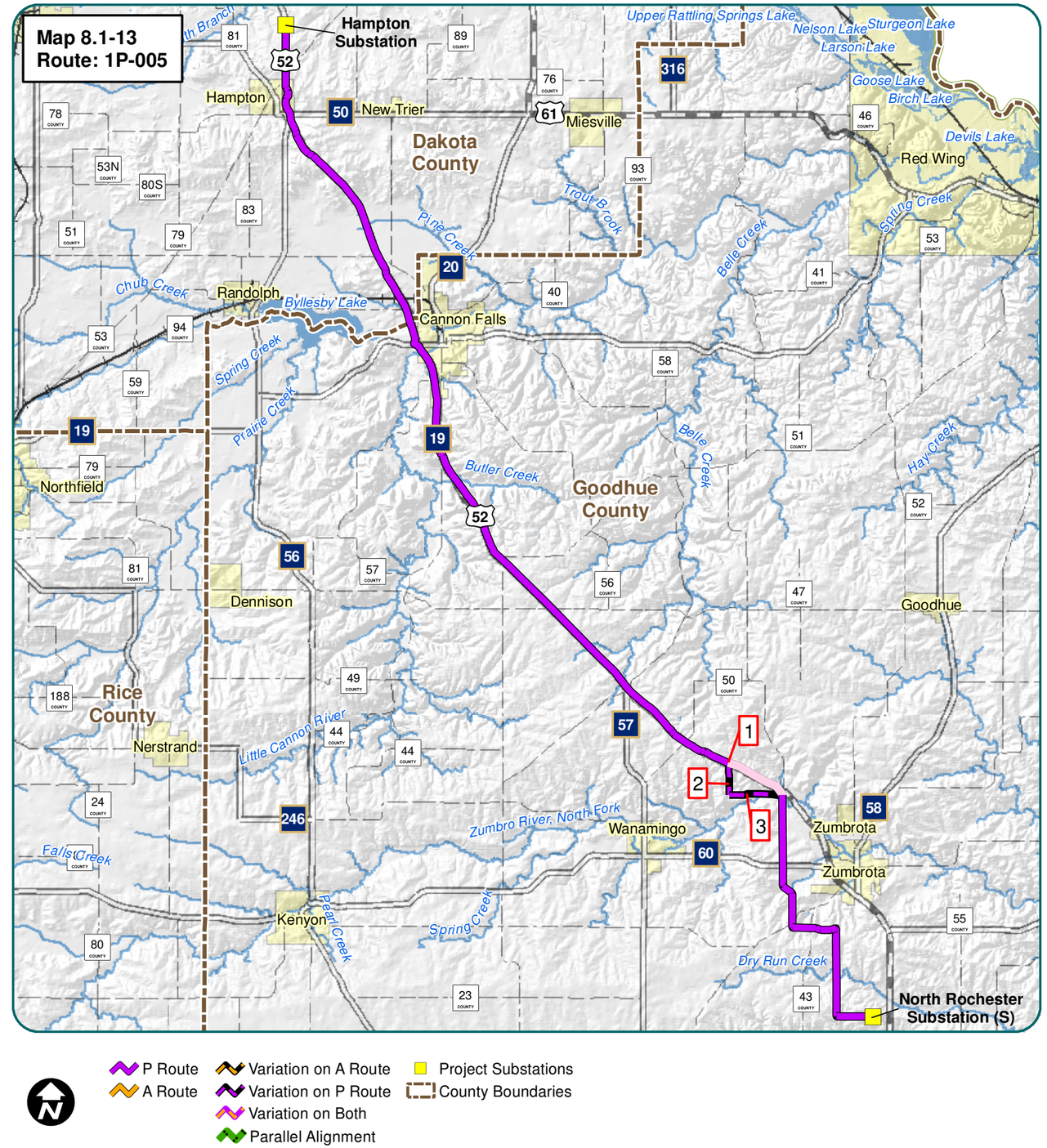
Hampton to North Rochester (1P-003)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's preferred route until the intersection of US Hwy 52 and Harry Ave.		
2	Turn south following Harry Ave.	1.90	Cnty or Twp Road
3	Continue south cross-country to Stanton Trail	1.66	Cross-country
4	Continue south following Stanton Trail	0.50	Cnty or Twp Road
5	Turn east cross-country/field lines	0.92	Cross-country/field lines
6	Continue east on 323rd St.	0.11	Cnty or Twp Road
7	Continue east cross-country/field lines	0.53	Returns to applicant's preferred route - Cross-country/field lines



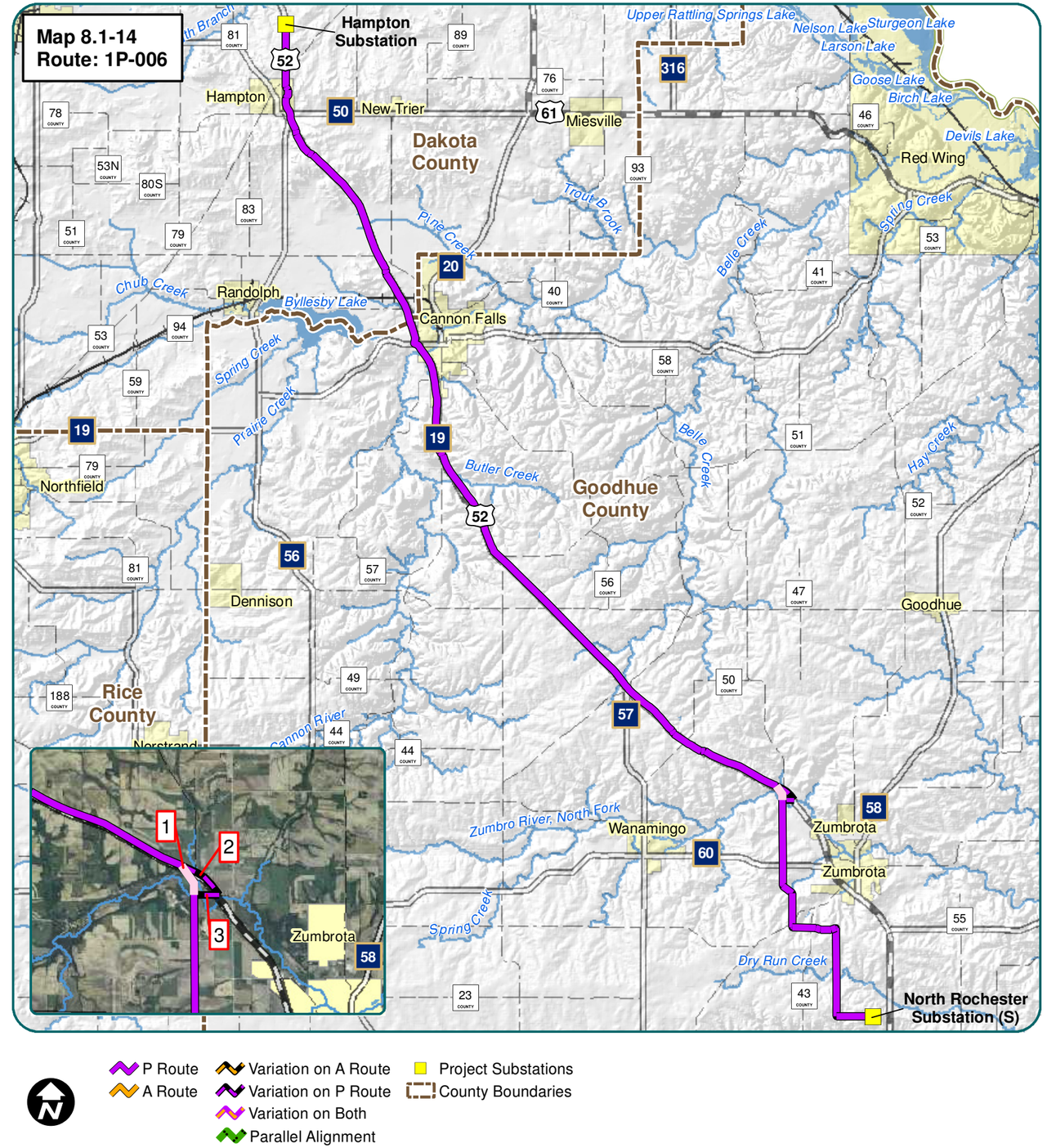
Hampton to North Rochester (1P-004)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's preferred route until 0.5 miles east of intersection US Hwy 52 and 145th Ave. Way		
2	Turn south following field line	0.68	Field Line
3	Turn east cross-country	1.00	Returns to applicant's preferred route - Cross-country



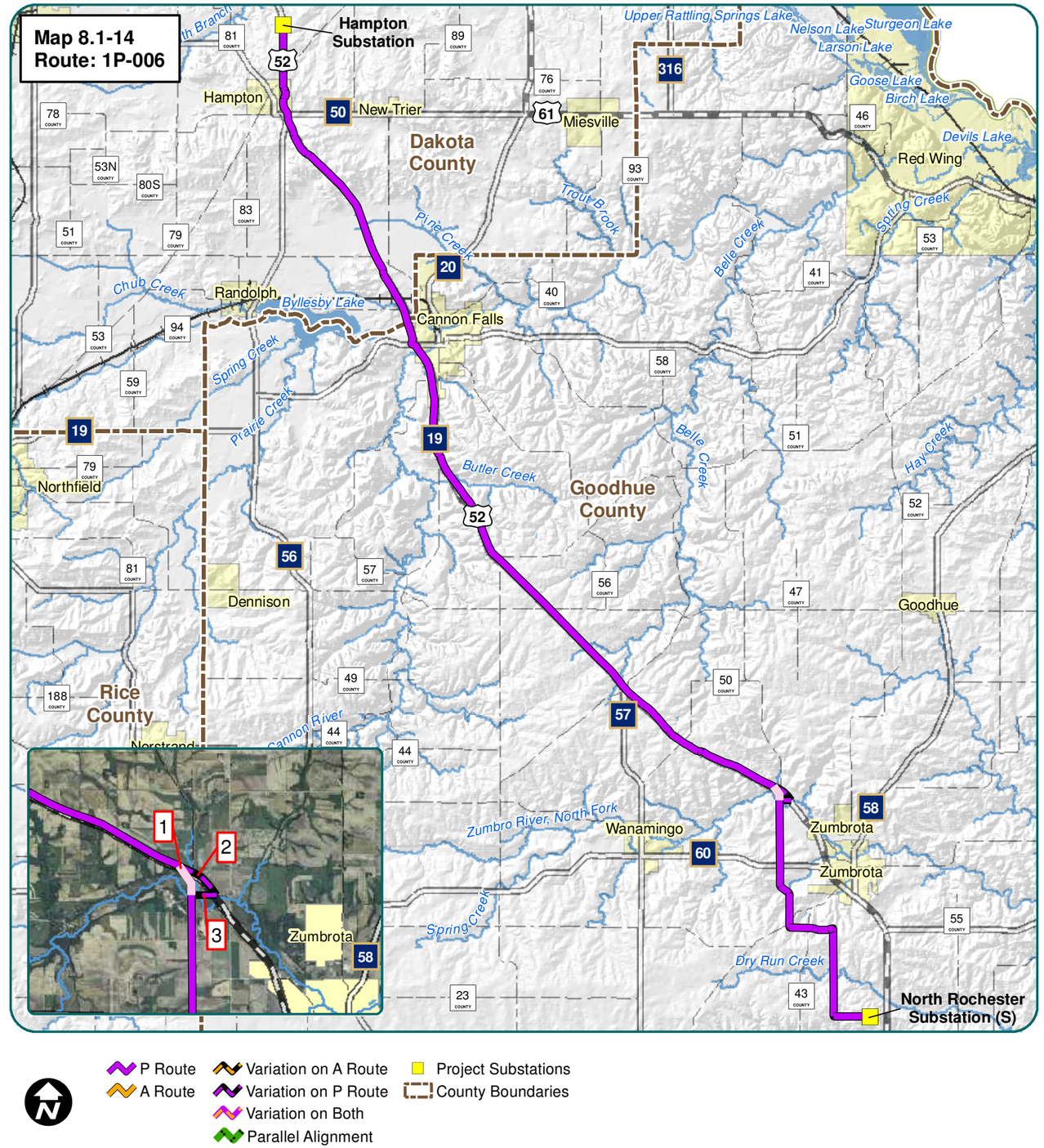
Hampton to North Rochester (1P-005)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's preferred route until the intersection of US Hwy 52 and 145th Ave. Way		
2	Turn south following 145th Ave. Way	0.92	Cnty or Twp Road
3	Turn east cross-country/field lines	1.51	Returns to applicant's preferred route - Cross-country/field lines



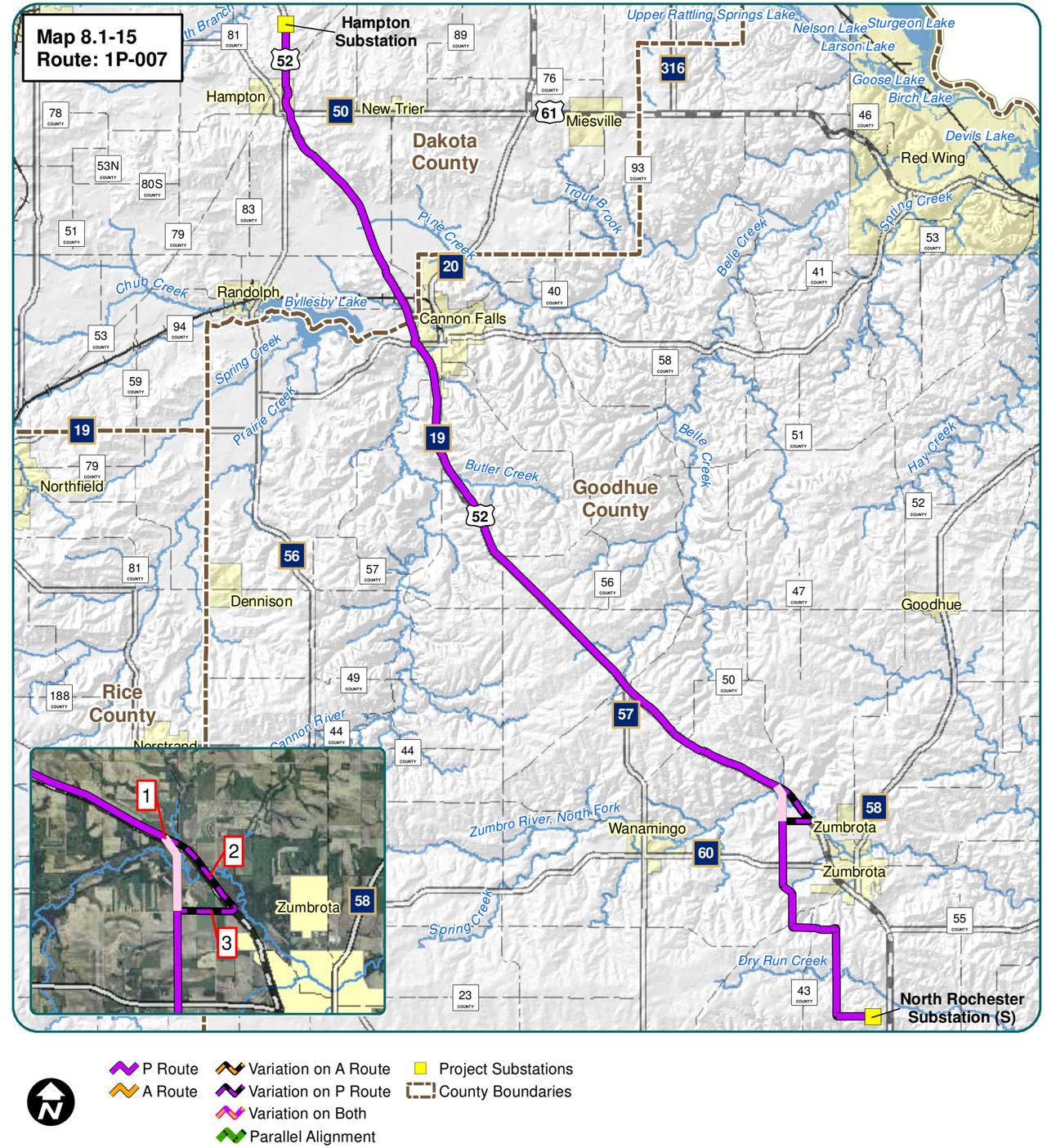
Hampton to North Rochester (1P-006)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's preferred route until 0.2 miles west of intersection US Hwy 52 and Cty Hwy 7		
2	Continue southeast following US Hwy 52	0.65	Major Hwy/Transmission Line
3	Turn west cross-country	0.33	Returns to applicant's preferred route - Cross-country



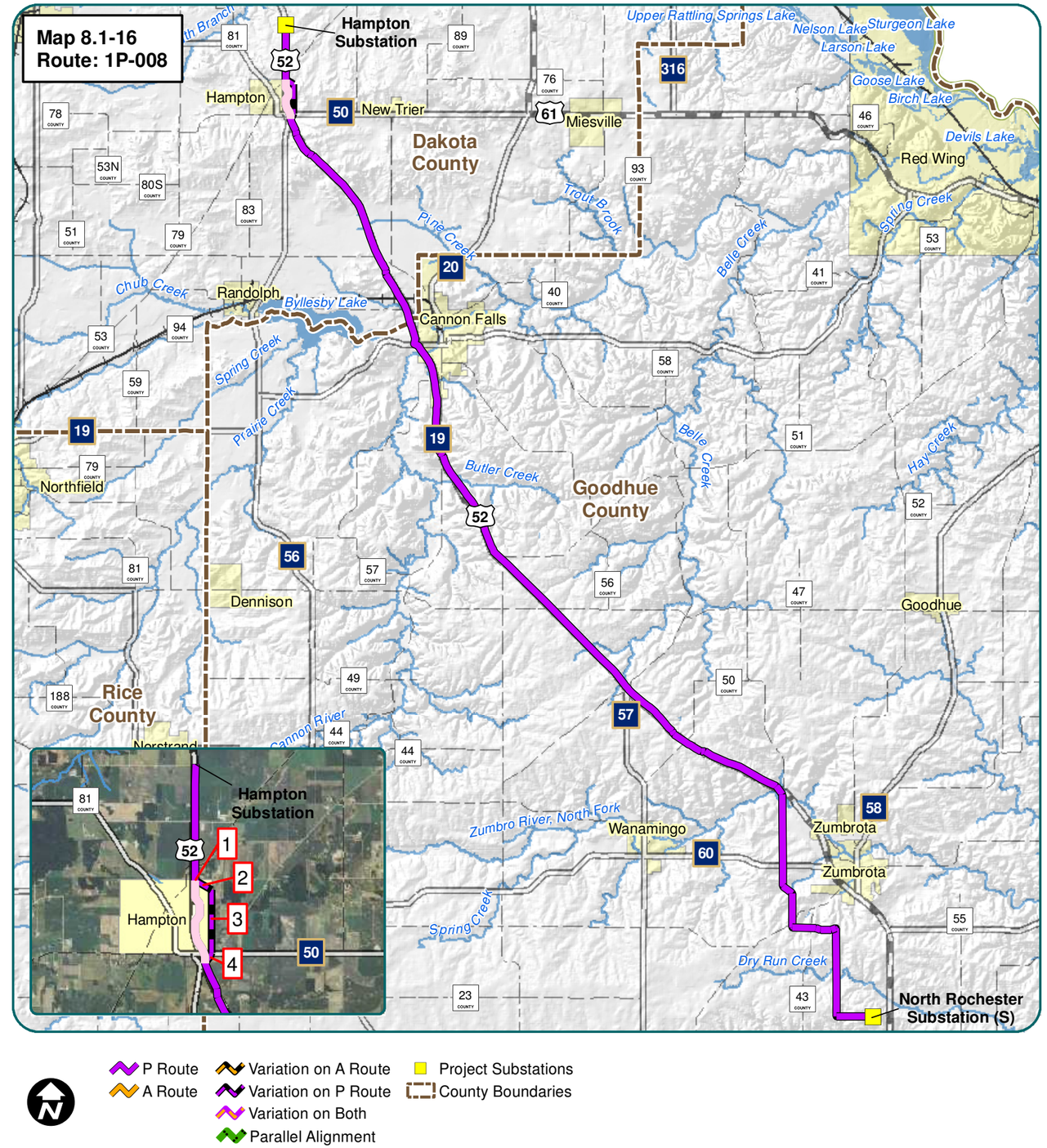
Hampton to North Rochester (1P-006)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's preferred route until 0.2 miles west of intersection US Hwy 52 and Cty Hwy 7		
2	Continue southeast following US Hwy 52	0.65	Major Hwy/Transmission Line
3	Turn west cross-country	0.33	Returns to applicant's preferred route - Cross-country



