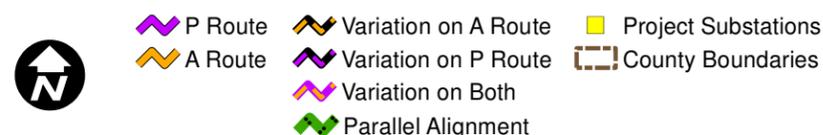
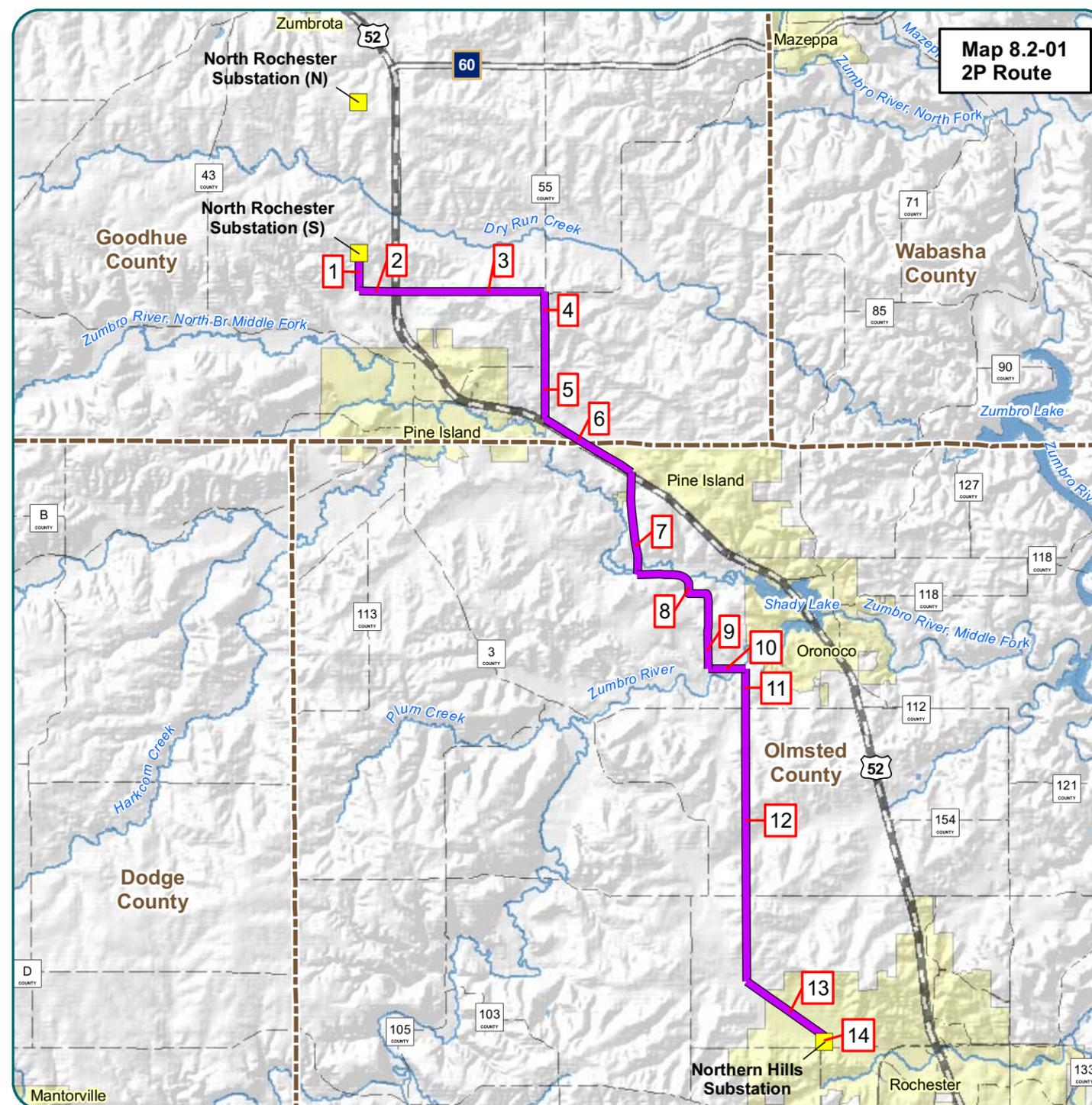
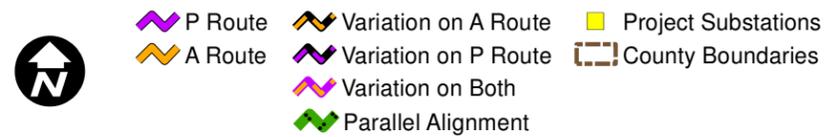
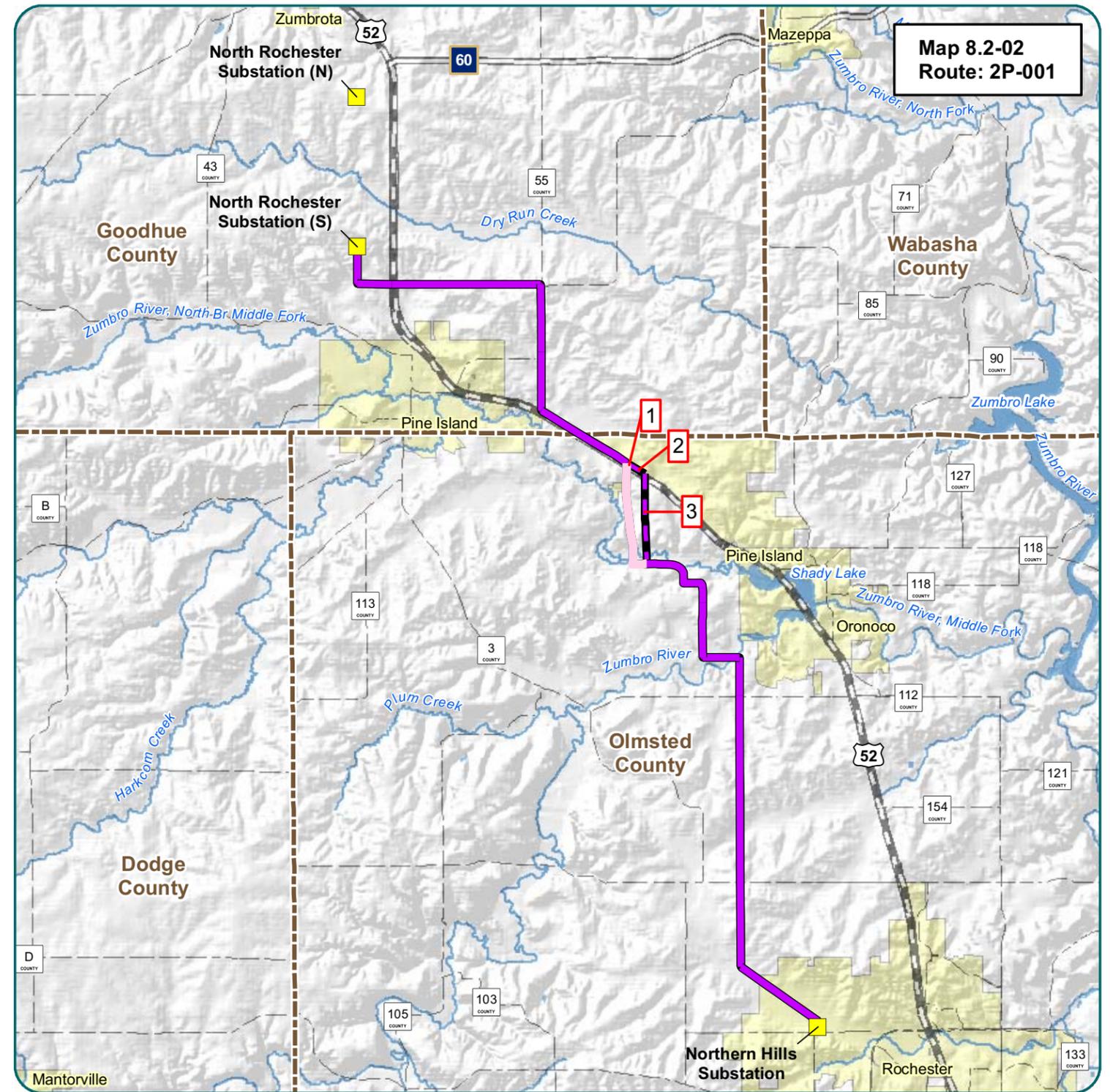