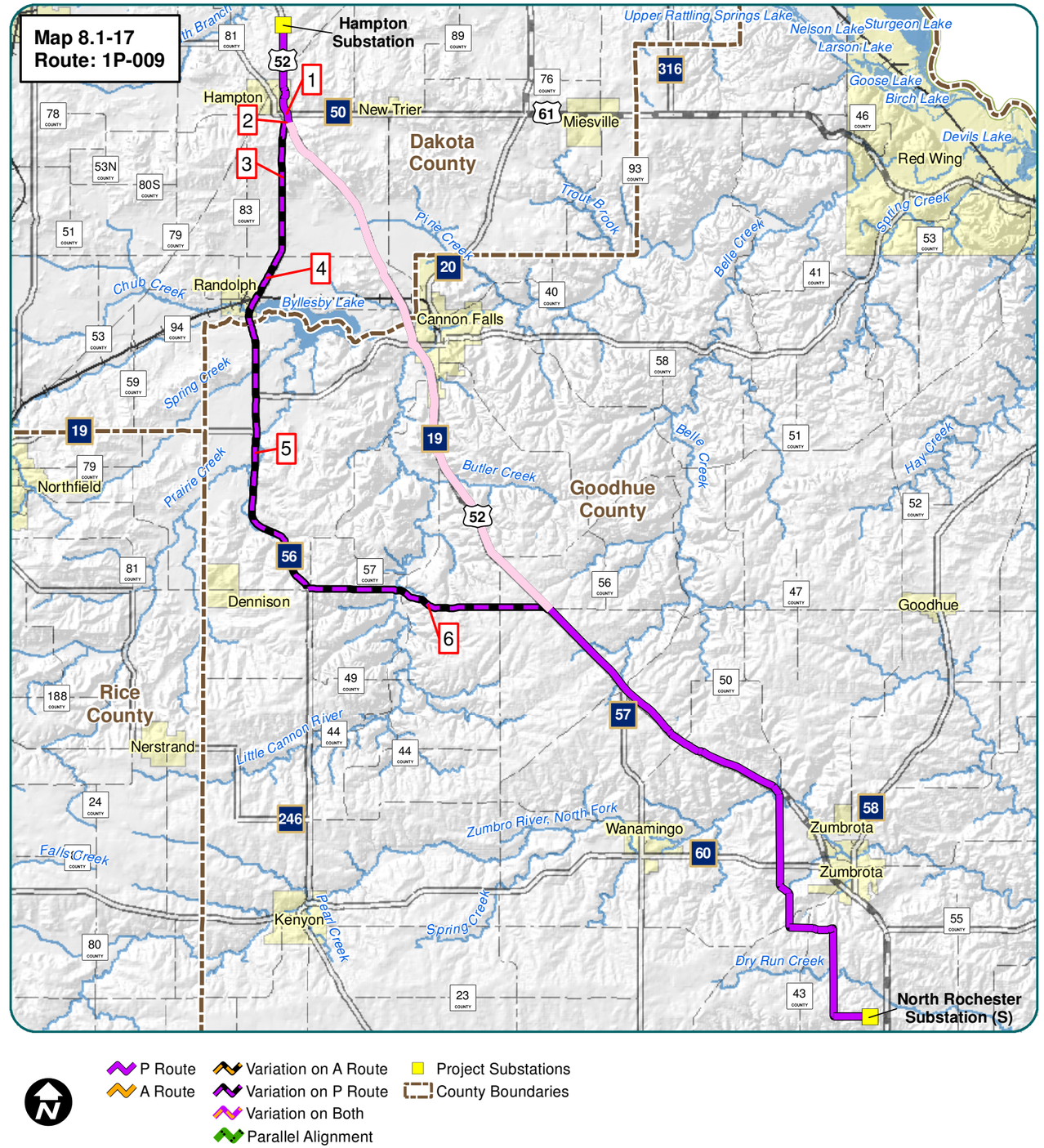
Hampton to North Rochester (1P-007)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's preferred route until 0.2 miles west of intersection US Hwy 52 and Cty Hwy 7		
2	Continue southeast following US Hwy 52	1.37	Major Hwy/Transmission Line
3	Turn west following 440th St.	0.79	Returns to applicant's preferred route - Cty or Twp Road



Hampton to North Rochester (1P-008)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's preferred route until 0.2 miles south of the intersection US Hwy 52 and CSAH 47		
2	Turn southeast cross-country	0.25	Cross-country
3	Turn south field lines/cross-country	0.84	Cross-country
4	Turn southwest cross-country	0.17	Returns to applicant's preferred route - Cross-country



Hampton to North Rochester (1P-009)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's preferred route until 0.1 miles south of the intersection of Emery Ave. and Rochester Blvd.		
2	Turn west cross-country to Emery Ave.	0.14	Cross-country
3	Turn south following Emery Ave.	3.66	Major Hwy
4	Continue south following Randolph Blvd.	2.29	Major Hwy
5	Continue south/southeast following MN Hwy 56	8.20	Major Hwy
6	Turn east following CSAH 9	7.04	Returns to applicant's preferred route - Cty or Twp Road



8.1.2 Environmental Setting – Hampton to North Rochester Substation

This segment of the route extends from the Hampton Substation, near Hampton, Minnesota, south to the proposed North Rochester Substation, near the Pine Island, Minn. This segment is located within Dakota, Goodhue, and Rice Counties, Minnesota. According to the Minnesota Department of Natural Resources (DNR) Ecological Classification System (ECS), this segment is located within three subsections of the Eastern Broadleaf Forest Province – the Rochester Plateau, Oak Savanna, and Blufflands. The Eastern Broadleaf Forest Province covers much of the southeastern corner of Minnesota and into Wisconsin. The Eastern Broadleaf Forest Province represents a transition between semiarid portions of the state that were historically prairie and semi-humid mixed conifer-deciduous forests to the northeast (DNR 2010d). Precipitation in the Eastern Broadleaf Forest Province increases annually from about 24 inches in the northwestern portion to about 35 inches in the southeastern portion (DNR 2010d).

The Rochester Plateau subsection, which dominates this segment, consists of level to gently rolling till plains. Topography is largely controlled by underlying glacial till, with sinkholes, indicative of karst topography, present in the southwestern portion of the subsection (DNR 2010e). Presettlement vegetation consisted of tallgrass prairie and bur oak savanna.

The Oak Savanna and Blufflands subsections cover relatively small portions of Segment 1. The Oak Savanna subsection consists of loess plain over bedrock or till, with gently rolling topography (DNR 2010f). Historically, bur oak savanna was the primary vegetation, with areas of prairie and maple-basswood forest also common (DNR 2010f).

The Blufflands subsection consists of loess-capped plateau deeply dissected by river valleys (DNR 2010g). Topography is controlled by underlying glacial till along the western edge of the subsection, where loess is several feet thick; sinkholes are common in the southwestern portion (DNR 2010g). Historically tallgrass prairie and bur oak savanna were the major vegetation types on ridge tops and dry upper slopes, while red oak-white oak-shagbark hickory-basswood forests were present on moister slopes, and red oak-basswood-black walnut forests in protected valleys (DNR 2010g).

The communities located within Segment 1 include the City of Hampton, Hampton Township, Vermillion Township, Randolph Township, City of Randolph, Sciota Township, Cannon Falls Township, City of Cannon Falls, Stanton Township, Leon Township, Minneola Township, Wanamingo Township, City of Wanamingo, Pine Island Township, Roscoe Township, Holden Township, and Northfield Township, Cherry Grove Township, City of Dennison, Kenyon Township, Stanton Township, Warsaw Township. With the exception of Cannon Falls, these communities are primarily agricultural.

8.1.3 Socioeconomic Setting – Hampton to North Rochester Substation

This segment is located in a relatively sparsely populated, agricultural part of Minnesota and crosses parts of Dakota, Rice, and Goodhue Counties. The primary industries for Dakota, Rice, and Goodhue Counties include education, health and social services, manufacturing, and retail trade. Table 8.1.3-1 shows the differences in population across the counties spanned by this segment of the project.

8.1.4 Analysis of Route Alternatives for the Hampton to North Rochester Substation

Resources are discussed in the same order in which they appeared in Section 7 and include the following:

- **8.1.4.1** Public health and safety
- **8.1.4.2** Property values
- **8.1.4.3** Human settlement
- **8.1.4.4** Land use compatibility
- **8.1.4.5** Land-based economies
- **8.1.4.6** Rare and unique natural resources
- **8.1.4.7** Flora and fauna
- **8.1.4.8** Water resources
- **8.1.4.9** Electronic device interference
- **8.1.4.10** Archaeological and historic resources
- **8.1.4.11** Transportation and public services
- **8.1.4.12** Recreation
- **8.1.4.13** Air quality

Table 8.1.3-1 Socioeconomic statistics in Dakota and Goodhue Counties - Segment 1

County	2009 Population	2009 Total Minority Population	2009 Minority Population Percentage	1999 Per Capita Income
Dakota	396,500	45,201	11.4	$27,008
Rice	62,723	3,387	5.4	$19,695
Goodhue	45,836	1,742	3.8	$21,934

Source: U.S. Census Bureau (1999, 2009)

8.1.4.1 Public Health and Safety - Analysis of Segment Alternatives for the Hampton to North Rochester Substation Segment

Discussion of potential public health and safety impacts associated with this project are discussed in Section 7.1. Primary public health and safety concerns are associated with:

- Electric and Magnetic Fields (EMFs);
- Implantable Medical Devices; and
- Stray Voltage.

These features do not vary notably between the proposed route alternatives in this segment. Thus, the nature of impacts to public health and safety are not expected to vary notably from one route alternative to the next.

Any perceived risks to health and safety from EMFs, stray voltage or impacts to implantable medical devices are 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 segment is provided in Section 8.1.4.3. Additional health and safety concerns along with proposed mitigation procedures are discussed in Section 7.1.

8.1.4.2 Property Values - Analysis of Segment Alternatives for the Hampton to North Rochester Substation Segment

Public input gathered earlier in the permitting process for the project revealed that many people are concerned about the potential effect of proximity to transmission lines on the value of their property. The relationship between property values and proximity to transmission lines has been thoroughly researched, but no clear cause-and-effect relationship has been identified. A recent literature review of this topic found that the research to date has identified little or no effect on sales prices due to proximity to transmission lines. In studies that identified a relationship between property values and proximity to transmission lines, the effect generally dissipated with time and distance. The effects that were found ranged from an approximately 2 percent to 9 percent decrease in property value. In some cases, particularly with development of vacant land, increases in property value were found (Jackson and Pitts 2010).

An additional potential adverse effect of transmission lines on adjacent properties is on the ability of homeowners and developers to obtain Federal Housing Administration (FHA) and/or Housing and Urban Development (HUD) loans. Loan guidelines for these agencies contain provisions restricting funds for properties in close proximity to transmission lines (FHA/HUD 1999).

In any event, the primary strategy to mitigate impacts to property values would be to avoid residences as much as possible during route selection. Potential project impacts on property values are discussed in detail in Section 7.2. Information on the proximity of homes to each proposed route alternative within this segment is provided in Section 8.1.4.3.

8.1.4.3 Human Settlement-Analysis of Segment Alternatives for Hampton to North Rochester Substation Segment

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 7.3 provides an overview of each of these potential impact areas.

The extent to which particular route alternatives may impact human settlement is primarily a function of proximity to the proposed route alternatives. Noise impacts, for example, are most likely to cause concern where people are nearby to experience these impacts – in areas where the line is located near human settlement features such as homes, businesses, schools, daycares, hospitals, and churches. In addition, in areas where the proposed route alternatives are in close proximity to human settlement areas there is a greater tendency for certain features of these settlement areas to be impacted. Tree groves and wind breaks, for example, are frequently established in areas of human settlement 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 the human settlement features that they were established to protect.

Displacement impacts also depend upon the proximity of the transmission line to homes. As discussed in Section 7.3, 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). Displacement would occur where any occupied structure (residence or business) is located within the 150-foot ROW of the proposed route alternatives.

Because of the close correlation between the proximity of the proposed route alternatives to human settlement features and the extent and magnitude of impacts on human settlement, this impact summary focuses on the proximity of each of the proposed route alternatives to homes, schools, churches, cemeteries, nursing homes and hospitals.

Table 8.1.4.3-1 and Figure 8.1.4.3-1 summarize the proximity of the proposed route alternatives to human settlement features within Segment 1.

Map 8.1-20 provides an overview of each of these human settlement features along the proposed route alternatives.

Table 8.1.4.3-1 compares the number of homes within 75 feet, 150 feet, 300 feet, and 500 feet of the proposed centerline of each route alternative in this segment. This figure shows that route alternatives that share ROW with existing infrastructure (particularly US Highway (Hwy) 52), including the P route alternatives, tend to have more homes within the proposed 1000-foot route width. While these route alternatives do have a higher "house count," they meet Minnesota's non-proliferation requirements and have the advantage of minimizing new infrastructure impacts. Within this segment, the A route alternatives tend to have fewer homes nearby. Each of the route alternatives in this segment includes a least one residence within the proposed ROW.

Field verification to confirm house locations indicated a need to adjust the mapped position of one residence along the 1P route alternative (along US Hwy 52, just south of the junction with Goodhue County Hwy 8). As a result, this residence has been identified as being located within the ROW of the 1P route alternative. At this location, no significant obstacles appear to prohibit relocation of the centerline to the opposite side of the road to avoid displacement. Similarly, the mapped position of one residence along the 1A route alternative was adjusted as a result of field verification (near Dennison, just north of where the 1A route alternative crosses Goodhue County Hwy 9), and has been identified as being within the ROW. Again, no significant obstacles appear to prohibit relocation of the centerline to the opposite side of the road to avoid displacement. All route alternatives proposed during scoping for this segment of the route encounter at least one site where adjustment would be necessary to avoid displacement. With a total of seven houses within the ROW, route alternative 1P-009 has the greatest number of potential displacement impacts.

Figure 8.1.4.3-1 summarizes the proximity of the proposed route alternatives to other human settlement features including schools, churches, cemeteries, and hospitals. St. Paul Lutheran Church and School is located within the 1000-foot route width of route alternatives 1P and 1P-004 through 1P-008. None of the other route alternatives proposed within this segment include schools within the 1,000-foot route width. All of the 1P route alternatives, with the exception of 1P-003 and 1P-009 pass within 1 mile of the Cannon Falls Community hospital. Urland Church is located within the 1000 foot route width of 1P-009 and this route alternative, as well as several others (1B-001, 1B-003, 1B-005, 1A-001, 1A-003, 1A-004), include another unknown church (noted during field review) within the 1000-foot route width. Only one cemetery, the Urland Church cemetery (within the 1000-foot route width of route alternative 1P-009), is located within the 1000-foot route width of any of the route alternatives.

Pinch Points

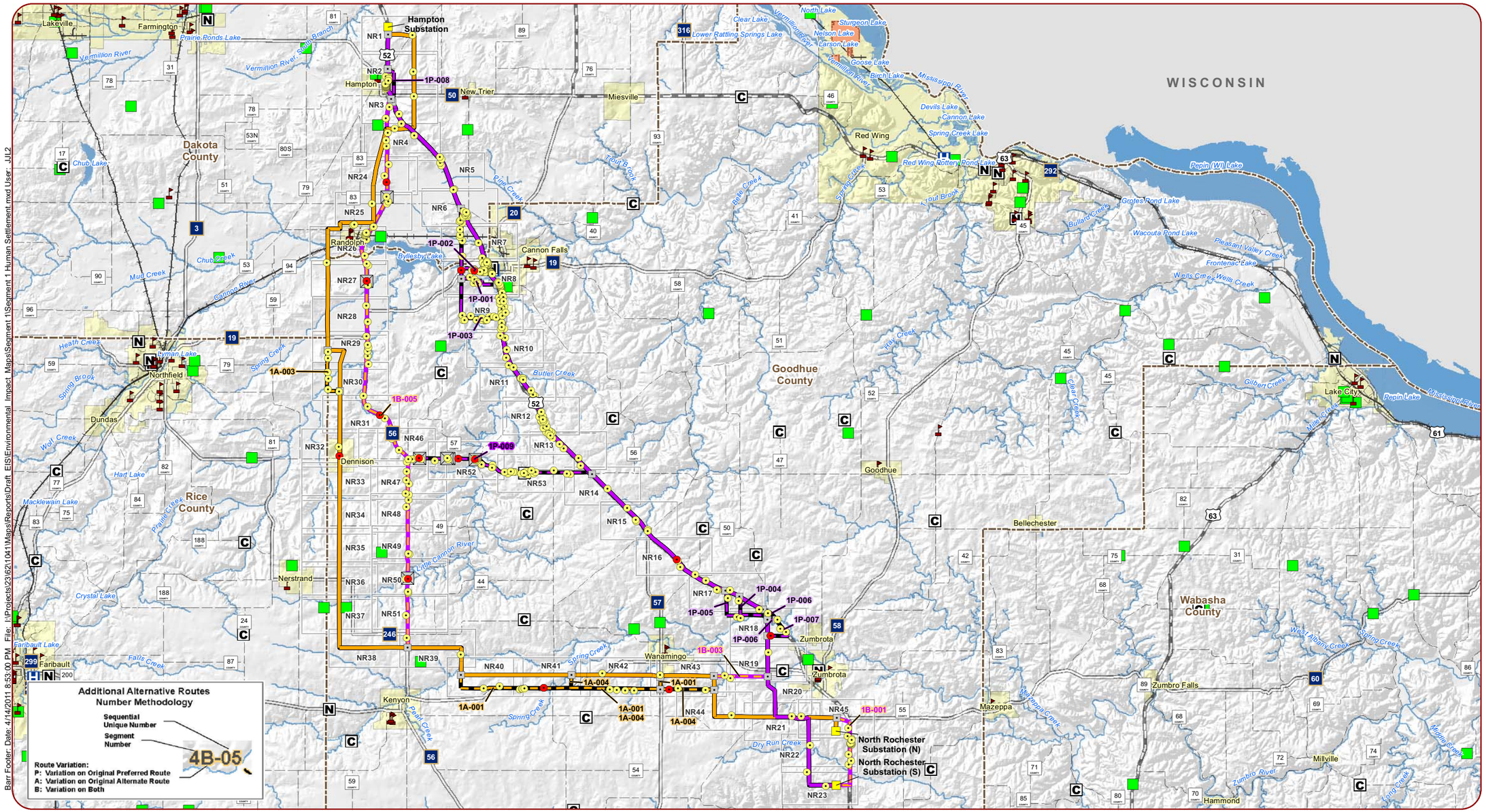
A review of GIS data and a field survey were completed to aid in identifying pinch points, or narrow areas along each of the proposed route alternatives. In these areas, human settlement features or important resources are located on either side of the proposed route and avoiding impacts by modifying route alignment may not be possible. Table 8.1.4.3-2 provides an overview of the number of critical pinch points along each of the proposed route alternatives in Segment 1. A more detailed discussion of each of these pinch points is provided below (see also, Map 8.1-20).