8.2.1 Description of Route Alternatives – North Rochester Substation to Northern Hills Substation

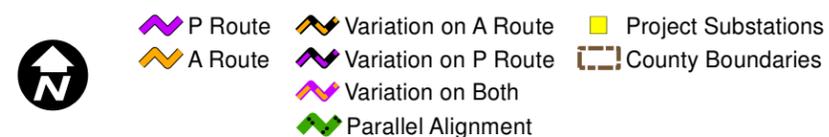
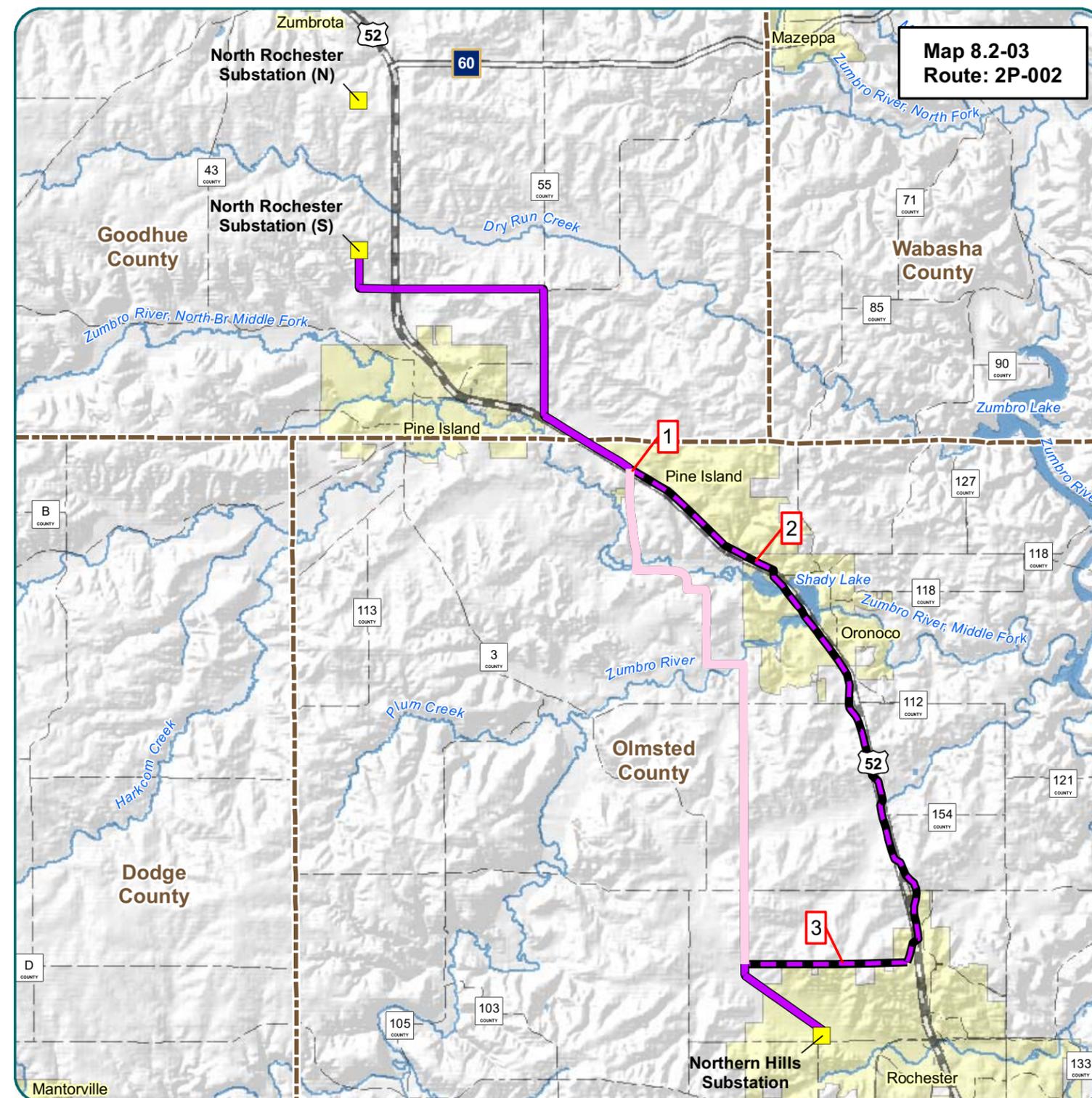
North Rochester to Northern Hills (2P)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 From the proposed North Rochester Substation (S) go south following transmission line	0.51	Transmission Line
2 Turn east following field line	0.46	Field Line
3 Continue east following 500th St.	2.00	Cty or Twp Road
4 Turn south following CSAH 11	0.90	Cty or Twp Road
5 Continue south following 210th Ave	0.78	Cty or Twp Road
6 Turn southeast following MN Hwy 52	1.34	Major Hwy
7 Turn south following CSAH 31	1.36	Cty or Twp Road
8 Turn east then south following 117th St. NW	1.35	Cty or Twp Road
9 Continue south following 65th Ave NW	0.74	Cty or Twp Road
10 Turn east following field line/cross-country	0.49	Field Line/Cross-country
11 Turn south cross-country to 60th Ave NW	0.50	Cross-country
12 Continue south following 60th Ave NW	3.62	Cty or Twp Road
13 Turn southeast following Douglas State Trail/Transmission line	1.26	Trail/Transmission Line
14 Turn south following transmission line and enters the Northern Hills Substation Area	0.08	Transmission Line



North Rochester to Northern Hills (2P-001)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 Follow the applicant's preferred route until the intersection of US Hwy 52 and CSAH 31		
2 Continue southwest following US Hwy 52	0.28	Major Hwy
3 Turn south cross-country	1.21	Returns to preferred route - Cross-country