Within this segment, pinch points are only located along route alternatives 1P-009 and 1B-005. The first pinch point on 1P-009 occurs along Minnesota (MN) Hwy 56, just north of 280th Street East in Dakota County where a house is located on the east side of the highway within 75 feet of the proposed route centerline.

Table 8.1.4.3-1 Proximity of homes along each proposed route alternative - Segment 1

Route Alternative	Number of Homes				
	Within 0-75 feet	Within 76-150 feet	Within 151-300 feet	Within 301-500 feet	Total homes within 500 feet
1P	1	13	32	103	149
1P-001	2	12	30	80	124
1P-002	2	23	33	84	142
1P-003	2	13	27	70	112
1P-004	1	13	33	102	149
1P-005	1	13	33	103	150
1P-006	1	13	33	103	150
1P-007	2	14	33	104	153
1P-008	1	13	29	90	133
1P-009	7	20	38	48	113
1B-001	1	8	13	15	37
1B-003	1	3	10	8	22
1B-005	4	7	31	37	79
1A-001	2	8	11	10	31
1A-003	1	3	13	8	25
1A-004	2	5	10	9	26
1A	1	3	9	8	21

Source: Field Survey observations, comments from project public meetings and aerial photograph interpretation by AECOM (Barr 2010)



Barr Footer: Date: 4/14/2011 8:53:00 PM File: i:\Projects\23\62\1041\Maps\Reports\Draft_EIS\Environmental_Impact_Maps\Segment 1\Segment 1 Human Settlement.mxd User: JJ12

NR1 Appendix A Map Index

0 1.5 3 6 Miles

0 2.5 5 10 Kilometers

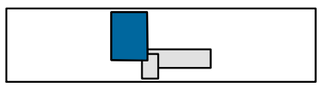
For detailed maps refer to Appendix A.
Refer to Appendix B for information on data sources.

Original Alignments
- P Route
- A Route

Additional Alternative Routes
- Variation on P Route
- Variation on A Route
- Variation on Both

- Project Substations
- County Boundaries
- Residences within 75 Feet of Alternatives
- Residences within 500 Feet of Alternatives
- Pinch Points
- Hospitals
- Nursing Homes
- Schools
- Churches
- Cemeteries
- Tribal Lands

Map 8.1-20
Human Settlement Map
Segment 1, Hampton Substation to North Rochester Substation Area



A second pinch point on 1P-009 occurs further south on MN Hwy 56, immediately north of the intersection with 310th Street. At this location a residence is located on the east side of the highway within 75 feet of the proposed centerline. In the area where 1P-009 and 1B-005 overlap along MN Hwy 56, the two pinch points noted above may also cause concern if the 1B-005 route alternative was chosen.

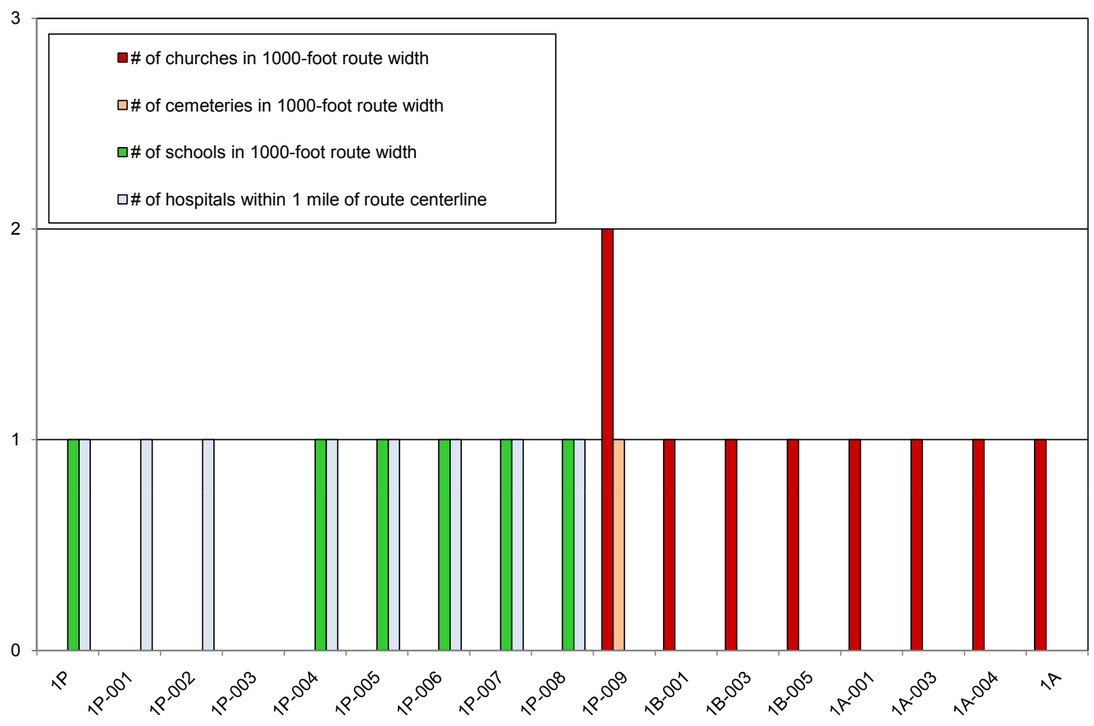
Four other pinch points on 1P-009 occur along County Hwy 9 in Goodhue County. The easternmost pinch point along County Hwy 9 occurs where a residence is located within 75 feet of the proposed centerline on the north side of the road and two other residences are located on the opposite side of the road immediately to the east and immediately to the west (Figure 8.1.4.3-2). Residences and a silo located on opposite sides of the road create additional pinch points located along County Hwy 9 just west of 41st avenue (Figure 8.1.4.3-3). Finally, a pinch point occurs immediately west of the junction of County Hwy 9 and County Hwy 14, where a residence is located on one side of the road and a shed is located on the opposite side of the road, both within the potential ROW of the proposed line (Figure 8.1.3.2-4).

One additional pinch point is located on route 1B-005 on MN Hwy 56, just north of 410th Street. At this location a residence is located on the east side of the road within 75 feet of the proposed centerline, and other buildings are located on the opposite side of the road.

Table 8.1.4.3-2 Pinch points - Segment 1

Route Alternative	Number of Pinch Points
1P-009	6
1B-005	3

Figure 8.1.4.3-1 Proximity of proposed route alternatives to various human settlement features - Segment 1



Source: Field Survey observations, comments from project public meetings and aerial photograph interpretation by AECOM (Barr 2010)

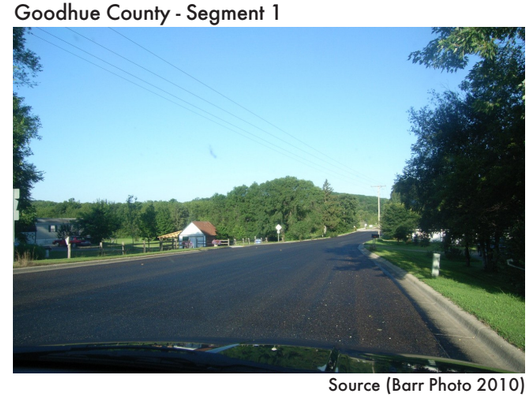
Figure 8.1.4.3-2 Pinch point on route 1P-009 along County Highway 9 in Goodhue County - Segment 1

Source (Barr Photo 2010)

Figure 8.1.4.3-3 Pinch point on route 1P-009 along County Highway 9, west of 41st Avenue in Goodhue County - Segment 1

Source (Barr Photo 2010)

Figure 8.1.4.3-4 Pinch point on route 1P-009 along County Highway 9, east of County Highway 14 in Goodhue County - Segment 1



Source (Barr Photo 2010)

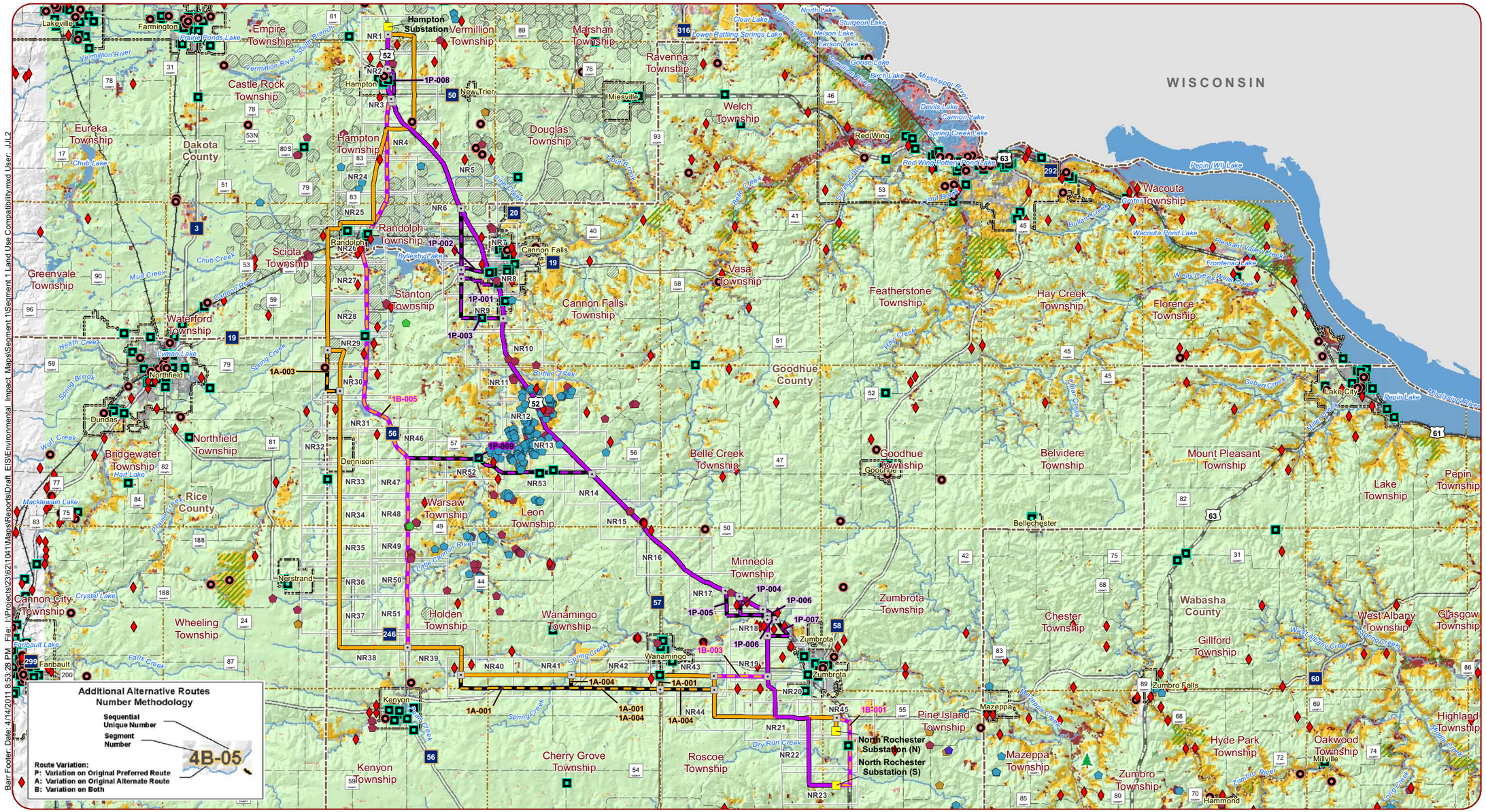
8.1.4.4 Land Use Compatibility – Analysis of Segment Alternatives for the Hampton to North Rochester Substation Segment

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 route alternatives with these land uses.

Current land cover types along the 150-foot ROW for each route alternative in this segment have been reviewed and are summarized in Figure 8.1.4.4-1.

All route alternatives within this segment are located primarily on or adjacent to agricultural land. The 1P route alternatives parallel Hwy 52 and therefore run adjacent to more developed land than other proposed route alternatives in this segment. Some proposed route alternatives run adjacent to recreation and special interest areas, which are discussed in detail in Section 8.1.4.12.

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 also affects the operation of irrigation equipment (if present) as well as crop spraying operations. Stray voltage and cattle are also a compatibility concern. Single pole towers will 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 impact does not affect many people. Areas along Hwy 52 are already extensively impacted by human modifications to the landscape and the marginal impact of the proposed project is not expected to fundamentally change the visual character of



NR1 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
- P Route
- A Route

Additional Alternative Routes
- Variation on P Route
- Variation on A Route
- Variation on Both

- Project Substations
- Aggregate Mines
- Tree Farms
- Soil and Groundwater Contamination Sites
- LUST Sites
- Forest Stands
- Pivot Irrigation
- County Boundaries

Land Cover
- Upland Conifer Forest
- Upland Deciduous Forest
- Lowland Conifer Forest
- Lowland Deciduous Forest
- Upland Conifer-Deciduous mix
- Aquatic Environments
- Crop/Grass
- Non-Vegetated
- Shrubland

Karst Features
- Spring
- Stream Sink/Sieve
- Sinkhole
- Surface Tile Inlet
- Surface Tile Outlet
- Miscellaneous

Map 8.1-21
Land Use Compatibility Map
Segment 1, Hampton Substation to North Rochester Substation

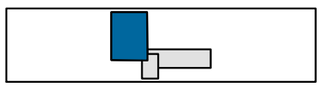
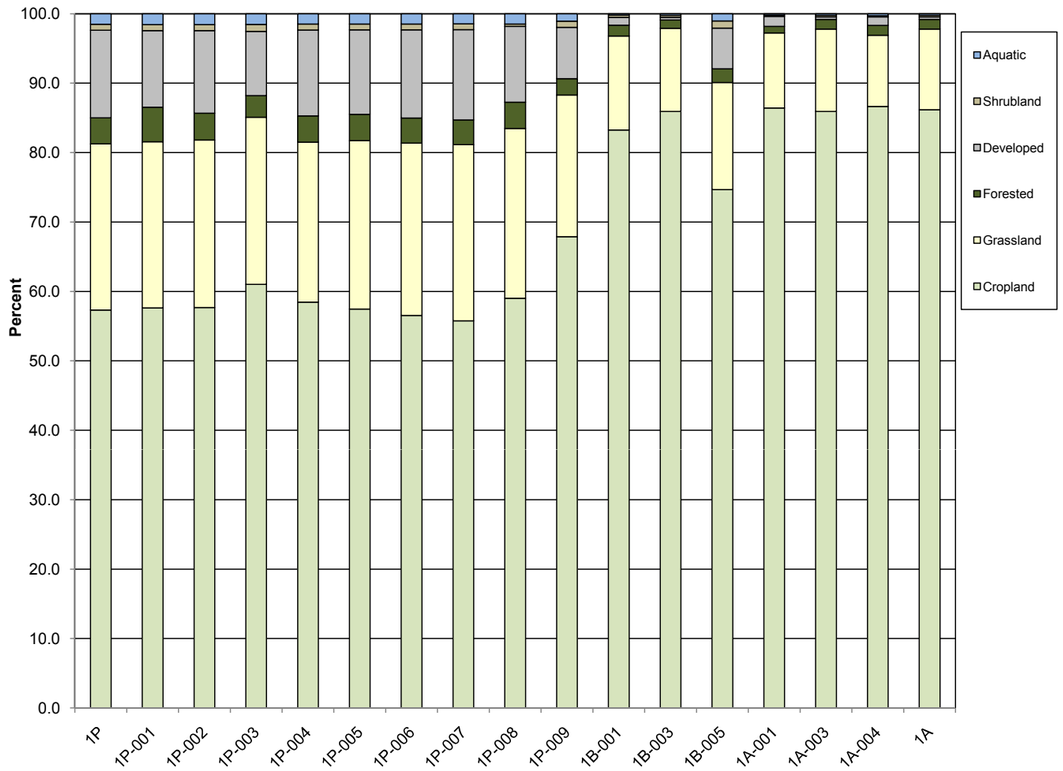


Figure 8.1.4.4-1 Land cover types along each route alternative - Segment 1



Source: GAP data

this corridor. Impacts during tower construction include destruction of crops within the grading/construction zoning and the compacting of soils by construction equipment and activities.

The major impact on residential areas may include changes to viewsheds for some properties and potential minor noise impacts for properties in close proximity to the transmission line. Individual property values may be negatively affected depending on proximity to, and views of, the transmission line. 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. 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 periodic conflicts with use and enjoyment of the property.

While local approvals are not required for construction and operation of the transmission line, local ordinances and land use plans were examined for potential future impacts of the proposed project on future development plans. These ordinances and plans are available as part of the route permit application and available through each city and county government. In general, the project's various route alternatives are not inconsistent with city and county ordinances and land use plans. There are some cases where a given route alternative would be inconsistent with a local ordinance or land use plan. These cases are discussed below.

In Dakota County, 11 route alternatives would cross through portions of Lake Byllesby Regional Park. This activity would be inconsistent with Dakota County Park Ordinance #107, the goal of which is "…to provide for the protection and preservation of land in its natural state…." The route alternatives that would cross this county park are 1A-001, 1A-003, 1A-004, 1B-001, 1B-003, 1B-005, 1P-001, 1P-002, 1P-003, 1P-009, and 1A.

The Goodhue County Zoning Ordinance includes protections from development or encumbrance for aggregate resources, agricultural land, bluff lands, and shore lands. Portions of the proposed project that cross these resources or zoning districts could permanently impact the resources the county has sought to protect, and would not be subject to county scrutiny by way of a conditional use permit or zoning change.

Mitigation

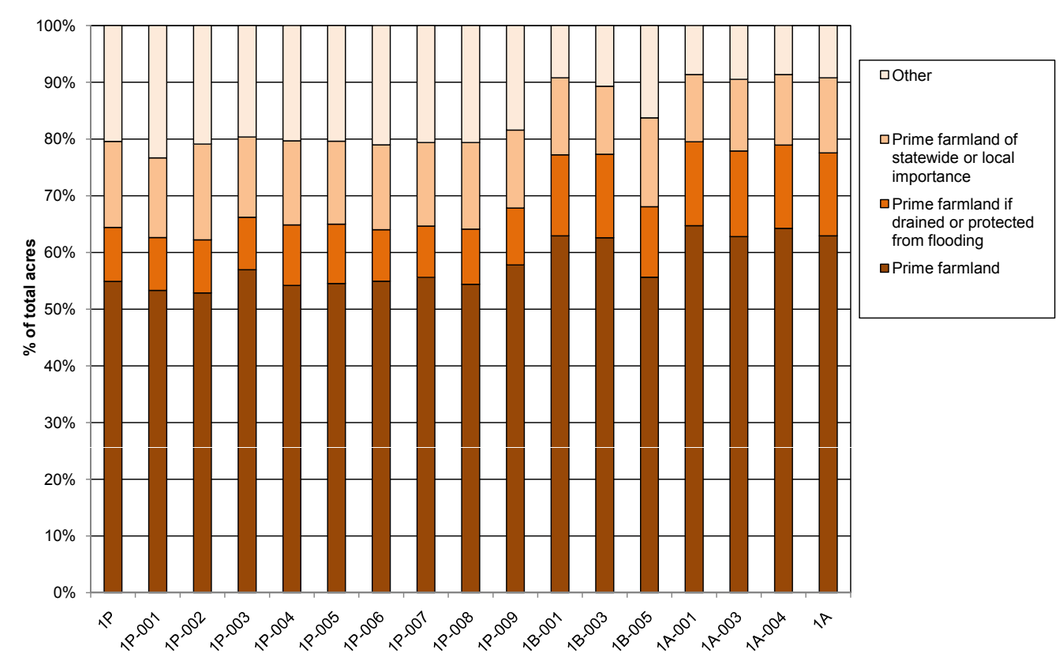
General mitigation measures to minimize impacts to land use compatibility are discussed in Section 7.4. Within this segment, impacts to land use compatibility can be mitigated by routing choices and through best management practices (BMPs) to reduce impacts to agricultural areas during construction, operation, and maintenance.

8.1.4.5 Land Based Economies – Analysis of Segment Alternatives for the Hampton to North Rochester Substation Segment

The primary land based economies along this segment are agricultural. Agricultural economies in the area include crops, livestock, dairy farms, and bee-keeping. Crops in Dakota County primarily include peas, corn and soybeans, and livestock consists primarily of turkeys, cattle and calves (U.S. Department of Agriculture (USDA) 2007a). Crops in Goodhue County primarily include corn and soybeans, and livestock consists primarily of turkeys, hogs, and pigs (USDA 2007b). Agricultural crops in Rice County primarily include corn and soybeans; livestock raised include turkeys, hogs, and pigs (USDA 2007c).

Much of the land in this segment is designated as "prime farmland," (Figure 8.1.4.5-1) indicating land that 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

Figure 8.1.4.5-1. Prime farmland and non-farmland within ROW of route alternatives - Segment 1



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

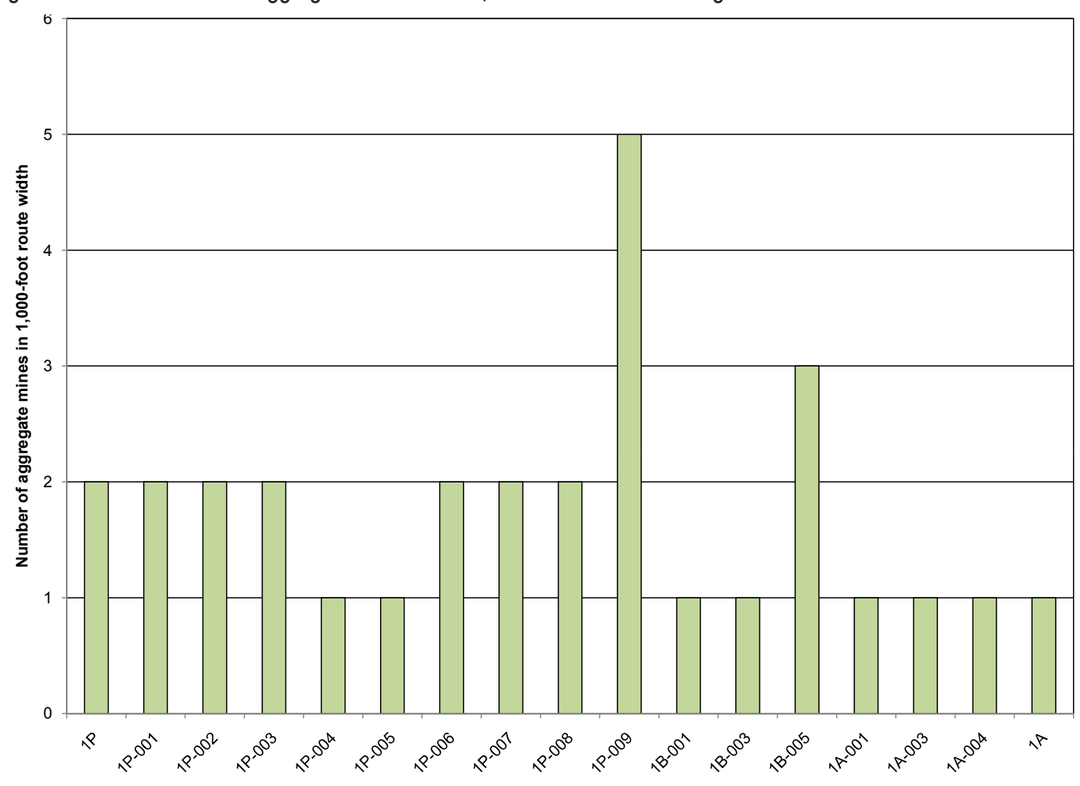
structure placement along the route centerline. It is estimated that the permanent impacts in agricultural fields would be 55 square feet per pole. During construction, temporary impacts, such as soil compaction and crop damage within the ROW, are likely to occur. Temporary impacts in agricultural fields are estimated to be one acre per pole for construction activities.

The percentage of prime farmland and farmland of statewide or local importance within the ROW does not change notably from one route alternative to the next within this segment.

Impacts to organic farms present within this segment would be avoided through implementation of mitigative measures discussed in Section 7.5 and below.

Mines and future reserve areas have been identified along the route alternatives in this segment using data collected from the Minnesota Department of Transportation (DOT) Aggregate Sources Interactive Map; these mines are shown on Map 8.1-21. All of the route alternatives in this segment have 2 or less aggregate mines within the 1,000-foot route width, except 1P-009 and 1B-005, which have 5 and 3 aggregate mines within the 1,000-foot route width, respectively (Figure 8.1.4.5-2). Minn. Stat. § 84.94 requires each Minnesota county to identify and protect aggregate resources, in addition to locating areas to mine and develop long-term comprehensive plans that incorporate aggregate resources (DNR 2007). Goodhue and Rice Counties were identified by the DNR as being a region of many crushed stone operations, and southwestern Dakota County was identified as being a source of horticultural peat (DNR 1998).

Figure 8.1.4.5-2. Number of aggregate mines within 1,000-foot route width - Segment 1



Source: Minnesota Department of Transportation and Minnesota Department of Natural Resources

Some forested areas are present along the various route alternatives in this segment (see Figure 8.1.4.4-1 and Map 8.1-21). However, there are no known economically important forestry resources present along the route alternatives in this segment; thus, impacts to forest-based economies in this segment are not anticipated. Impacts to other forested areas within this segment are discussed in Section 8.1.4.7.

Mitigation

As discussed in Section 7.5, the applicant has worked with the Minnesota Department of Agriculture (MDA) to develop an Agricultural Impact Mitigation Plan (AIMP) for this project (AIMP is available in Appendix E). The overall objective of the AIMP is to identify measures that utilities must take to avoid, mitigate, repair and/or provide compensation for impacts that may result from transmission line construction on agricultural land in Minnesota. The AIMP includes an appendix that outlines mitigation measures and procedures specific to 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 can be minimized and mitigated.

Impacts to aggregate resources could be minimized by choosing a route alternative other than 1P-009 or 1B-005.

8.1.4.6 Rare and Unique Resources – Analysis of Segment Alternatives for the Hampton to North Rochester Substation Segment

Rare and unique resources were identified within the 150-foot ROW and within one mile of each route alternative evaluated in Segment 1 using the DNR Natural Heritage Information System (NHIS) database, DNR Minnesota County Biological Survey (MCBS) database, and DNR state-designated railroad prairies data (see Appendix B). The discussion here is focused on federally-listed and state-listed threatened and endangered species. State species of special concern and non-status species within Minnesota are not discussed; however, data on these species are available in Appendix F. It is anticipated that most waterbodies and watercourses could be spanned, thus limiting potential impacts to threatened and endangered aquatic species. Accordingly, aquatic species are mentioned here but are not the focus of discussion. Data on native plant communities, animal assemblages, and MCBS sites are discussed generally in this section; however, additional, more detailed data are provided in Appendix F.

Table 8.1.4.6-1 and Map 8.1-22 summarize the rare and unique resources documented within the 150-foot ROW and one mile of the route alternatives within this segment (see Appendix A for more detailed maps). In order to protect rare resources from exploitation or destruction, Map 8.1-22 and the maps in Appendix A do not indicate the names of species or communities identified within the NHIS database.

Twelve threatened and endangered species have been documented within one mile of the various route alternatives in Segment 1; these include six plant species, two of which are federally listed, one snake, one turtle, one bird, two mussels, and one fish. The six rare plant species include the state and federally endangered dwarf trout lily (*Erythronium propullans*), the state and federally threatened prairie bush clover (*Lespedeza leptostachya*), and the following state threatened plant species: glade mallow (*Napaea dioica*), kitten tails (*Besseya bullii*), tubercled rein-orchid (*Platanthera flava var. herbiola*), and valerian (*Valeriana edulis var. ciliate*). The non-plant species documented within one mile of the route alternatives in this segment include the following state threatened species: the timber rattlesnake (*Crotalus horridus*), the Blanding's turtle (*Emydoidea blandingii*), the loggerhead shrike (*Lanius ludovicianus*), the ellipse mussel (*Venustaconcha ellipsiformi*), the mucket mussel (Actinonaias ligamentina), and the paddlefish (*Polyodon spathula*). The ellipse, the mucket, and the paddlefish are all aquatic species; however, because watercourses will most likely

Table 8.1.4.6-1 Summary of rare species within 150-foot ROW and one mile of each route alternative - Segment 1

					Route Alternatives																
Common Name	**Scientific Name**	**Type**	**MN Status**	**U.S. Status**	**1P**	**1P-001**	**1P-002**	**1P-003**	**1P-004**	**1P-005**	**1P-006**	**1P-007**	**1P-008**	**1P-009**	**1B-001**	**1B-003**	**1B-005**	**1A-001**	**1A-003**	**1A-004**	**1A**
Dwarf trout lily	*Erythronium propullans*	Vascular Plant	END	LE	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Prairie bush clover	*Lespedeza leptostachya*	Vascular Plant	THR	LT										X	X	X	X	X	X	X	X
Glade mallow	*Napaea dioica*	Vascular Plant	THR	NONE					X	X				X	X	X	X	X		X	X
Kitten tails	*Besseya bullii*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tubercled rein-orchid	*Platanthera flava var. herbiola*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Valerian	*Valeriana edulis var. ciliata*	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X		X					
Ellipse	*Venustaconcha ellipsiformis*	Invertebrate Animal	THR	NONE										X	X	X	X	X	X	X	X
Mucket	*Actinonaias ligamentina*	Invertebrate Animal	THR	NONE	X	X	X		X	X	X	X	X		X	X		X	X	X	X
Blanding's turtle	*Emydoidea blandingii*	Vertebrate Animal	THR	NONE										X			X				
Loggerhead shrike	*Lanius ludovicianus*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Paddlefish	*Polyodon spathula*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X								
Timber rattlesnake	*Crotalus horridus*	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X								

Species highlighted in blue indicate aquatic species.

"END" refers to state-endangered, "THR" refers to state-threatened, "LE" refers to federal-endangered, "LT" refers to federal-threatened, and "NONE" refers to no federal status

An "X" indicates the presence of that particular species within 1 mile of the proposed centerline, while a blank cell indicates that a particular species or site has not been documented within 1 mile of the proposed centerline.

Cells in pink indicate the presence of that particular species within the proposed ROW.

Source: Minnesota Department of Natural Resources – Natural Heritage Information System Database

be spanned, impacts to these species are not anticipated.

The dwarf trout lily is most commonly found in wooded floodplains or river terraces (DNR 2011a). The prairie bush clover inhabits remnants of native tall grass prairie (DNR 2011b). In Minnesota, the glade mallow has been documented on stream banks and floodplains in the valleys of small to medium sized streams (DNR 2011c). In Minnesota, kitten-tails has been documented primarily on bluffs and terraces of large rivers, such as the Cannon River (DNR 2011d). The tubercled rein-orchid prefers undisturbed wetland habitats, such as wet prairies and meadows, marsh edges, swamps, and lakeshores (DNR 2011e). Valerian inhabits a variety of calcareous wetlands, including fens, wet meadows, and moist prairies (DNR 2011f). The timber rattlesnake inhabits forested bluffs, rock outcrops, and bluff prairies (DNR 2011g). The Blanding's turtle generally inhabits wetland complexes where there are adjacent sandy uplands for nesting (DNR 2011h). The loggerhead shrike is a migratory song bird that inhabits relatively open land with some shrub cover (DNR 2011i).

Three of the documented non-aquatic rare species have been found within the 150-foot ROW of some of the route alternatives in this segment; these include the prairie bush clover, the glade mallow, and the loggerhead shrike (Table 8.1.4.6-1). The prairie bush clover has been found within the 150-foot ROW of the A route alternatives, 1B-001, and 1B-003 (Table 8.1.4.6-1). The glade mallow has been documented within the 150-foot ROW of route alternatives 1P-009 and 1B-005 (Table 8.1.4.6-1). The loggerhead shrike has been found within the 150-foot ROW of all route alternatives in this segment (Table 8.1.4.6-1).

Bald eagles have been found within one mile of all route alternatives in this segment and within the 150-foot ROW of the following route alternatives: all of the A route alternatives, 1P-009, 1B-001, and 1B-003 (Appendix F).

A colonial waterbird nesting site and a freshwater mussel concentration area has been documented within one mile of all A and B route alternatives (Appendix F). The colonial waterbird nesting site is not within the 150-foot ROW of any route alternatives in this segment and only route alternative 1A-001 has a freshwater mussel concentration area in its 150-foot ROW (Appendix F).

DNR native plant communities are present within the 150-foot ROW of all route alternatives in this segment (Figure 8.1.4.6-1). These native plant communities consist of Dry Bedrock Bluff Prairie (Southern), Dry Sand-Gravel Prairie (Southern), Elm-Ash-Basswood Terrace Forest, Mesic Prairie (Southern), Mesic Sandstone Cliff (Southern), Red Oak-Sugar Maple-Basswood-(Bitternut Hickory) Forest, and Sugar Maple-Basswood-(Bitternut Hickory) Forest (see data in Appendix F). As shown in Figure 8.1.4.6-1, with the exception of route alternatives 1P-003, 1P-009, and 1B-009, the route alternatives in this segment generally have similar acreages of native plant communities within the 150-foot ROW. With the exception of route alternative 1B-005, which does not have any MCBS Sites of Biodiversity Significance (SBS) within the 150-foot ROW, all route alternatives in this segment have similar acreages of MCBS SBS in their 150-foot ROW (Figure 8.1.4.6-1).

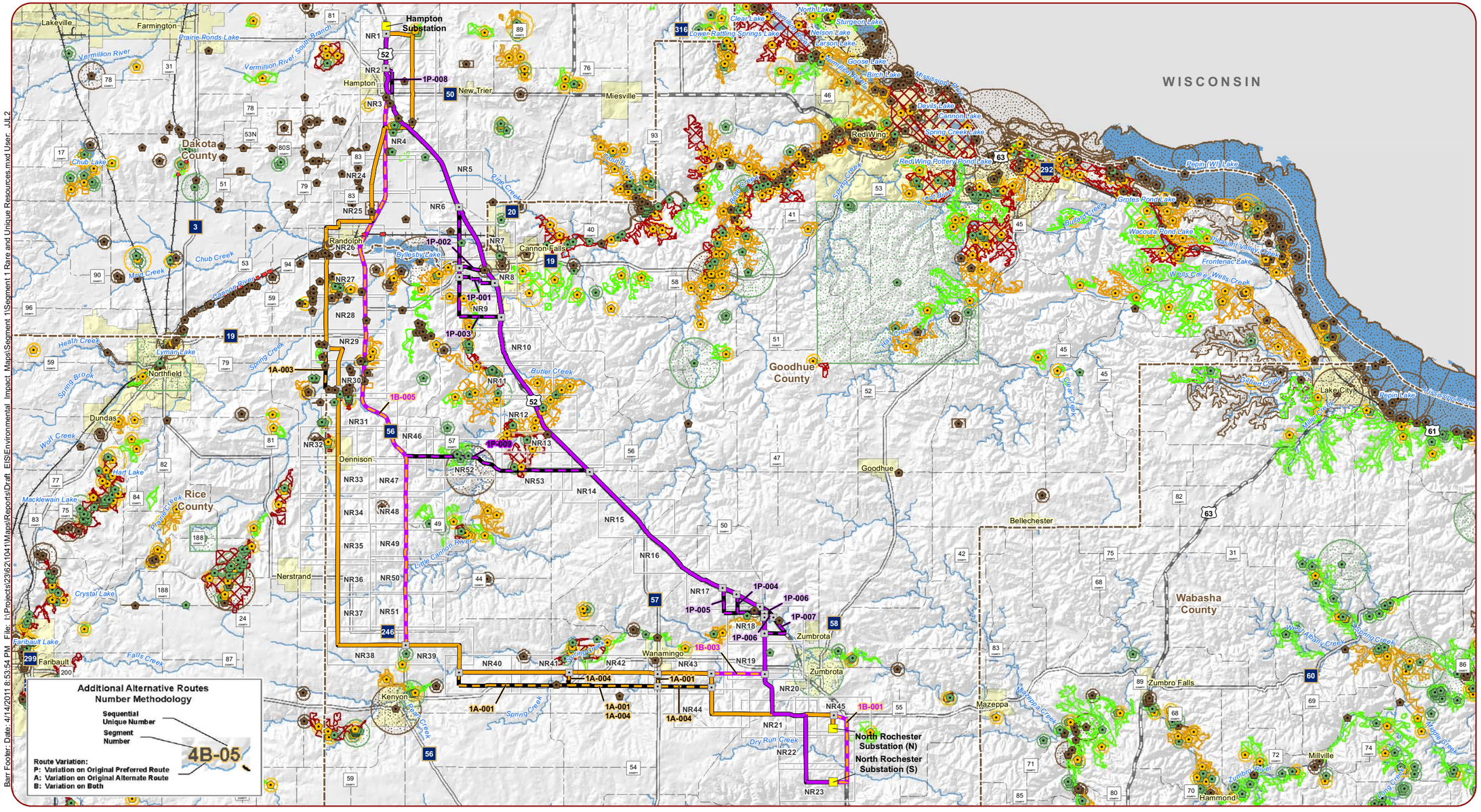
Route alternatives 1B-005 and 1P-009 both have 60 feet of state designated railroad prairie within their 150-foot ROW, while the remaining route alternatives in this segment do not have any state designated railroad prairie in their 150-foot ROW.

Mitigation

General mitigation measures that could be employed to minimize impacts to rare and unique resources are discussed in Section 7.6. See Section 7.7 for a discussion of the measures that could be utilized to minimize the impacts of avian collisions with transmission lines.

Within Segment 1, threatened and endangered species are found within one mile of each route alternative and within the 150-foot ROW of several route alternatives. As waterbodies and watercourses would most likely be spanned, impacts to threatened and endangered aquatic species are not anticipated.