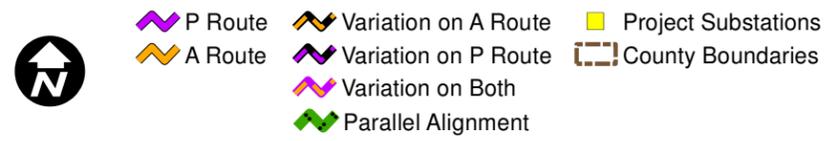
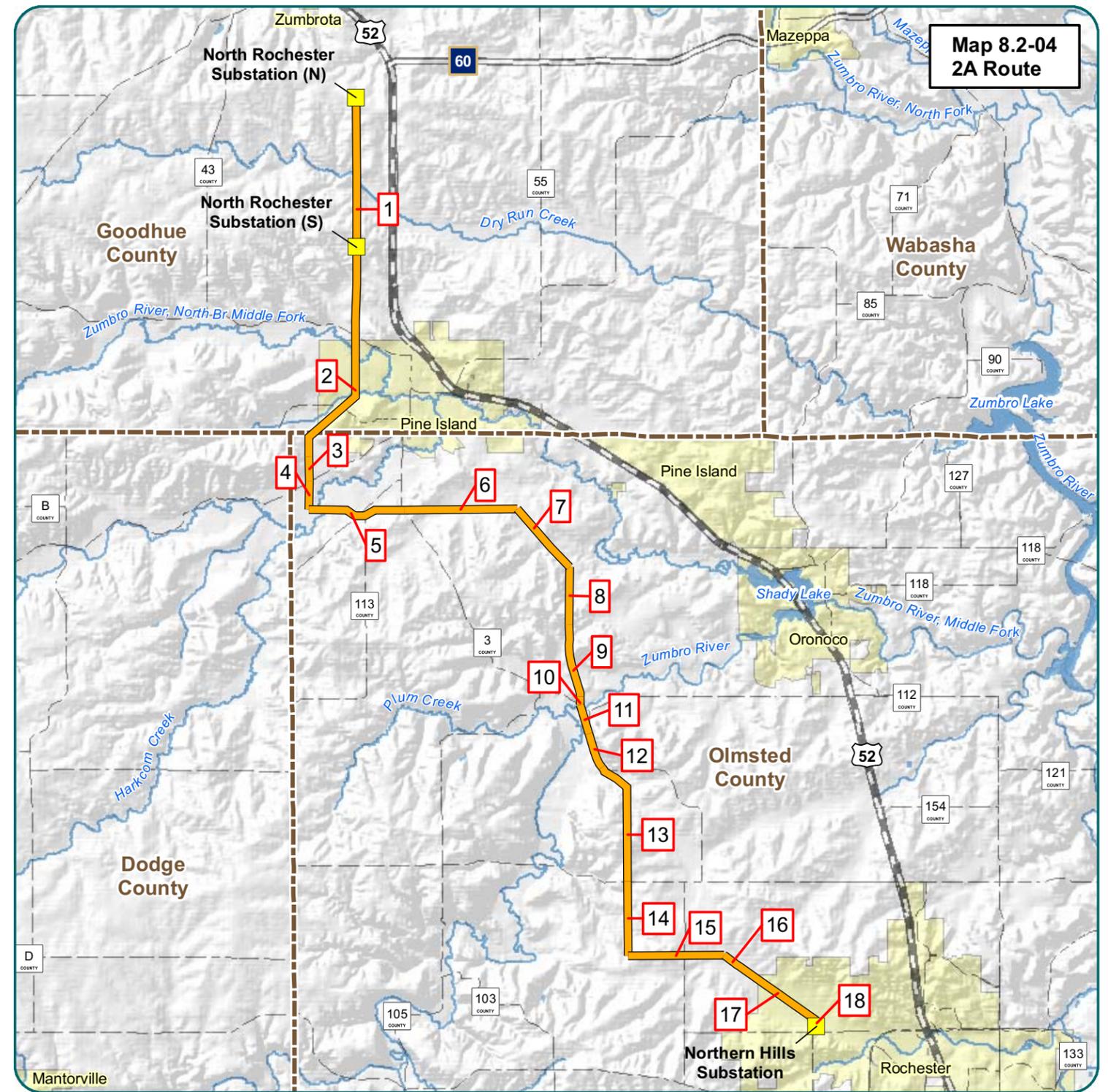


North Rochester to Northern Hills (2P-002)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1		Follow the applicant's preferred route until the intersection of US Hwy 52 and CSAH 31
2	8.20	Major Hwy
3	2.15	Returns to preferred route - Cnty or Twp Road

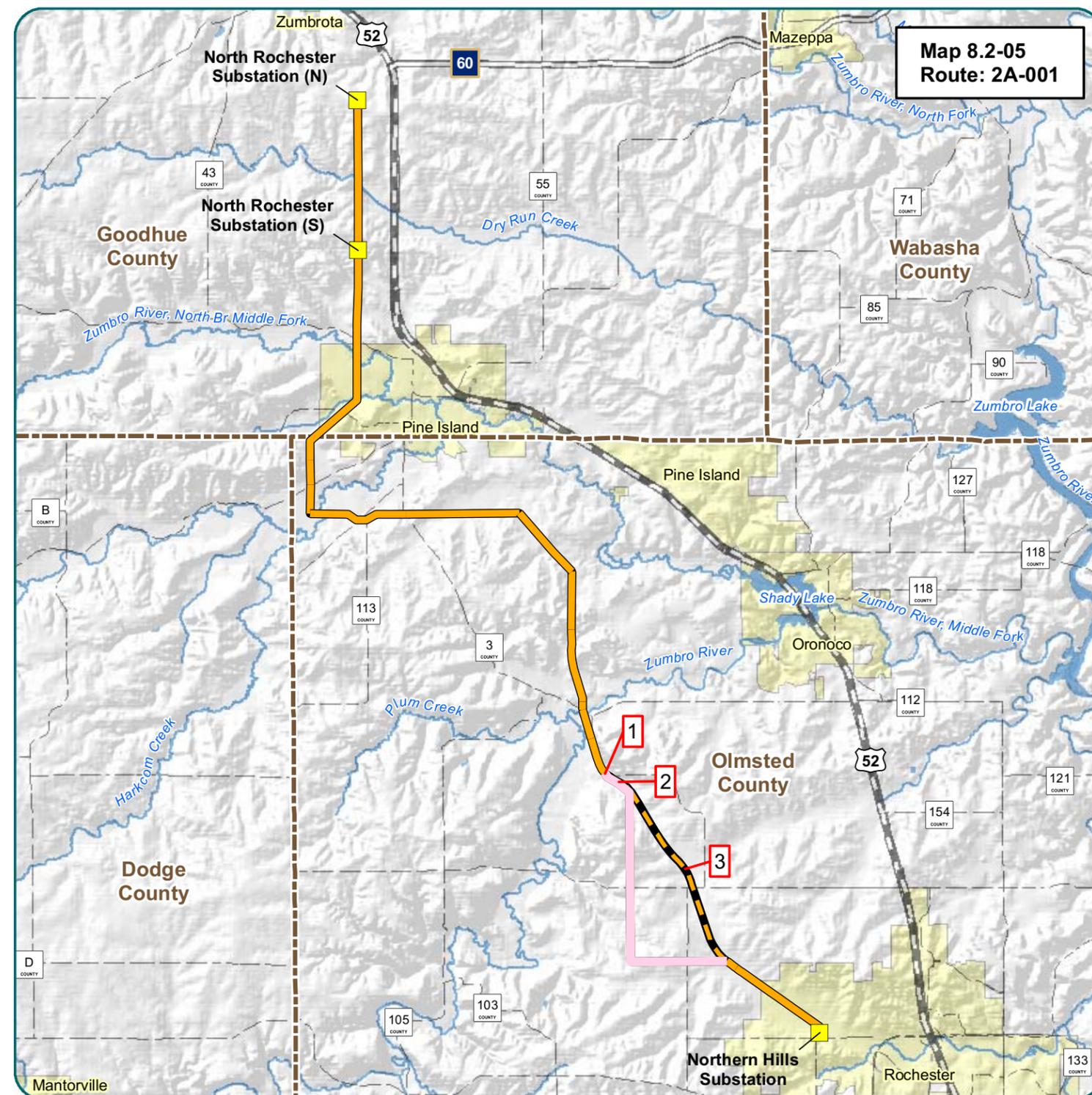


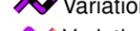
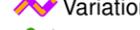
Section 8.2
North Rochester Substation to Northern Hills Substation