Impacts to dwarf trout lily, which is not found within the 150-foot ROW of any route alternative in this segment, could be minimized by avoiding or spanning wooded floodplains and river terraces. Impacts to the prairie bush clover and the glade mallow could be minimized by choosing one of the P route alternatives (except 1P-009). Impacts to kitten-tails, which has been documented within one mile of all route alternatives in this segment, could be minimized by avoiding or spanning bluffs and terraces of the Cannon River. Impacts to the tubercled rein-orchid and valerian could be minimized by spanning all wetlands or choosing the route alternative with the least acres of wetland within the 150-foot ROW. Impacts to the timber rattlesnake could be minimized by avoiding or spanning forested bluffs, rock outcrops, and bluff prairies or by choosing one of the A or B route alternatives or 1P-009. Impacts to loggerhead shrike could be minimized by avoiding or spanning open



NR1 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
- P Route
- A Route

Additional Alternative Routes
- Variation on P Route
- Variation on A Route
- Variation on Both

- Project Substations
- County Boundaries

MN DNR Natural Heritage
- Botanical
- Ecological
- Zoological
- Botanical
- Ecological
- Zoological

- State Designated Railroad Prairie

MCBS Biodiversity Significance
- Moderate Significance
- High Significance
- Outstanding Significance

Map 8.1-22
Rare & Unique Resources/Critical Habitat Map
Segment 1, Hampton Substation to North Rochester Substation

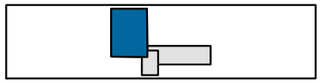
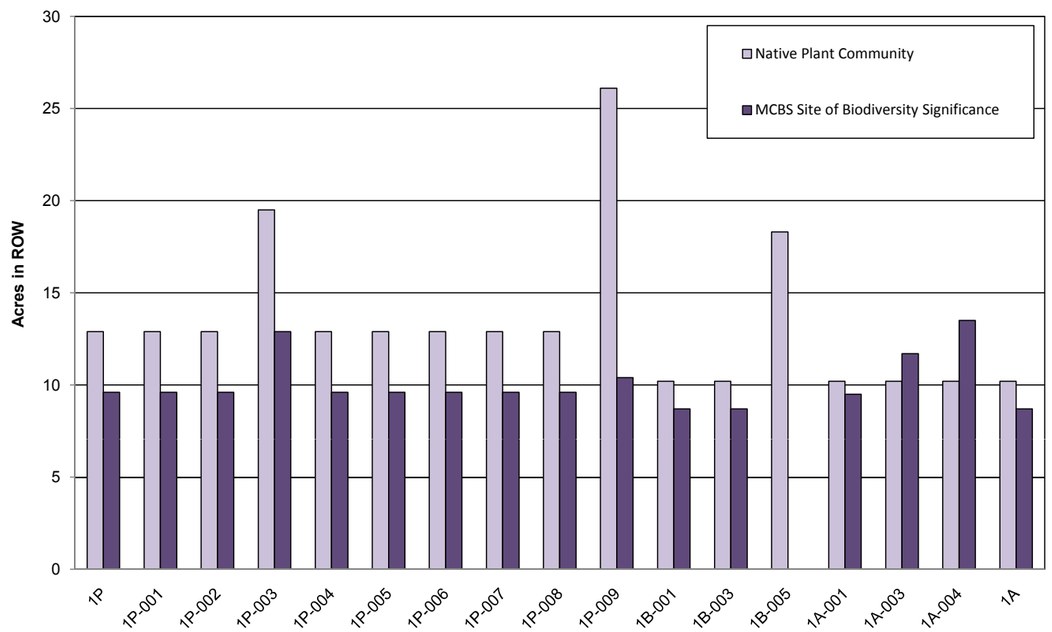


Figure 8.1.4.6-1 Summary of DNR plant communities and MCBS Sites of Biodiversity Significance within 150-foot ROW of each route alternative - Segment 1



Source: Minnesota Department of Natural Resources MCBS Sites of Biodiversity Significance do not include sites designated as "below."

grassland areas with some shrub component. Impacts to bald eagles could be minimized by choosing one of the P route alternatives (except 1P-009). Surveys for threatened or endangered species would be conducted in suitable habitat within the permitted route corridor as directed by state agencies. If rare species are unavoidable, a Takings Permit from the DNR may be required along with other conditions.

Impacts to the freshwater mussel concentration area are not anticipated because all watercourses will likely be spanned. Impacts to the colonial waterbird nesting site could be minimized by choosing one of the P route alternatives, since this nesting site is not located within one mile of any of these route alternatives.

There are DNR native plant communities and MCBS sites within one mile of each route alternative within this segment, with the exception of 1B-005 which does not have any MCBS sites within one mile of it. The placement of structures within DNR native plant communities and MCBS sites could be avoided or minimized by spanning them to the extent possible. Impacts to state designated railroad prairies could be minimized by choosing a route alternative other than 1B-005 or 1P-009. Where structure placement cannot be avoided in these DNR native plant communities, MCBS sites, and designated railroad prairies, rare species associated with these habitats would be affected. As stated above, surveys for rare species may be necessary in areas where rare habitat is unavoidable.

8.1.4.7 Flora and Fauna - Analysis of Segment Alternatives for the Hampton to North Rochester Substation Segment

Flora

Vegetation community cover types associated with all route alternatives for Segment 1 are dominated by agricultural and/or other artificial cover types, and generally have only small amounts of forested vegetation. The term "artificial cover type" as used here refers to the DNR Minnesota Land Cover Classification System (MLCCS) usage, meaning "areas of vegetation alteration…(which) have been fragmented by humans" (DNR 2004). The P route alternatives have notably more artificial cover than those based on the A route alternatives, since they follow US Hwy-52 for much of this segment. The majority of the A route alternatives pass along field and property lines through agricultural land. See Figures 8.1.4.7-1 and 8.1.4.7-2 for a comparison of vegetation community cover types between the A and P route alternatives. Figure 8.1.4.7-1 approximates the vegetation coverages along the P route alternatives. Similarly, Figure 8.1.4.7-2 approximates the vegetation coverage along the A route alternatives.

Common plant species and plant communities known to occur in the project area, including Segment 1, are described in Section 7.7. Data on vegetation that currently exists and that historically existed in the project area for this segment were gathered from the DNR MCBS. The P route alternatives in this segment are located primarily within the Rochester Plateau and the Blufflands Subsection of the Paleozoic Plateau Section (DNR 2009a). Approximately five miles of the P route alternatives pass through the Oak Savanna subsection of the Minnesota and Northeast Iowa Morainal section. The A route alternatives are located primarily within the Oak Savanna subsection of the Minnesota and Northeast Iowa Morainal section. The northern and southern ends of the A route alternatives lie within the Rochester Plateau subsection of the Paleozoic Plateau section.

Historically, the predominant vegetation communities in the Rochester Plateau Subsection were tallgrass prairie and bur oak savanna. Vegetation and habitats in the Rochester Plateau are described in greater detail in Chapter 7.7. The predominant vegetation communities in the Blufflands Subsection were tallgrass prairie and bur oak savanna along ridge tops and dry upper slopes. Red oak, white oak, shagbark hickory, and basswood forests were present along moist slopes, and red oak, basswood, and black walnut forests were present in protected valleys (DNR 2009). Vegetation and habitats in the Blufflands are described in greater detail in Section 7.7.

Current vegetation cover is dominated by agriculture, primarily row crops such as corn and soybeans. Grasslands, including prairies, pastures and old field areas make up roughly one-quarter of the vegetation cover in this segment. Forested cover is minor, and is limited to woodlots and riparian areas.

The State of Minnesota has a total of eleven species of noxious weeds on their primary list,

Figure 8.1.4.7-1 Vegetation community cover along the P route alternatives - Segment 1

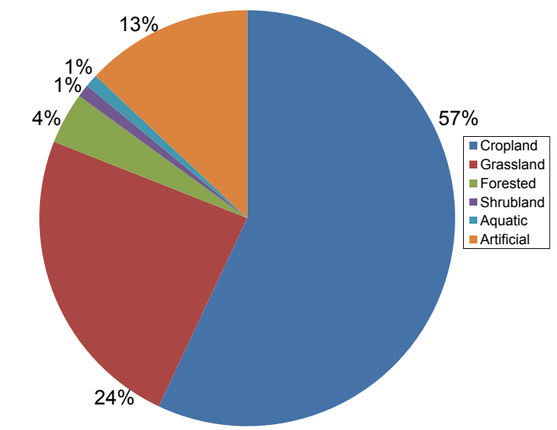
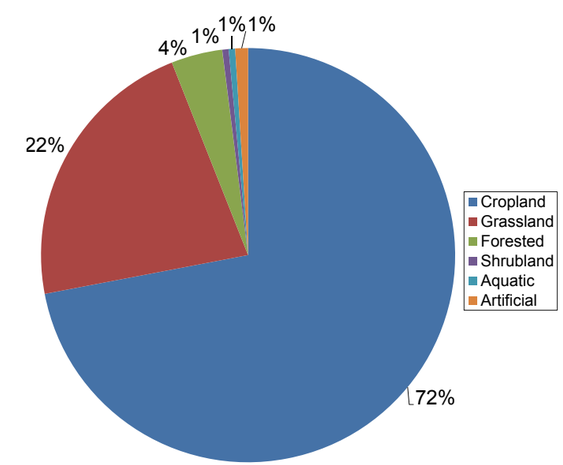
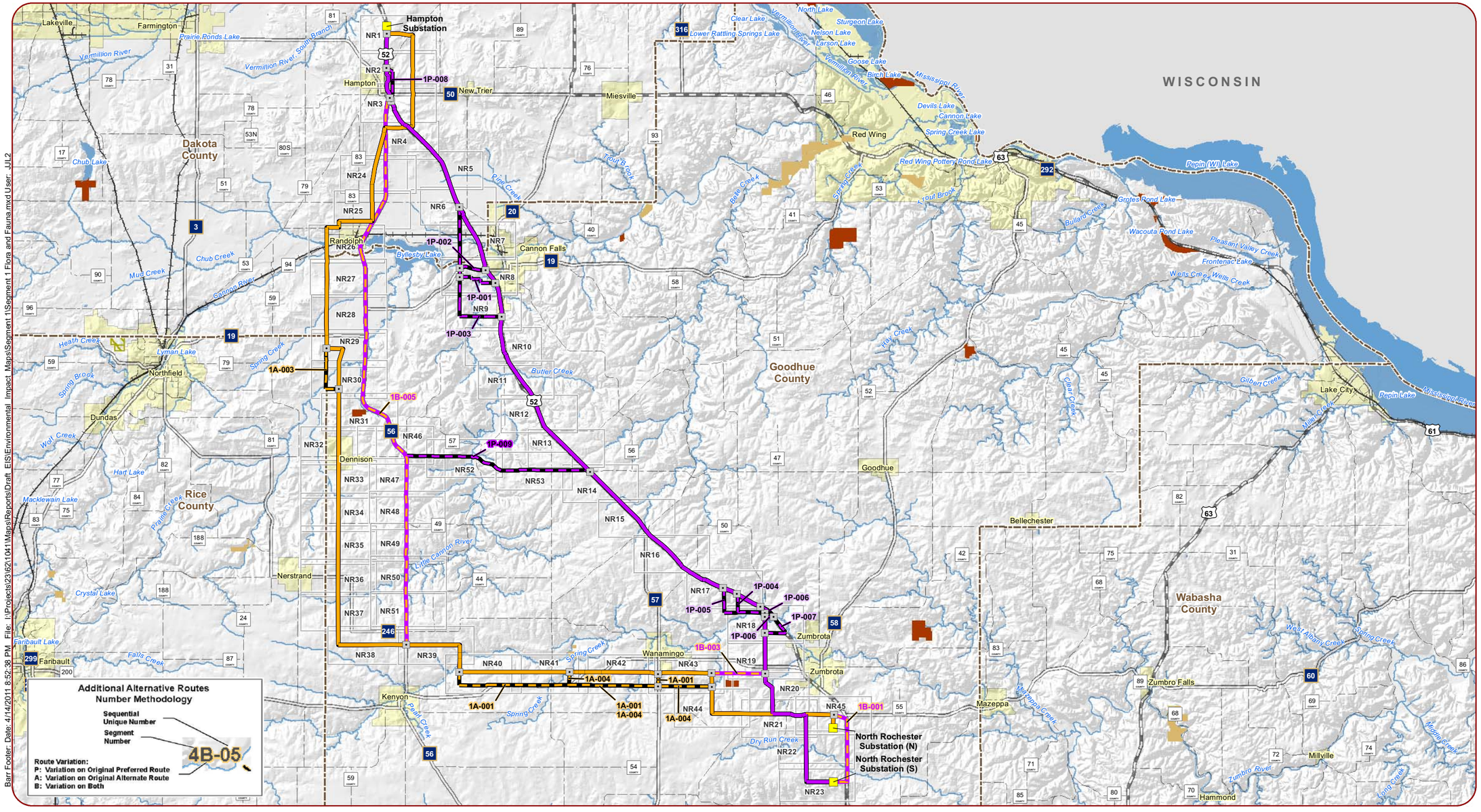


Figure 8.1.4.7-2 Vegetation community cover along the A route alternatives - Segment 1





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NR1 Appendix A Map Index

0 1.5 3 6 Miles

0 2.5 5 10 Kilometers

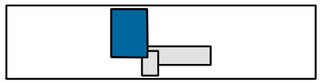
For detailed maps refer to Appendix A.
Refer to Appendix B for information on data sources.

Original Alignments
- P Route
- A Route

Additional Alternative Routes
- Variation on P Route
- Variation on A Route
- Variation on Both

- Project Substations
- County Boundaries
- Fish Technology Center
- Fisheries Research Station
- National Fish Hatchery
- National Wildlife Refuge
- Waterfowl Production Area
- Wildlife Management Area
- Scientific and Natural Area
- Designated Wildlife Lakes

Map 8.1-23
Flora & Fauna Map
Segment 1, Hampton Substation to North Rochester Substation



as identified in Section 7.7. Dakota County restricts three additional species from the State's secondary noxious weed list. Goodhue County does not have a secondary county-specific list.

Impacts to Flora

Impacts may include both temporary and permanent effects. The impacts include localized physical disturbance caused by construction equipment during site preparation, such as grading, excavation, and soil stockpiling. There may be clearing of local vegetation for access roads. In forested areas, trees or shrubs that interfere with safety and equipment operation would be removed. Permanent vegetative changes would take place at each new pole footprint (55 square feet) and within the 150-foot ROW that occurs in the forested communities.

Fauna

Wildlife resources are shown on Map 8.1-23.

P Route Alternatives

A number of wildlife conservation and management areas, as well as several easement lands, occur along the P route alternatives. These include:

- The Woodbury Wildlife Management Area (WMA);
- The Gemini Aquatic Management Area (AMA);
- Pine Creek, a DNR-designated trout stream;
- The Lake Byllesby Important Bird Area (IBA).

The Woodbury WMA is 76 acres in size and is located within one mile of all P route alternatives. Approximately 60 acres of the property is restored to native prairie, providing nesting habitat for grassland birds. The Gemini AMA is an 83-acre easement located along the Cannon River, in the northwest corner of Cannon Falls. Approximately ten acres of the AMA is located within the route. Pine Creek is crossed by the southeast of Hampton by P route alternatives. The eastern edge of the Lake Byllesby IBA occurs within one mile of the point where these route alternatives cross the Cannon River. This shallow lake, owned by DNR, serves as important habitat for a variety of migratory birds including ducks, herons, geese, gulls, terns, and shorebirds. Sandhill cranes (*Grus canadensis*), a species known to collide with transmission lines, have been observed near Lake Byllesby during breeding season, though no confirmed nesting records exist (NHIS 2009).

Other recognized bird habitat within one mile of the P route alternatives includes two Grassland Bird Conservation Areas (GBCAs). The first is located west of, but is not crossed by, the P route alternatives. The other is located west of Zumbrota; its eastern edge is crossed for approximately one mile by most of the P route alternatives. Both GBCAs are classified as Type 3 areas, meaning they have a core area of at least 55 acres of grassland habitat at least 1/4 mile wide that, when combined with other grassland habitat within a 1.0-mile buffer, equal 20 percent total grassland. Type 3 GBCAs have smaller core grassland habitat and less total percent grassland habitat than either Types 1 or 2.The core area is the Woodbury WMA described above. Impacts to grassland habitat within GBCAs are likely to be temporary and long term impacts are anticipated to be minimal.

Easement lands that may provide wildlife habitat along the P route alternatives include 263 CRP lands located within one mile of these route alternatives. Two Conservation Reserve Enhancement Program (CREP) easements were identified within one mile of the P route alternatives. No other wildlife conservation and management areas or easement lands were identified within one mile of the P route alternatives for this segment.

A Route Alternatives

Conservation and management areas within one mile of the A route alternatives include one IBA, two WMAs, one Scientific and Natural Area (SNA), and three GBCAs. The Lake Byllesby IBA described above is located within one mile of the A route alternatives, but is not crossed by these route alternatives. Another area considered to provide potential wildlife habitat along the A route alternatives is the Cannon River crossing. The A route alternatives cross the Cannon River approximately 2 miles west of the western edge of the Lake Byllesby IBA (described above). The Woodbury WMA (described above) also occurs within one mile of all A route alternatives. In addition, the Warsaw WMA, northeast of Dennison, is within one mile of the A route alternatives. The Warsaw WMA is primarily grassland with some scattered wetland patches. Management goals are intended to promote wildlife diversity in grassland and wetland communities. The North Fork Zumbro Woods SNA is approximately 0.5 mile north of the A route alternatives, immediately west of where these routes cross State Route 60. Lastly, three GBCAs occur within one mile of the A route alternatives. All are classified as Type 3, as described above. One of the GBCAs is crossed by the A route alternatives approximately four miles southeast of Wanamingo. Impacts to grassland habitat within GBCAs are likely to be temporary and long term impacts are anticipated to be minimal.

In addition to designated conservation and management areas, several land easements occur within one mile of the A route alternatives. Thirty-one Conservation Reserve Program (CRP) lands occur within most of these route alternatives, and a total of 183 CRP lands are located within one mile of them. One CREP land easement occurs within one mile of the A route alternatives.

Potential wildlife impacts along all P and A route alternatives in this segment would be limited in magnitude. The Woodbury WMA and the Warsaw WMA occur within one mile of most route alternatives, but neither WMA is intersected by the any route alternative. As a result, losses of areas utilized by wildlife are not anticipated in these areas.

The Gemini AMA would not be intersected by any route alternative; therefore no impacts are anticipated. Similarly, the Lake Byllesby IBA occurs within one mile of most route alternatives; but none of the route alternatives intersect the IBA. Therefore, no impacts to birds within the IBA are anticipated. All route alternatives cross the Cannon River, where avian collision risk may be higher relative to other areas along these routes. The crossing of the state designated trout stream, Pine Creek, occurs along the P route alternatives. It is possible that some trees may need to be cleared along the banks of Pine Creek in the immediate vicinity of the crossing, which may reduce shading in this area. In general, transmission line routing avoids direct impacts to lakes and rivers to limit impacts to fisheries and other aquatic resources. The potential impacts that may result from tree clearing are not expected to impact trout or other aquatic species populations.

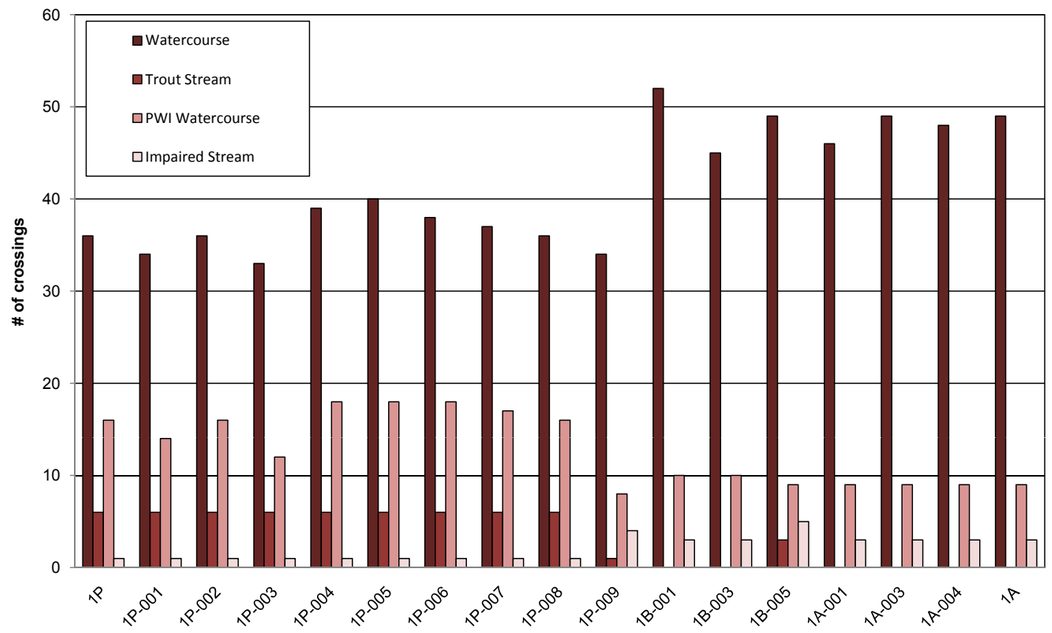
Section 7.7 identifies and discusses potential temporary and permanent impacts to fauna, as well as avian specific impacts that may occur in the project area as a result of transmission line construction. Impacts beyond those discussed generally in Section 7.7 are not anticipated along the 345 kV route alternatives. Avoidance and mitigation measures also would be similar to those discussed in Section 7.7.

8.1.4.8 Water Resources – Analysis of Segment Alternatives for the Hampton to North Rochester Substation Segment

Several sources of data (see Appendix B) were reviewed to identify water resources within the 150-foot ROW and 1,000-foot route width of each route alternative within Segment 1. Map 8.1-24 and the detailed maps in Appendix A identify the water resources within the vicinity of each route alternative in this segment.

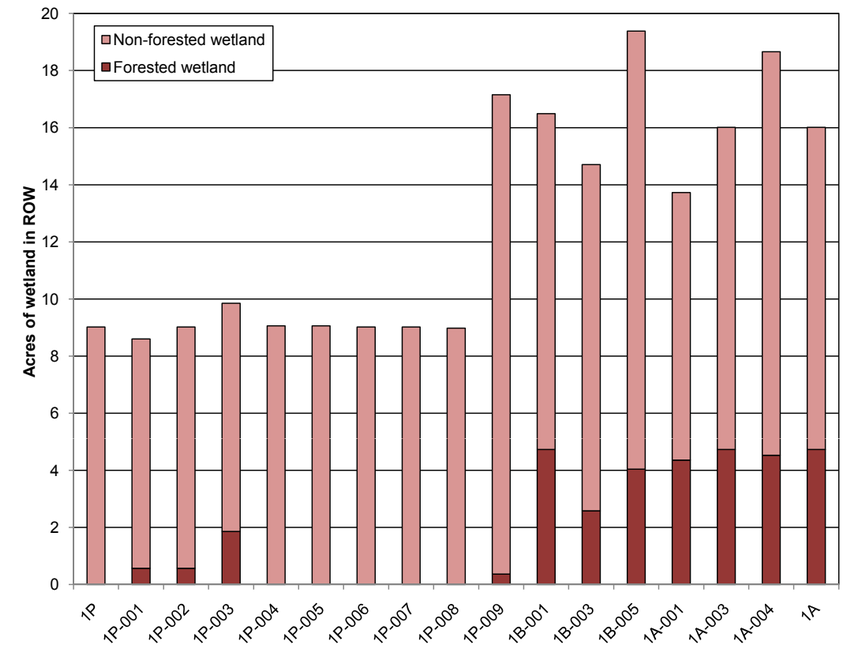
Several rivers, streams, and ditches (collectively referred to as "watercourses" below) would be crossed by the route alternatives within this segment. The main watercourses that run through this segment include the Cannon River, North Fork of the Zumbro River, Belle Creek, Butler Creek, Dry Run Creek, Little Cannon River, Pine Creek, Chub Creek, Prairie Creek, Shingle Creek, and Spring Creek; all of these watercourses are listed on the Public Water Inventory (PWI) (Map 8.1-24). As discussed in

Figure 8.1.4.8-1 Number of watercourse, PWI, trout stream, and impaired stream crossings necessary for each route alternative - Segment 1



Source: DNR - Division of Waters - Trout streams include designated trout streams and tributaries to trout streams

Figure 8.1.4.8-2 Acres of forested and non-forested wetland within proposed 150-foot ROW of each route alternative - Segment 1



Source: DNR - Division of Waters - Trout streams include designated trout streams and tributaries to trout streams

Sections 7.8 and 7.12, portions of the Cannon River are designated as Recreational under the Minnesota Wild, Scenic, and Recreational River System. Each of the route alternatives within this segment would cross the Cannon River where it is designated as Recreational.

Pine Creek and portions of the Little Cannon River are designated trout streams (Map 8.1-24). In addition, there are a couple of unnamed tributaries to Pine Creek and the Little Cannon River that are designated trout stream tributaries. The P route alternatives and 1B-005 would all require crossing at least one of these trout streams (Map 8.1-24, Figure 8.1.4.8-1).

There are four impaired watercourses within this segment; these include Prairie Creek, Cannon River, Little Cannon River, and Chub Creek. All of the route alternatives within this segment would require crossing at least one impaired watercourse (Map 8.1-24, Figure 8.1.4.8-1).

Lake Byllesby is a PWI basin and is also listed on the Minnesota Pollution Control Agency (PCA) impaired waters list. Lake Byllesby is the only lake located within the vicinity of this segment; however, this lake is not located within the 150-foot ROW of any of the route alternatives in this segment. Lake Byllesby is located within the 1,000-foot route width of the following route alternatives: 1P-001, 1P-002, 1P-003, 1P-009, and 1B-005.

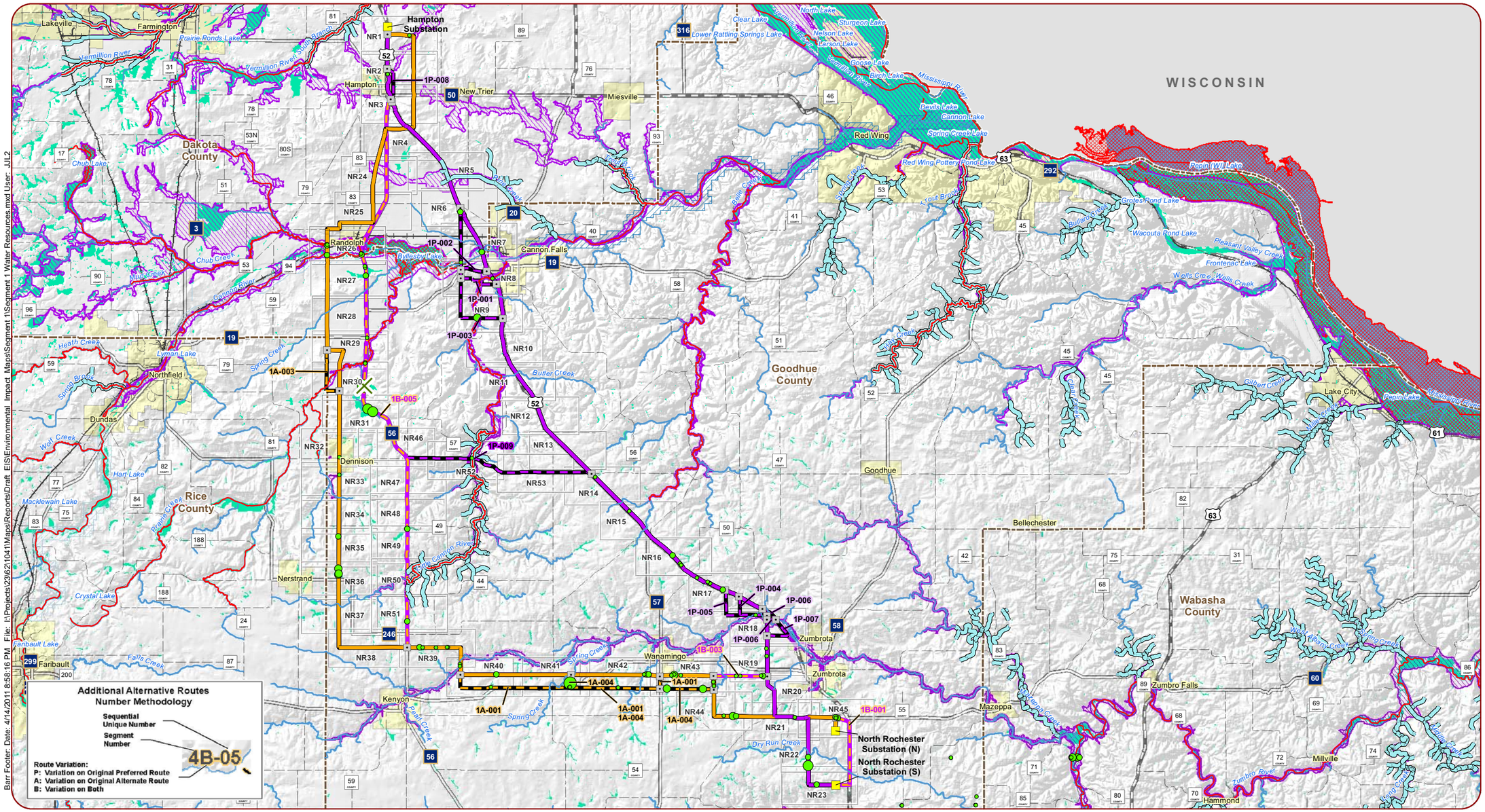
Figure 8.1.4.8-1 summarizes the total number of watercourses, trout streams, PWI watercourses, and impaired streams that would be crossed by each route alternative in this segment. The route alternatives within this segment have between 33 and 52 watercourse crossings within the 150-foot ROW. The P route alternatives have fewer watercourse crossings than the remaining route alternatives within this segment (Figure 8.1.4.8-1). With the exception of route alternative 1P-009, the P route alternatives have more PWI watercourse and trout stream crossings relative to the A and B route alternatives (Figure 8.1.4.8-1). With the exception of route alternative 1P-009, the P route alternatives would only have one impaired stream crossing, while the remaining route alternatives would have between 3 and 5 impaired stream crossings (Figure 8.1.4.8-1). None of the route alternatives within this segment would cross PWI basins.

Wetlands within the 150-foot ROW of the route alternatives in this segment consist mostly of small freshwater emergent wetlands, with a few small freshwater ponds, shrub dominated wetlands, and forested wetlands also present. Figure 8.1.4.8-2 summarizes the total acres of wetland and forested wetland that are present within the 150-foot ROW of each route alternative in this segment. With the exception of route alternative 1P-009, the P route alternatives have the fewest acres of wetland within the 150-foot ROW and 1,000-foot route width (Figure 8.1.4.8-2, Table 8.1.4.8-1). The P route alternatives also have the fewest acres of forested wetland in the 150-foot ROW, ranging from none in several of the route alternatives to 1.9 acres of forested wetland in 1P-003 (Figure 8.1.4.8-2). In contrast, the A and B route alternatives have between 2.6 and 4.73 acres of forested wetland with the 150-foot ROW (Figure 8.1.4.8-2).

Although wetlands would be spanned to the extent possible, route alternatives 1P-009 and 1B-005 each have one wetland within the 150-foot ROW that is wider than 1,000 feet. Wetlands wider than 1,000 feet may require placement of one or more poles within them.

Mitigation

General mitigation measures that would be employed to minimize impacts to water resources are discussed in Section 7.8. Within this 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 likely be spanned, no structures would be



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NR1 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
- P Route
- A Route

Additional Alternative Routes
- Variation on P Route
- Variation on A Route
- Variation on Both

- Project Substations
- County Boundaries
- Q3 FEMA Floodplain
- Trout Streams

Wild and Scenic Rivers
- Recreational
- Scenic
- Wild

- Wetland Crossings > 1,000 Feet

Wetland Area (acres) within 150-foot ROW
- 0.0 - 0.5
- 0.6 - 1.0
- 1.1 - 2.0
- 2.1 - 3.0
- 3.1 - 6.1

- Public Water Inventory Watercourse
- Impaired Streams
- Public Water Inventory Basins (includes lakes and wetlands)
- Impaired Lakes
- Designated Wildlife Lakes
- NWI Wetlands

Map 8.1-24
Water Resources Map
Segment 1, Hampton Substation to North Rochester Substation

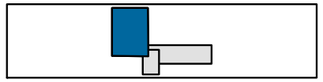


Table 8.1.4.8-1 Acres of wetland within entire proposed 1,000-foot route width of each route alternative - Segment 1

Route Alternative	Acres of Wetland within 1,000-foot Route Width
1P	51
1P-001	52
1P-002	54
1P-003	57
1P-004	54
1P-005	56
1P-006	52
1P-007	49
1P-008	51
1P-009	148
1B-001	110
1B-003	106
1B-005	199
1A-001	99
1A-003	110
1A-004	121
1A	109

Source: U.S. Fish and Wildlife Service – National Wetland Inventory

placed within these features and direct impacts to watercourses and lakes are anticipated to be minimal. Potential indirect impacts to these resources, such as increases in turbidity, could be minimized through use of BMPs and by choosing one of the P route alternatives, since these route alternatives have fewer watercourse crossings than the A and B route alternatives.

Temporary impacts to wetlands may occur if they need to be crossed during construction. Utilizing BMPs and choosing one of the P route alternatives (except 1P-009), which have the least acres of wetland within the 150-foot ROW and 1,000-foot route width, could minimize temporary impacts to wetlands. Permanent impacts to wetlands may occur if structures need to be placed within wetland boundaries; the only two route alternatives within this segment that have a wetland wider than 1,000 feet within the 150-foot ROW are 1P-009 and 1B-005. Choosing any of the other route alternatives could 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 one of the P route alternatives (except 1P-009) could minimize these impacts because these route alternatives have the fewest acres of forested wetland within the 150-foot ROW.

8.1.4.9 Electronic Interference – Analysis of Segment Alternatives for the Hampton to North Rochester Substation Segment

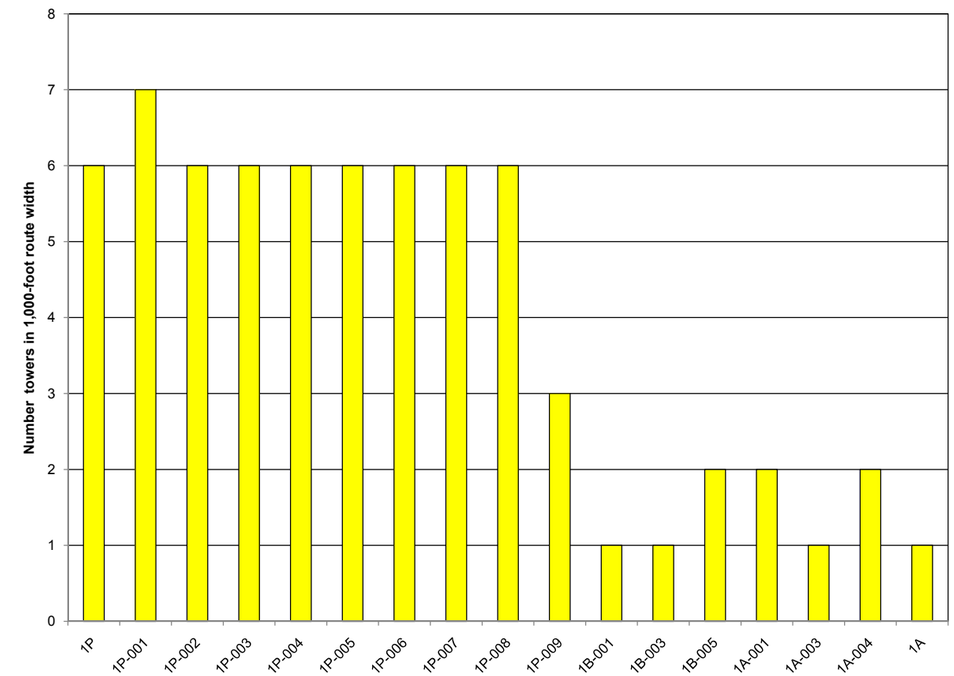
The nature of impacts related to electronic interference are not likely to vary notably between the route alternatives in this segment. Impacts are expected to be greatest very close to the line for amplitude modulated (AM) radio reception and minor for all other types of reception. The placement of structures may also result in line-of-sight interference. Structure placement could be coordinated so that they do not interfere with microwave communication corridors. Figure 8.1.4.9-1 shows the number of communication towers within the 1,000-foot route width of each route alternatives in Segment 1. The towers within the 1,000-foot route width of the route alternatives in this segment are primarily privately owned land mobile towers; however, Antenna Structure Registration (ASR), cellular, and land mobile communication service towers are also present.

Section 7.9 provides an overview of the potential impacts from electronic interference and outlines general steps that could be taken to mitigate impacts from interference.

8.1.4.10 Cultural Resources - Analysis of Segment Alternatives for the Hampton to North Rochester Substation Segment

Available Minnesota 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 within Segment 1. Publishing specific locations of cultural resources leaves those resources vulnerable to unauthorized removal or disturbance. To reduce the potential for unauthorized disturbance of

Figure 8.1.4.9-1 Number of communication towers within 1,000-foot route width for each route alternative - Segment 1



Source: Federal Communications Commission – edited by AECOM and Barr

known cultural resources, SHPO includes only township, section and range (TSR) in its publicly-available records for certain resources. For the purposes of the project's impact analysis, it has been assumed that the resource is potentially within the relevant area if any part of the SHPO TSR data for a recorded resource is within one-half mile of a proposed route centerline.

Potential historical and archaeological resource impacts for each of the route alternatives in Segment 1 (shown in Map 8.1-25 and Appendix A) are summarized in Figures 8.1.4.10-1 tand 8.1.4.10-2.

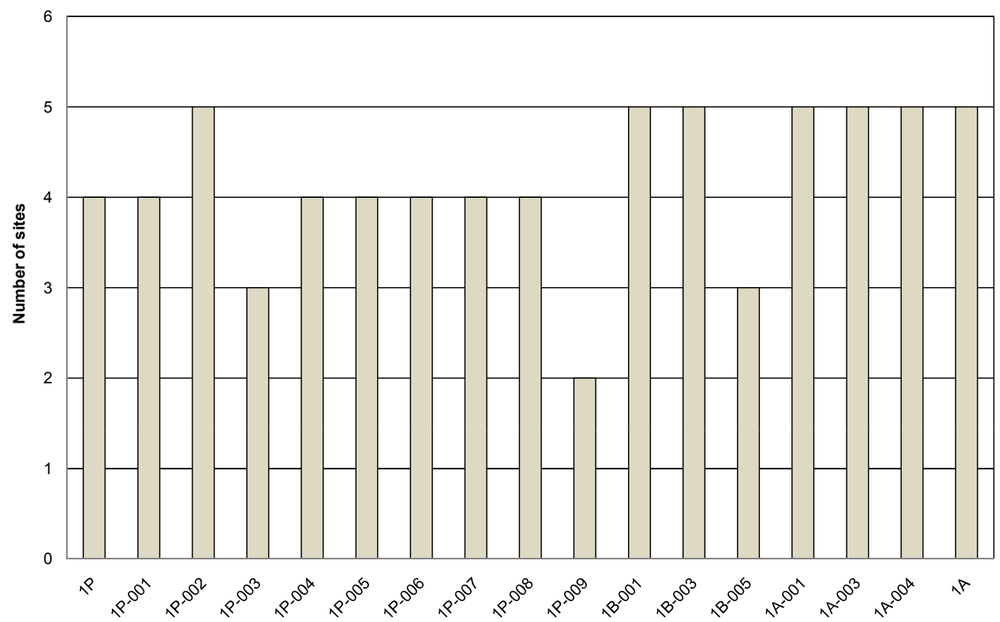
Figure 8.1.4.10-1 compares the number of archaeological sites within one-half mile on either side of the proposed centerline for each route alternative in this segment. No archaeological sites on the National Register of Historic Places (NRHP) are located within one-half mile of any route alternative's centerline in this segment. None of the archaeological sites potentially located within the one-half mile of the route centerlines have been evaluated for eligibility for listing on the NRHP and thus, their status is listed as Not Determined (Minnesota Valley Archaeological Center (MVAC) 2008). There is limited variability in the number of archaeological sites potentially affected along the P route alternatives. Most of the P route alternatives affect four sites. Route alternative 1P-009 potentially affects two sites, and route alternative 1P-002 affects five sites.