North Rochester to Northern Hills (2A)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	From the North Rochester Substation (N) go south following transmission line to North Rochester Substation (S)	1.99	Transmission Line
2	From the North Rochester Substation (S) go south/southwest following transmission line	3.09	Transmission Line
3	Continue south following T-1382 and transmission line	0.32	Cty or Twp Road/Transmission Line
4	Continue south following transmission line	0.38	Cty or Twp Road/Transmission Line
5	Turn east following field line/cross-country to 125th St. NW	1.32	Field Line/Cross-country
6	Continue east following 125th St. NW	1.52	Cty or Twp Road
7	Turn southeast following Douglas State Trail	1.04	Trail
8	Turn south following field line/cross-country to New Haven Road NW	0.77	Field Line/Cross-country
9	Continue south following New Haven Road NW	0.98	Cty or Twp Road
10	Continue south cross-country to Douglas State Trail	0.11	Cross-country
11	Turn southeast following Douglas State Trail	0.40	Trail
12	Continue southeast following CSAH 3	0.49	Cty or Twp Road
13	Continue southeast then south following 75th Ave. NW	1.69	Cty or Twp Road
14	Continue south following field line	0.99	Field Line
15	Turn east following 65th St. NW	1.29	Cty or Twp Road
16	Turn southeast following Douglas State Trail	0.15	Trail
17	Continue southeast following Douglas State Trail/Transmission line	1.36	Trail/Transmission Line
18	Turn south following transmission line and enters the Northern Hills Substation Area	0.08	Transmission Line



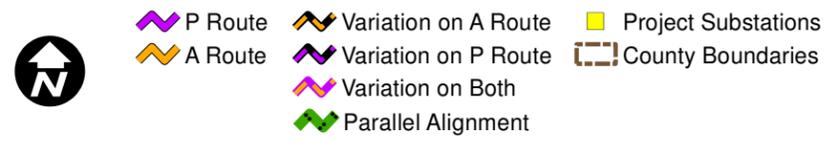
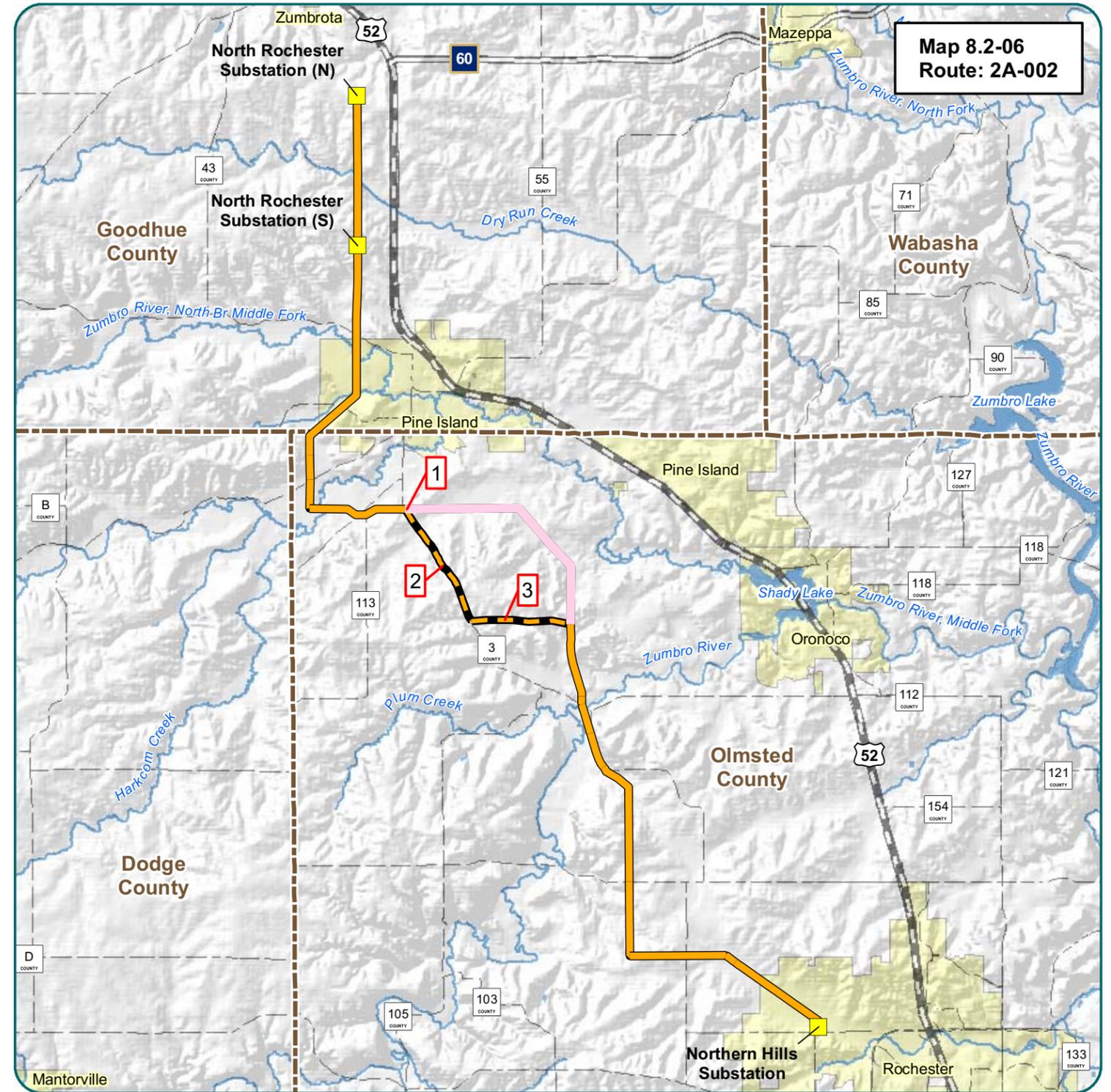
North Rochester to Northern Hills (2A-001)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 Follow the applicant's alternate route just north of intersection 90th Street and 75th Ave. NW		
2 Turn southeast following 75th Ave. NW	0.41	Cty or Twp Road
3 Continue southeast following Douglas Trail	2.66	Returns to applicant's alternate route - Trail



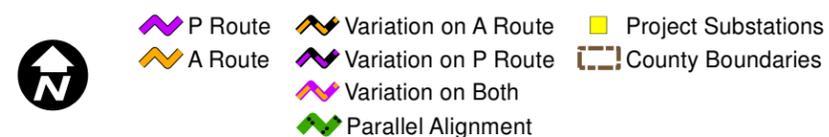
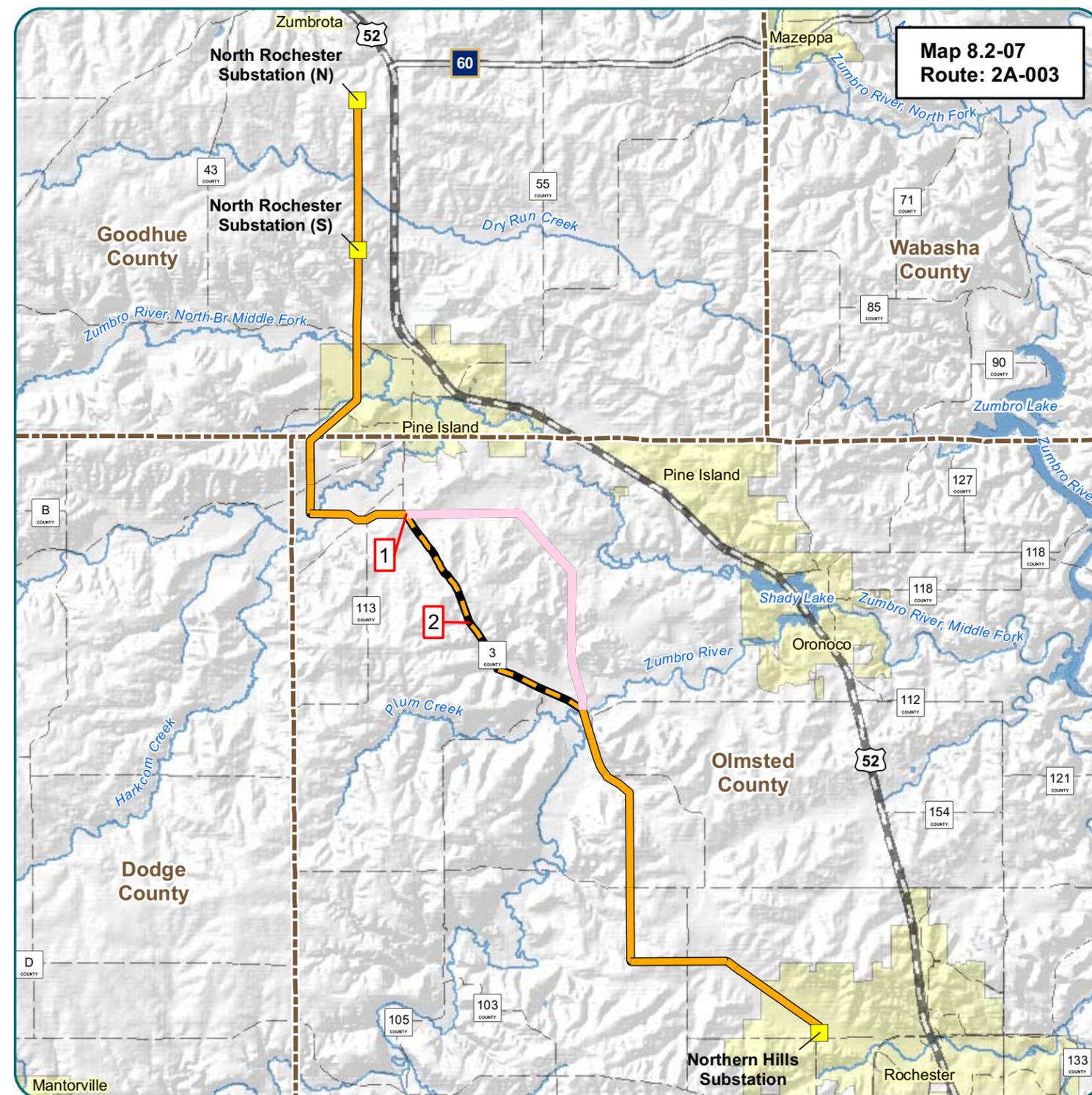
-  P Route
-  A Route
-  Project Substations
-  County Boundaries
-  Variation on A Route
-  Variation on P Route
-  Variation on Both
-  Parallel Alignment

Section 8.2 North Rochester Substation to Northern Hills Substation

North Rochester to Northern Hills (2A-002)			
	Turn by Turn	Distance (miles)	Comments/ROW Type
1	Follow the applicant's alternate route until the intersection of 125th St. and CSAH 3		
2	Turn southeast following CSAH 3	1.76	Cty or Twp Road
3	Turn east cross-country/field lines	1.33	Returns to applicant's alternate route - Cross-country/field lines

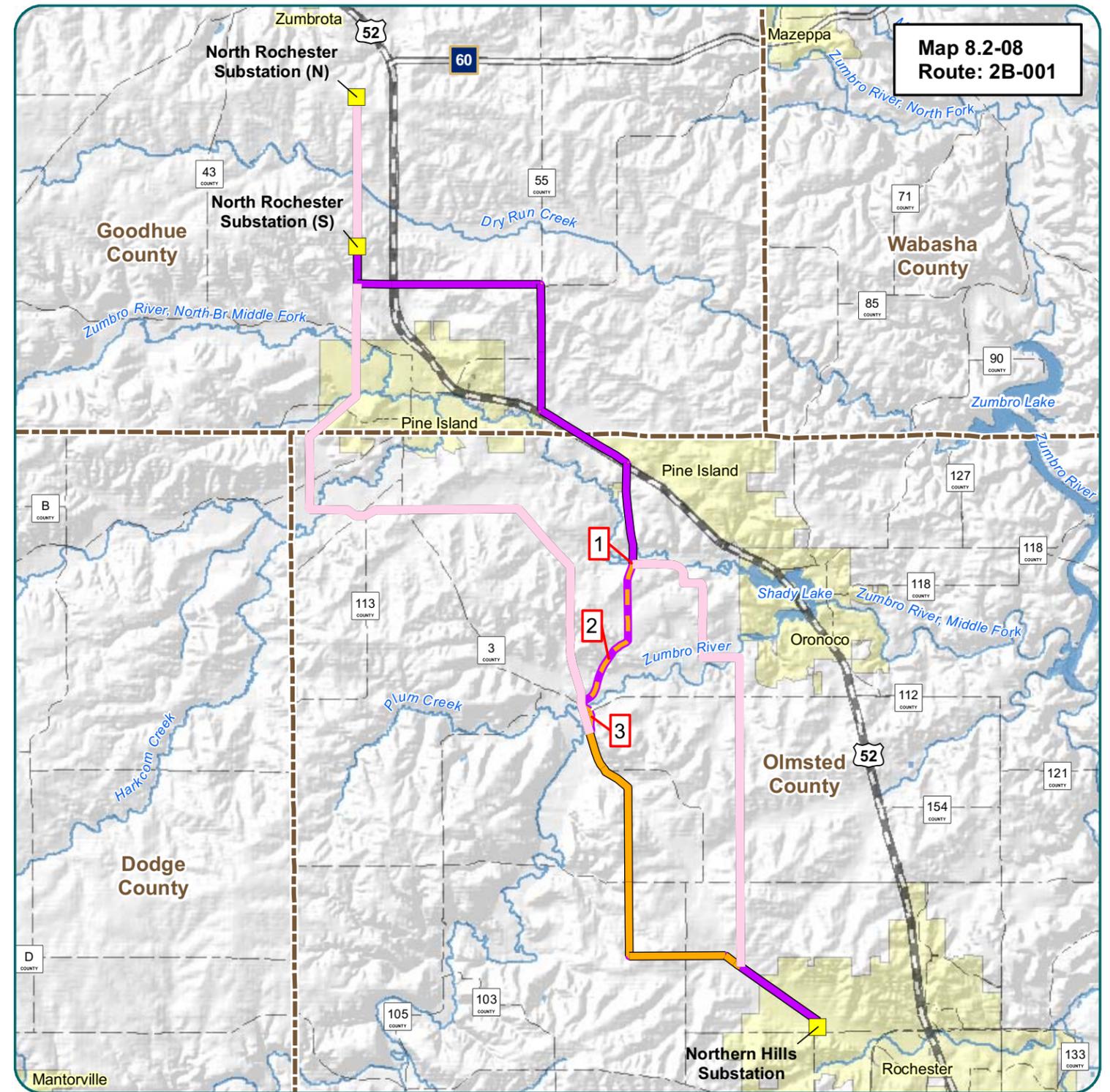


North Rochester to Northern Hills (2A-003)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 Follow the applicant's alternate route until the intersection of 125th St. and CSAH 3		
2 Turn southeast following CSAH 3	3.68	Returns to applicant's alternate route - Cty or Twp Road