The A route alternatives would potentially affect five archaeological sites. The NHRP status of these sites is listed as Not Determined (MVAC 2008).

Actual impacts to any archaeological sites will not be known until a route and alignment are selected. See the mitigation discussion below.

Figure 8.1.4.10-2 compares the number of historical architectural sites within one-half mile on either side of the proposed centerline for

Figure 8.1.4.10-1 Number of archaeological sites within one-half mile of each route alternative - Segment 1



each route alternative in this segment. As with the archaeological sites, the P route alternatives are all approximately equivalent in the number of nearby historic sites. Sites 1P-001 and 1P-003 would potentially affect 47 and 37 sites, respectively.

There are eight NRHP-listed sites within one-half mile of the P route alternatives. All sites are located in Cannon Falls. These NRHP sites include: Captain Charles Gellett House, Darwin E. Yale House, Third Street Bridge, Cannon Falls School, Yale Hardware Store, Ellsworth Hotel, Livery Stable, and Church of the Redeemer.

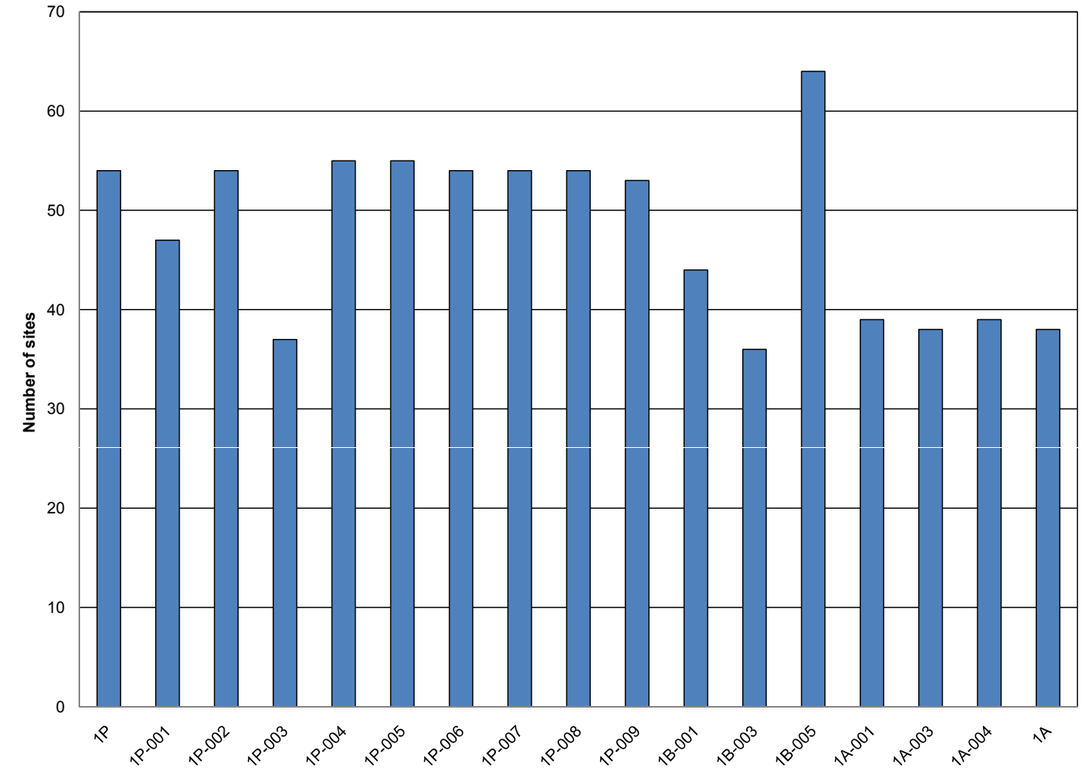
The A route alternatives would potentially affect 38 to 29 historic sites. Of all the route alternatives considered, route alternative 1B-005 would have the highest potential impacts on historic resources, passing near 64 sites. The Veblen Farmstead is the only NRHP-listed site within 1 mile of the A route alternatives.

Figure 8.1.4.10-2 compares the number of historical architectural sites within one-half mile on either side of the proposed centerline for each route alternative in this segment. As with the archaeological sites, the P route alternatives are all approximately equivalent in the number of nearby historic sites. Sites 1P-001 and 1P-003 would potentially affect 47 and 37 sites, respectively.

There are eight NRHP-listed sites within one-half mile of the P route alternatives. All sites are located in Cannon Falls. These NRHP sites include: Captain Charles Gellett House, Darwin E. Yale House, Third Street Bridge, Cannon Falls School, Yale Hardware Store, Ellsworth Hotel, Livery Stable, and Church of the Redeemer.

The A route alternatives would potentially affect 38 to 29 historic sites. Of all the route alternatives considered, route alternative 1B-005 would have the highest potential impacts on historic resources, passing near 64 sites. The Veblen Farmstead is the only NRHP-listed site within 1 mile of the A route alternatives.

Figure 8.1.4.10-2 Number of historic sites within one-half mile of each route alternative - Segment 1



Mitigation

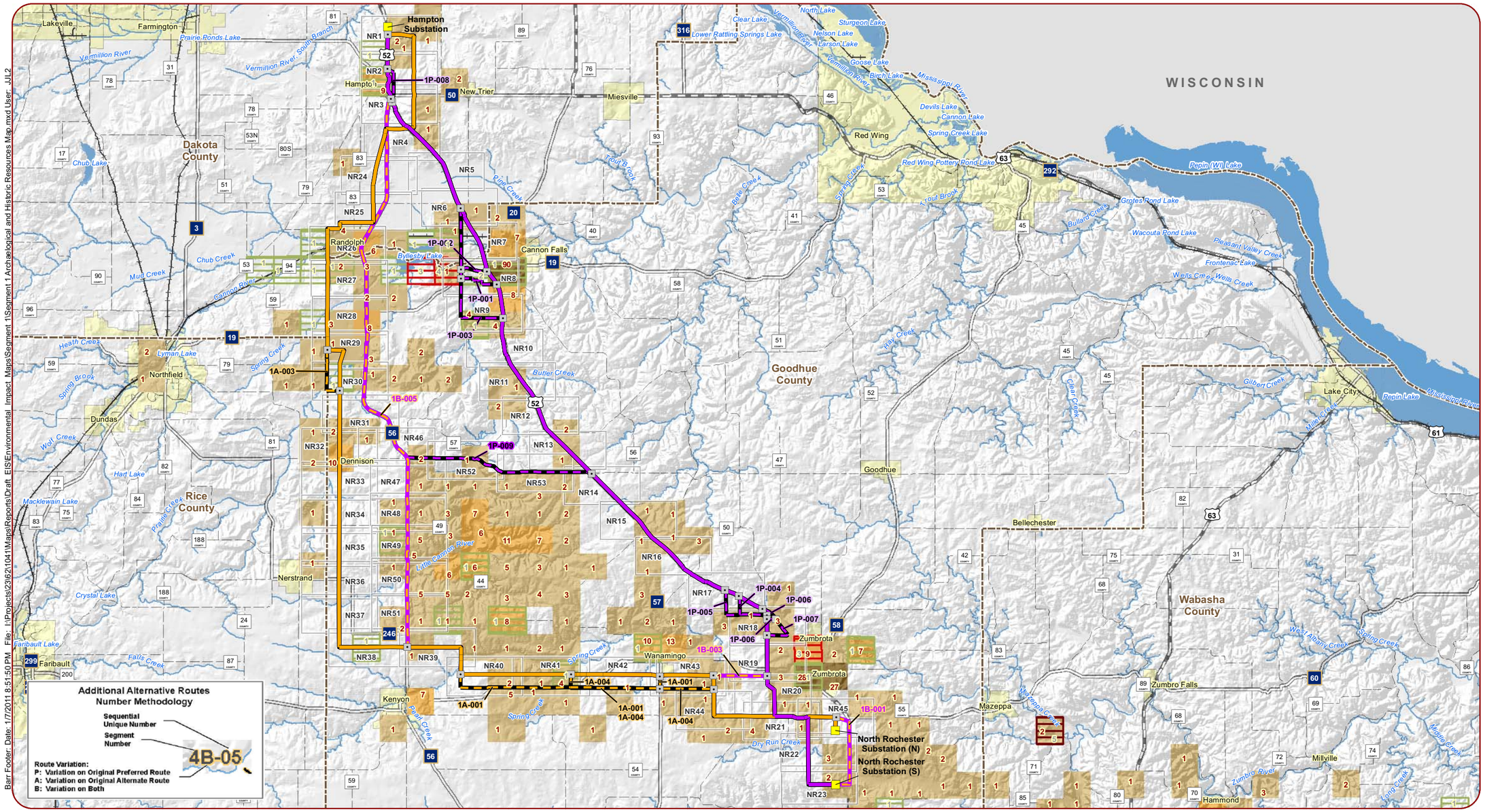
The primary means of mitigating impacts to cultural resources is avoidance through prudent routing. Route alternatives 1P-009 and 1P-003 have the fewest archaeological sites potentially within one-half mile of the route centerline. Route alternatives 1P-003 and 1B-001 have the fewest historical architectural sites potentially within one-half mile of the route centerline. However, the proximity analysis is based on the SHPO TSR information; actual proximity to archaeological and historic sites is not known. Therefore, 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 would be. Specific mitigation plans cannot be made until a complete NHRP assessment of potentially affected sites has been made.

For cultural resources within the route width, once a route is permitted by the Public Utilities Commission (Commission), archaeological investigations would be required to locate resources sites and to develop specific mitigation plans. Mitigation plans could entail compensation for the losses of properties that are eligible for listing on the NRHP. Section 7.10 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.

8.1.4.11 Transportation and Public Services—Analysis of Segment Alternatives for Hampton to North Rochester Substation Segment

ROW Sharing

Sharing ROW with existing infrastructure is in accordance with Minnesota Power Plant Siting Act (PPSA) to reduce the amount of ROW that



Barr Footer: Date: 1/7/2011 8:51:50 PM File: I:\Projects\23\62\1041\Maps\Reports\Draft EIS\Environmental Impact Maps\Segment 1\Segment 1 Archaeological and Historic Resources Map.mxd User: JJL2

NR1 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
- P Route
- A Route

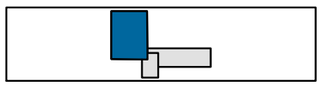
Additional Alternative Routes
- Variation on P Route
- Variation on A Route
- Variation on Both

- Project Substations
- County Boundaries

Archaeological Sites
- 1 - 2
- 3 - 4
- 5 - 6

Historical Sites
- 1 - 5
- 6 - 20
- 21 - 164

Map 8.1-25
Archaeological & Historic Resources Map
Segment 1, Hampton Substation to North Rochester Substation



must be acquired from private land owners, and can minimize impacts to adjacent property (see Section 4.4). In areas where ROW is shared, however, there is the potential for impacts to transportation along the shared corridors. The possible impacts are discussed generally in Section 7.11 and specific impacts associated with proposed route alternatives for Segment 1 are discussed below.

Map 8.1-26 shows areas where the ROW for the proposed route alternatives would share ROW with existing transportation, transmission line or pipeline infrastructure. Figure 8.1.4.11-1 shows the percentage of total line distance where ROW is shared with existing infrastructure under each route alternative in this segment. Areas where proposed route alternatives follow field lines (survey lines, natural division lines and agricultural field boundaries), or cut cross country through fields, pastures, and forest have been highlighted. In these areas, there is no opportunity to use ROW sharing to minimize the amount of ROW that must be acquired from private land owners.

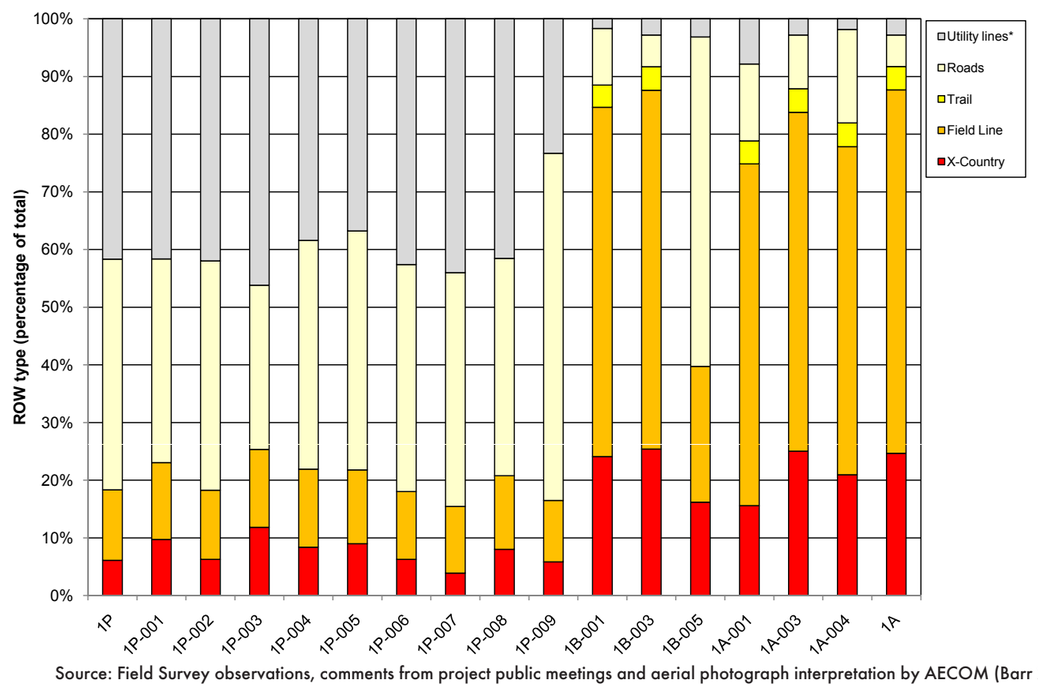
Figure 8.1.4.11-1 shows that the P route alternatives provide the most opportunities for ROW sharing and minimize corridor proliferation. These route alternatives share ROW primarily with existing transmission lines and with major highways.

Roadways and Emergency Services

The proposed route alternatives in this segment run parallel to a variety of different roadway types including county roads (CR) and highways (Hwy), state highways (MN Hwy) and United States highway (US Hwy). Impacts to roadways, railroads and emergency services are expected to be limited to temporary disturbances during construction.

Between the Hampton Substation and the North Rochester Substation the 1P route alternative follows US Hwy 52 for 27 miles. Northwest of Zumbrota, this route splits off from US Hwy 52 and follows field and property lines for approximately nine miles.

Figure 8.1.4.11-1 Comparison of shared ROW along each route alternative - Segment 1



Source: Field Survey observations, comments from project public meetings and aerial photograph interpretation by AECOM (Barr 2010);
*Note: Values include areas that parallel both a utility and road or trail. A more detailed breakdown of ROW types can be found in Appendix H.

US Hwy 52 is a four- lane divided highway that carries a high volume of vehicle traffic daily. As noted in Section 8.1.4.4, areas along US Hwy 52 are already extensively impacted by human modifications to the landscape and the marginal impact of the proposed project is not expected to fundamentally change the visual character of this corridor.

Most rural portions of US Hwy 52 in the project area are constructed on approximately 280 feet of ROW. Along US Hwy 52 the applicant has proposed that 70 feet of the transmission line ROW would be shared with road ROW. A utility permit from DOT is required to utilize DOT ROW, i.e., to place the centerline of the transmission line closer than 75 feet from the edge of the road ROW (Minn. R. 8810.3300, Subp. 1).

DOT has an "Accommodation Policy" that guides issuance of utility permits. The Accommodation Policy acknowledges that it is in the public interest for utility facilities to be accommodated on the ROW of any highway where the facilities do not interfere with the function and safety of the highway. The applicant has met with DOT representatives to review potential alignments along US Hwy 52; however, it is uncertain at this time what alignment DOT will permit along or near the US Hwy 52 ROW.

As noted in Section 7, if a utility pole must be relocated to accommodate a roadway expansion and the pole is within the public ROW, the utility is liable for the relocation cost. But if the pole is outside of the public ROW, the public must pay for the relocation.

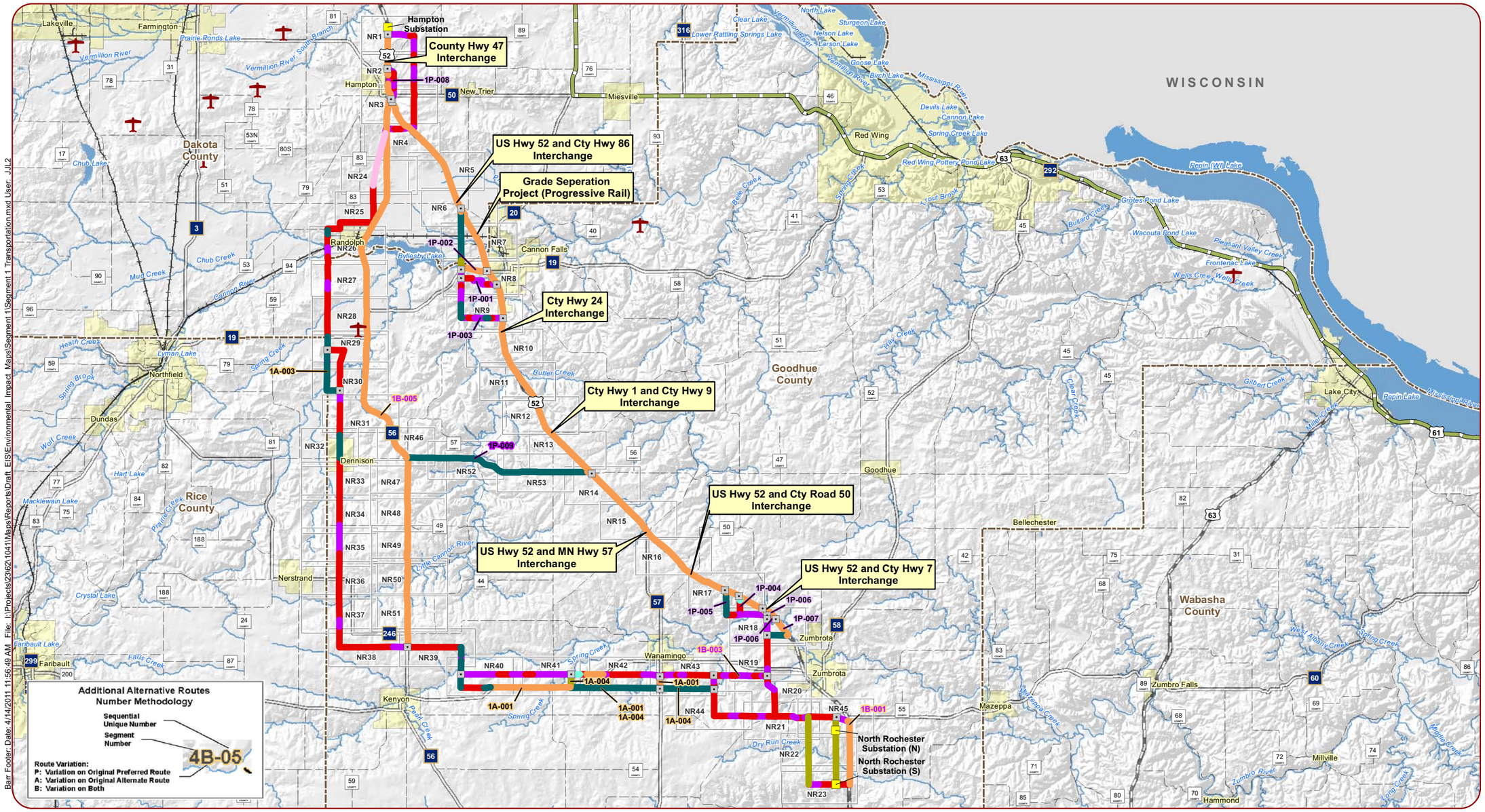
Local governments and DOT have expressed concern about the potential for having to pay the high cost of relocating the poles, should they need to be moved in the future. Along US Hwy 52, relocation costs for poles placed outside of the highway ROW would be borne by the State Trunk Highway Fund. According to the Route Permit Application, average costs are $2.3 million per mile for the 345 kilovolt (kV) transmission line, and $1.2 million per mile for the 161 kV transmission line. These figures represent costs for materials, engineering, survey, and ROW acquisition. However, actual costs for relocation would vary depending on the location, population density, natural resources, and other features at the specific point of relocation, as well as ability to reuse materials.