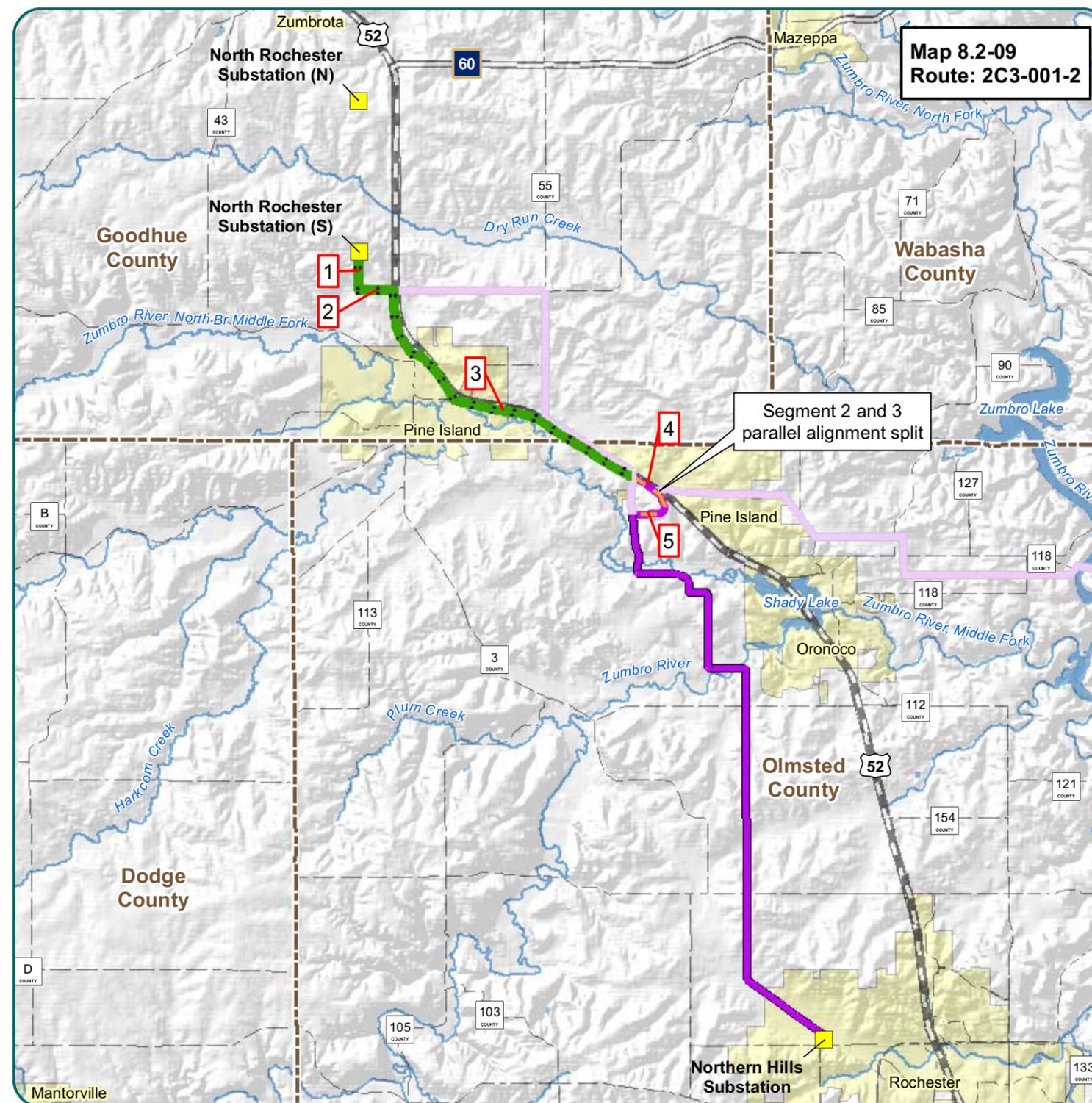
Section 8.2 North Rochester Substation to Northern Hills Substation

North Rochester to Northern Hills (2B-001)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 Follow the applicant's preferred route until the intersection of 117th St. NW and CSAH 31		
2 Continue south following CSAH 31	2.25	Returns to applicant's alternate route - Cty or Twp Road
3 Turn southeast following CSAH 3	0.31	Returns to applicant's alternate route - Cty or Twp Road



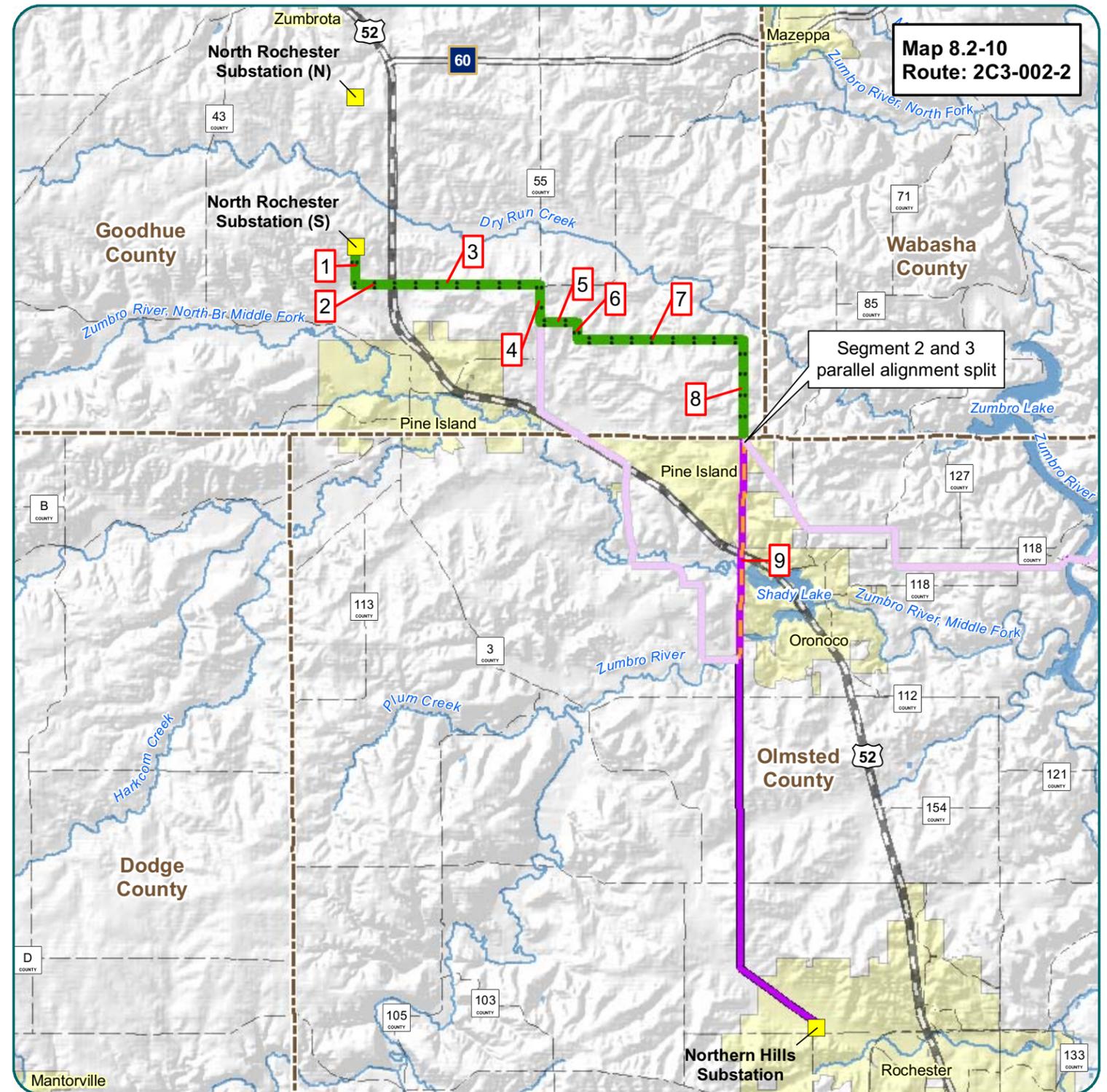
- P Route
- A Route
- Variation on A Route
- Variation on P Route
- Variation on Both
- Parallel Alignment
- Project Substations
- County Boundaries