The applicant has reviewed short-term and mid-term planned construction projects along the US Hwy 52 corridor and the 1P route alternative is not anticipated to impede any of the projects identified. In areas along US Hwy 52 where DOT is considering siting new infrastructure, the applicant has requested a wider route width to allow consideration of ROW options that avoid conflict with DOT plans.

The widened areas are shown on Map 8.1-26 and in Appendix A and include:

- Interchange at Dakota CR-47 near Hampton
- Potential railroad overpass approximate 0.3 miles north of the intersection for 295th Street and US Hwy 52
- Interchange at County 24 Boulevard and the industrial area south of Cannon Falls
- Interchange at County 1Boulevard
- Interchange at County 9 Boulevard
- Along US Hwy 52, approximately 0.7 miles north of the intersection of Dakota CR-86 and US Hwy 52 (Farmland Natural Areas Project (FNAP) Easements)

In areas where a wider route width has been requested in order to accommodate potential future roadway expansions, moving the transmission line away from the highway will push the line toward private land. This situation creates a tension between accommodating future highway developments and minimizing the proximity of the line to homes and other structures located along the roadway in these areas. The total number of residences and structures in each of the widened areas along



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NR1 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.

- Project Substations
- County Boundaries
- Airport
- Scenic Byway

ROW Sharing
- Pipeline
- County or Township Road
- Major Highway
- Municipal Street
- Railroad
- Trail
- Transmission LIne

Non-ROW Sharing
- Field Line
- Cross Country

Map 8.1-26
Transportation Map
Segment 1, Hampton Substation to North Rochester Substation

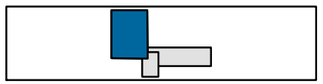


Table 8.1.4.11-1 Residences and structures within widened route width areas along US Hwy 52 - Segment 1

Interchange Name	Residences within route width	Other structures within route width
Cty Hwy 47 Interchange	3	0
US Hwy 52 and Cty Hwy 86 Interchange	0	0
Grade Separation Project (Progressive Rail)	0	0
Cty Hwy 24 Interchange	27	35
Cty Hwy 1 and Cty Hwy 9 Interchange	4	2

US Hwy 52 is summarized in Table 8.1.4.11-1. Depending on the final route centerline selected during permitting, accommodating future roadway expansion in these areas may result in impacts to these residences.

Between the Hampton Substation and the North Rochester Substation the 1A route alternative primarily follows property lines. Along this segment of the 1A route, the primary location where compatibility with road safety and expansion plans might be considered is the crossing at US Hwy 52 and MN Hwy 56.

A review of readily available transportation planning documents for the affected counties did not indicate any additional conflicts with roadway expansion or development plans for any of the route alternatives considered along this segment.

Railroads

Between the Hampton Substation and the North Rochester Substation the 1A route parallels railroad grade for a portion of the route (just after crossing MN Hwy 56). This railroad grade is abandoned and no impacts are expected to rail transport.

Initial plans are underway for a high speed passenger rail line from the Twin Cities to Rochester. Route options within this segment that share corridor with Hwy 52 may present challenges for the construction and operation of this possible rail line.

Airports and Landing Strips

There are three airports that are subject to Federal Aviation Administration (FAA) and DOT regulations in the project area in Minnesota: Stanton Airfield, Dodge Center, and Rochester International. FAA regulations state that notice of planned construction is required for a structure that falls into one of the following categories (FAA form 460-1):

- More than 200 feet in height;
- Height greater than 100:1 slope within 20,000 feet of a runway more than 3,200 feet in length;
- Height greater than 50:1 slope within 10,000 feet of a runway shorter than 3,200 feet in length; or Height greater than 25:1 slope within 5,000 feet of a heliport.

The Stanton Airfield is a privately owned and public-use airport located near Stanton, Minnesota and is located in the project area, within 1 mile of the 1A route alternative and several route alternatives proposed during scoping (1A-001, 1A-003, 1A-004, 1B-001, 1B-003, 1B-005, 1P-009). Federal Aviation Regulations (FAR) Part 77, Imaginary Surfaces, and Minn. R. 8800.2400, Airport Zoning Standards, were analyzed for the runways at Stanton Airfield. Both of the 1P and 1A route alternatives and proposed route alternatives 1A-001, 1A-003, 1A-004, 1B-001, and 1B-003 are located outside the safety zones established by the FAA and Minnesota Rule. Proposed route alternatives 1B-005 and 1P-009 pass within 300 feet of the east end of one of the Stanton Airfield runways and would present an obstacle to safe operation of the airfield.

The centerline of the 1P route is approximately 5 miles east of the Stanton Airfield, and the centerline of the 1A route is approximately 1.2 miles west of the Stanton Airfield. A review of Federal Aviation Regulations (FAR) Part 77, Imaginary Surfaces, and Minn. R. 8800.2400, Airport Zoning Standards, indicates that both the 1A and 1P routes are located outside the safety zones established by the FAA and the Minnesota Rule.

Certain objects such as steel pole transmission line structures can present a challenge to the operation of airport navigational aids and weather observation station facilities. Specifically, these facilities include very high frequency omni-directional radio range (VOR) air navigation systems and Automated Weather Observation Stations (AWOS). The FAA Order 6820.10, VOR, VOR/DME (Distance Measuring Equipment), and VHF Omni-Directional Range/TacticalAircraft Control (VORTAC) Siting Criteria, specifies the distance setback requirements for trees, buildings, and metallic structures. Within this order, Chapter 3, Section 15 identifies obstruction criteria for a VOR facility. Subsections D and E describe the setback distances for transmission lines and pole structures.

These regulations specify that overhead transmission line structures with conductors should be located beyond 1,200 feet of the VOR antenna to avoid communication interference. Additionally, metallic structures are required to subtend vertical angles of 1.2 degrees or less, measured from the ground elevation of the VOR facility. Based on these requirements, a 175-foot structure, the proposed pole height for the project, would have no impact on a VOR facility or antenna if it were located at least 8,350 feet away from a VOR facility or antenna. There are no VOR facilities or antennas within 2 miles of the 1P route alternative, 2P route alternative, 3P route alternative, 1A route alternative, 2A route alternative, or 3A route alternative. No impacts to VOR facilities or antennas are expected from these routes.

Mitigation

General mitigation measures to minimize impacts to transportation and public services are discussed in Section 7.11. Within this segment, impacts to transportation include potential short term, temporary impacts to roadways during construction, potential effects on future road expansion/modification, and possible impacts to the operation of Stanton Airfield (proposed route alternatives 1B-005 and 1P-009). Based on consultation with DOT, the 1A and 1P route alternatives are not expected to impact roadway expansion plans on US Hwy 52. Impacts to Stanton Airfield can be avoided by choosing a route option that allows adequate distance between the transmission line and the airfield. Due to the very close proximity of route alternatives 1B-005 and 1P-009 to the airfield, it is unlikely that modified transmission line structures could be used to meet height requirements for structures near the airfield.

8.1.4.12 Recreation Resources – Analysis of Segment Alternatives for the Hampton to North Rochester Substation Segment

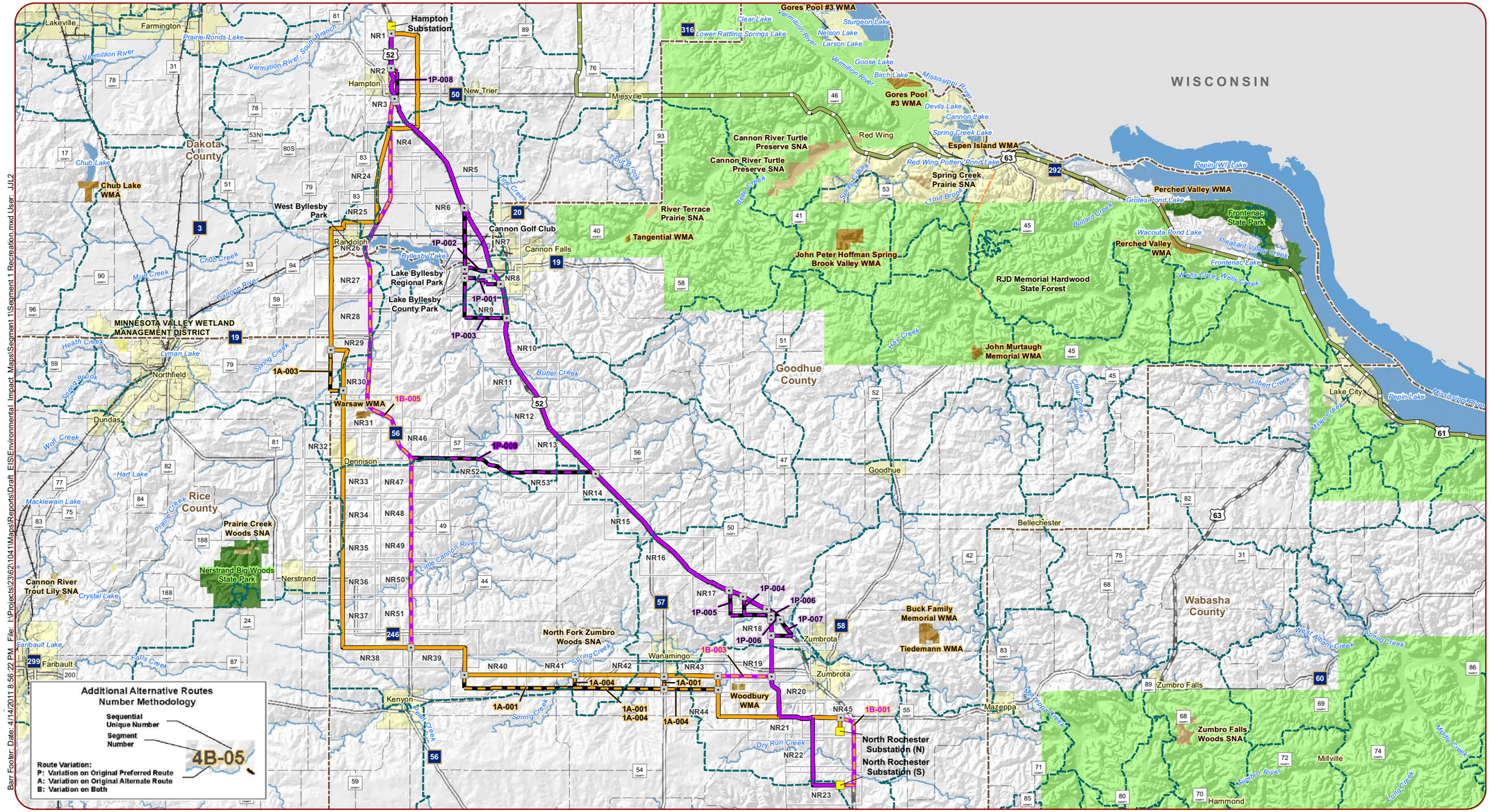
Several sources of data (see Appendix B) were reviewed to identify recreation resources within proximity of each route alternative within Segment 1. Map 8.1-27 and the detailed maps in Appendix A identify the recreation resources within the vicinity of each route alternative. The main recreation resources in this segment include one SNA, two WMAs, three county parks, the Cannon Golf Club, the Cannon River, and snowmobile trails.

The route alternatives in this segment have 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, recreation resources may experience viewshed impacts from the transmission line.

There is one SNA, the North Fork Zumbro Woods SNA, located within the vicinity of Segment 1. The North Fork Zumbro Woods SNA is located within one mile of the A and B route alternatives (Map 8.1-27).

The Warsaw and Woodbury WMAs are both located within the vicinity of the project area (Map 8.1-27). The Warsaw WMA is located within one mile of the A and B route alternatives and route alternative 1P-009. The Warsaw WMA is also located within the 1,000-foot route width of route alternatives 1B-005 and 1P-009. The Woodbury WMA is located within one mile of all route alternatives within this segment.

There are three county parks located within the 150-foot ROW of various route alternatives; these include West Byllesby Park, Lake Byllesby Regional Park, and Lake Byllesby County



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NR1 Appendix A Map Index

0 1.5 3 6 Miles

0 2.5 5 10 Kilometers

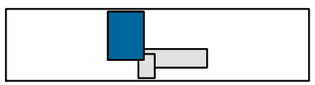
For detailed maps refer to Appendix A.
Refer to Appendix B for information on data sources.

Original Alignments
- P Route
- A Route

Additional Alternative Routes
- Variation on P Route
- Variation on A Route
- Variation on Both

- Project Substations
- County Boundaries
- Scenic_Byway
- State Existing Trail
- Snowmobile Trail
- Scientific and Natural Area
- Wildlife Management Area
- State Park
- State Forest
- Wildlife Refuge

Map 8.1-27
Recreation Map
Segment 1, Hampton Substation to North Rochester Substation



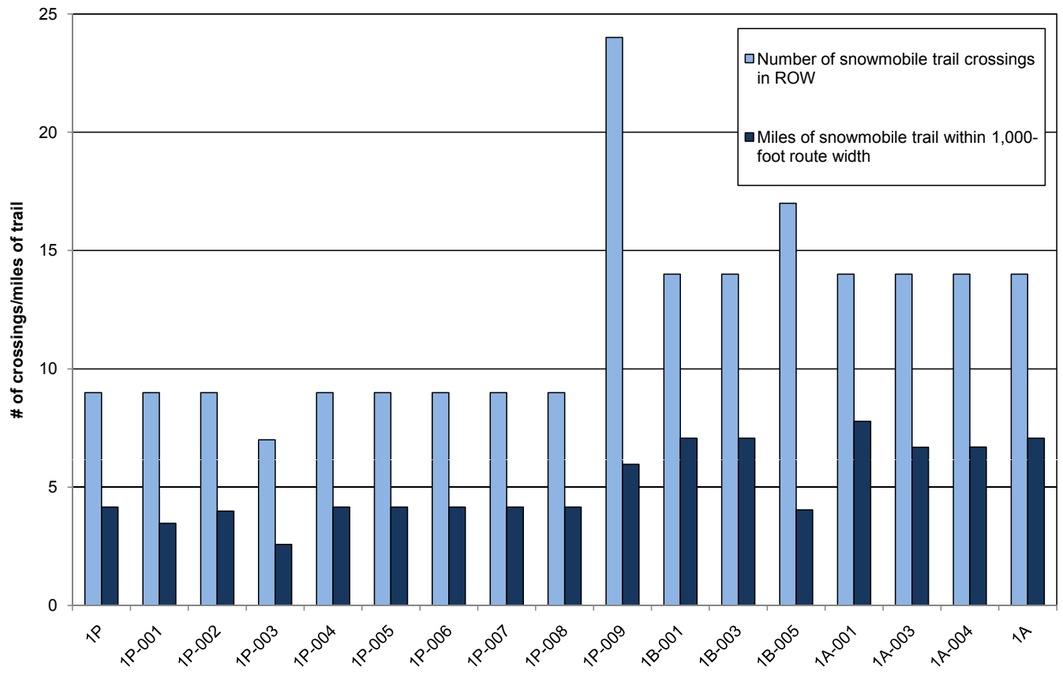
Park (Map 18.1-27). All of the A and B route alternatives would run along Randolph Road, which goes through West Byllesby Park (Map 8.1-27). Route alternatives 1P-001, 1P-002, and 1P-003 would all run along the east boundaries of Lake Byllesby Regional Park and Lake Byllesby County Park (Map 8.1-27). These route alternatives would run along an existing HVTL.

The Cannon Golf Club is located north of the Cannon River, west of U.S. 52 (Map 8.1-27). Route alternatives 1P, 1P-004, 1P-005, 1P-006, 1P-007, and 1P-008 would all run along the eastern boundary of the Cannon Golf Club. Route alternatives 1P-001, 1P-002, and 1P-003 would run approximately 0.25 miles west of the Cannon Golf Club boundary.

All route alternatives would cross the Cannon River, in a section that is designated by the DNR as Recreational under the Minnesota Wild, Scenic, and Recreational Rivers system (Map 8.1-24). None of the route alternatives would be seen from the section of the Cannon River that is designated by the DNR as Scenic; all route alternatives are at least 1.5 miles west of this section of the Cannon River (Map 8.1-24).

Snowmobile trails are abundant throughout the project area (Map 8.1-27). All route alternatives in this segment would have between 7 and 24 snowmobile trail crossings within the ROW and between 2.5 and 7.8 miles of snowmobile trail within the 1,000-foot route width. The A and B route alternatives, and route alternative 1P-009 have more snowmobile crossings than the remaining route alternatives (Figure 8.1.4.12-1). Route alternative 1B-005 and the P route (except 1P-009) have fewer miles of snowmobile trails within the 1,000-foot route width than the remaining route alternatives in this segment (Figure 8.1.4.12-1).

Figure 8.1.4.12-1 Snowmobile trails along each route alternative - Segment 1



Source: Minnesota Department of Natural Resources

Mitigation

The North Fork Zumbro Woods SNA is not likely to be impacted because the boundaries are more than one half mile from any of the route alternatives in this segment. The Woodbury WMA is not likely to be impacted because the boundary is more than 1,300 feet away from the closest route alternative in this segment. If route alternative 1P-009 or 1B-005 is chosen, the transmission line may be seen from the Warsaw WMA, which would be approximately 450 feet from the WMA boundary.

Several route alternatives in this segment would be visible from at least one of the county parks. Choosing a route alternative, such as 1P, 1P-004, 1P-005, 1P-006, 1P-007, or 1P-008, which is not within the 1,000-foot route width of West Byllesby Park, Lake Byllesby Regional Park, and Lake Byllesby County Park could minimize impacts. However, there is already an existing HVTL in the viewshed of Lake Byllesby Regional Park and Lake Byllesby County Park, where route alternatives 1P-001, 1P-002, and 1P-003 would run; because of this, impacts to these parks would be minimal if one of these route alternatives were chosen.

The Cannon Golf Club would be visible from several route alternatives in this segment. Choosing one of the A route alternatives could minimize impacts to the Cannon Golf Club.

The transmission line would be visible from snowmobile trails for any of the route alternatives in this segment. Snowmobile trails may be temporarily impacted during construction where the transmission line would cross or parallel the trail. Choosing one of the P route alternatives (except 1P-009) could minimize impacts to snowmobile trails because these route alternatives have the fewest snowmobile crossings in the ROW and the fewest miles of snowmobile trail within the 1,000-foot route width.

8.1.4.13 Air Quality—Analysis of Segment Alternatives for Hampton to North Rochester Substation Segment

Discussion of potential air quality impacts is provided in Section 7.13. Potential air quality impacts from operation 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 route alternatives in this segment, and operation of the proposed transmission line is not expected to create any potential for the concentration of these pollutants to exceed existing air quality standards. Minor short-term emissions associated with construction will also occur, regardless of the route alternative chosen. Thus, the nature of impacts to air quality is not expected to vary notably from one route alternative to the next.