North Rochester to Northern Hills (2C3-001-2)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 From the North Rochester Substation (S), go south following transmission line	0.51	Transmission Line (Parallel alignment)
2 Turn east following field line	0.46	Field Line (Parallel alignment)
3 Turn south/southeast following US Hwy 52	4.33	Major Hwy (Parallel alignment)
4 Continue southeast cross-country	0.42	Cross-country
5 Turn west cross-country	0.69	Returns to applicant's preferred route - Cross-country



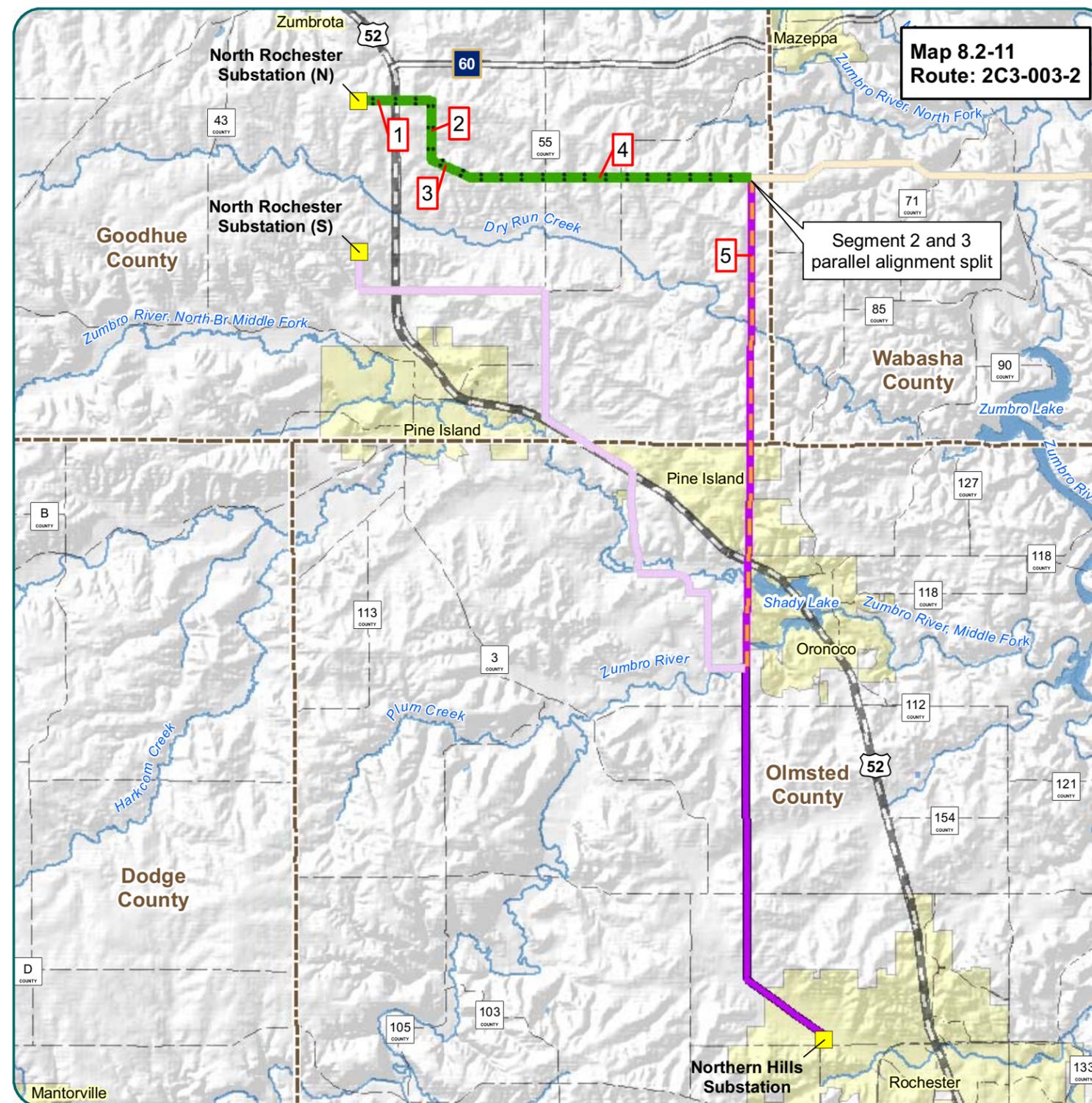
Section 8.2 North Rochester Substation to Northern Hills Substation

North Rochester to Northern Hills (2C3-002-2)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 From the North Rochester Substation (S), go south following transmission line	0.50	Transmission Line (Parallel alignment)
2 Turn east following field line	0.46	Field line (Parallel alignment)
3 Continue east following 500th St.	2.00	Cty or Twp Road (Parallel alignment)
4 Turn south following CSAH 11	0.50	Cty or Twp Road (Parallel alignment)
5 Turn east following field line	0.50	Field line (Parallel alignment)
6 Turn south following field line	0.23	Field line (Parallel alignment)
7 Turn east cross-country	2.23	Cross-country (Parallel alignment)
8 Turn south cross-country/field lines	1.31	Cross-country (Parallel alignment)
9 Continue south cross-country/field lines	2.93	Returns to applicant's preferred route - cross-country



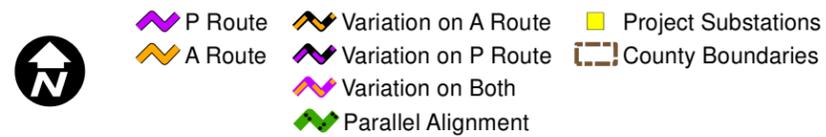
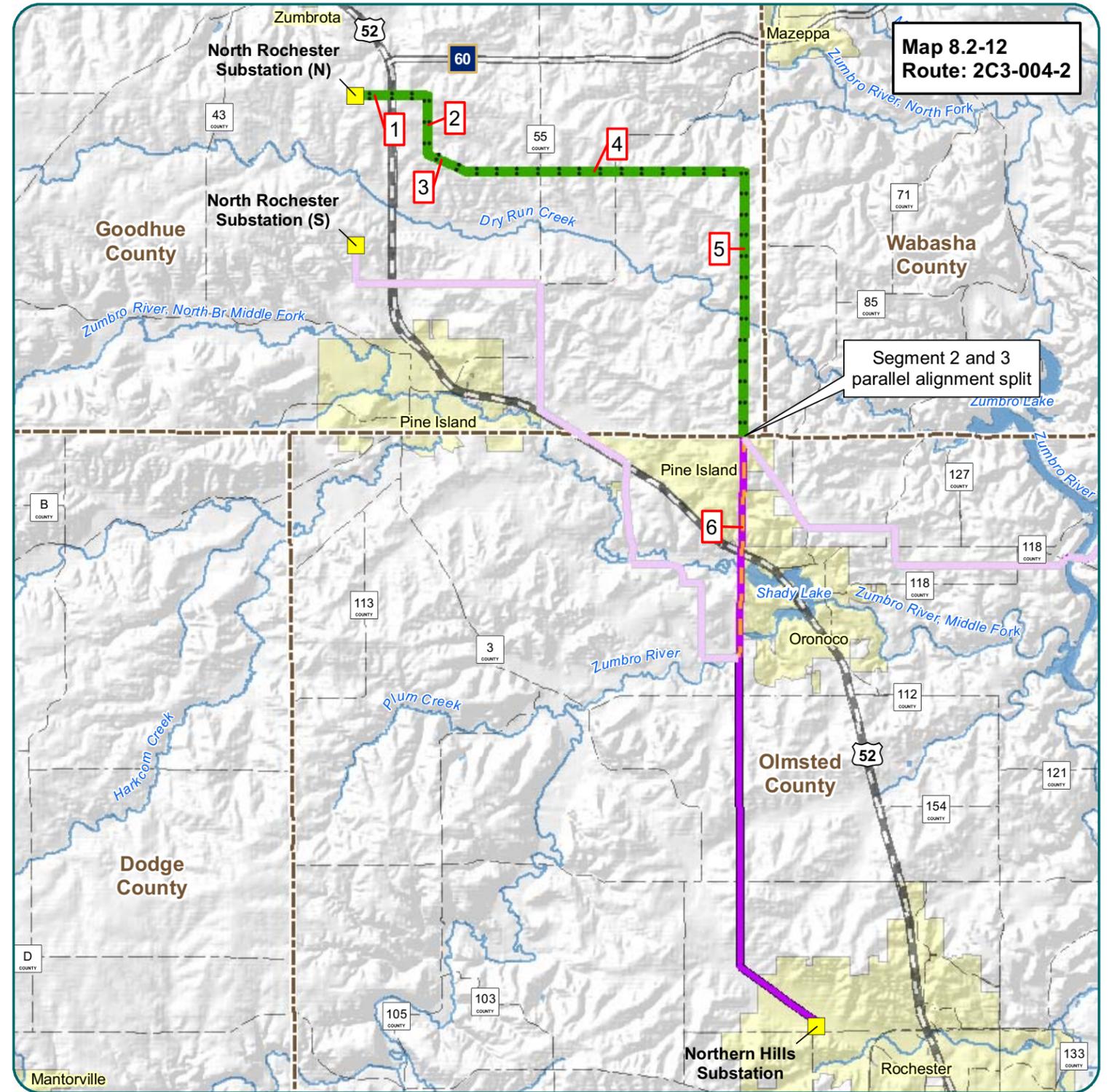
- P Route
- A Route
- Variation on A Route
- Variation on P Route
- Variation on Both
- Parallel Alignment
- Project Substations
- County Boundaries

North Rochester to Northern Hills (2C3-003-2)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 From the North Rochester Substation (N), go east following field line to 195th Ave.	0.97	Field Line (Parallel alignment)
2 Turn south following 195th Ave.	0.78	Cty or Twp Road (Parallel alignment)
3 Turn southeast cross-country	0.52	Cross-country (Parallel alignment)
4 Turn east following field line	3.75	Field Line (Parallel alignment)
5 Turn south cross-country/field line	6.46	Returns to applicant's preferred route - Cross-country

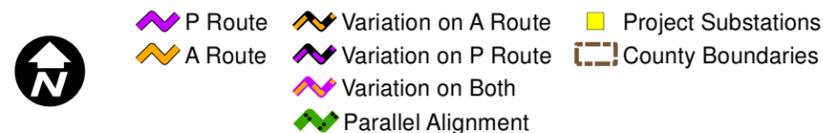
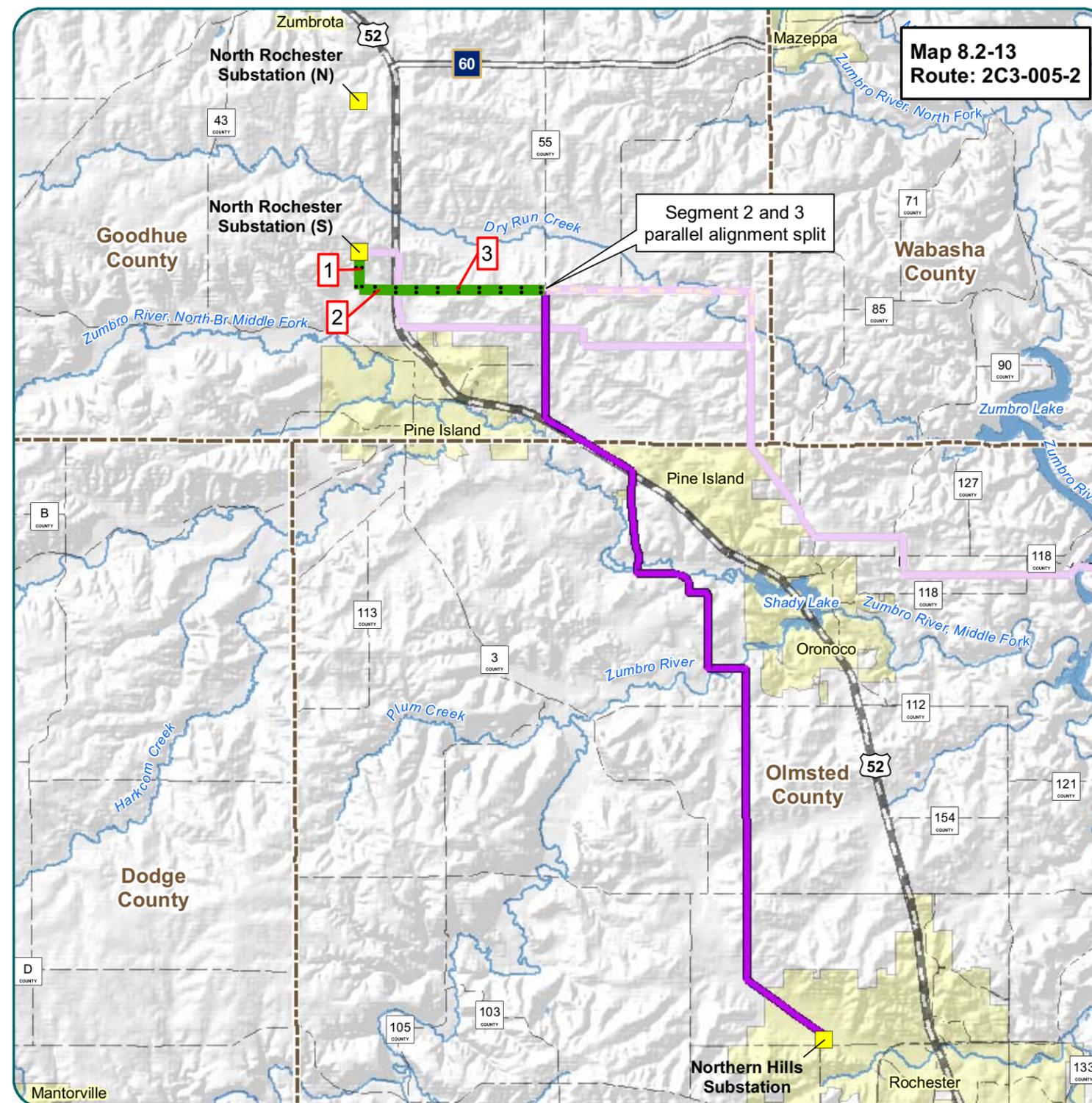


Section 8.2 North Rochester Substation to Northern Hills Substation

North Rochester to Northern Hills (2C3-004-2)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 From the North Rochester Substation (N), go east following field line to 195th Ave.	0.97	Field Line (Parallel alignment)
2 Turn south following 195th Ave.	0.78	Cty or Twp Road (Parallel alignment)
3 Turn southeast cross-country	0.52	Cross-country (Parallel alignment)
4 Turn east following field line/cross-country	3.75	Field Line (Parallel alignment)
5 Turn south cross-country	3.53	Cross-country (Parallel alignment)
6 Continue south cross-country	2.93	Returns to applicant's preferred route - Cross-country

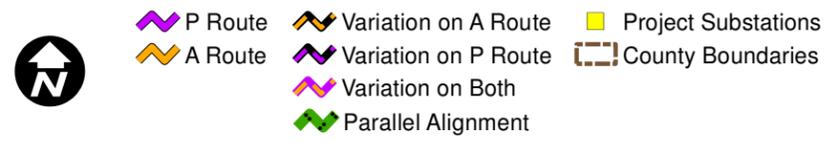
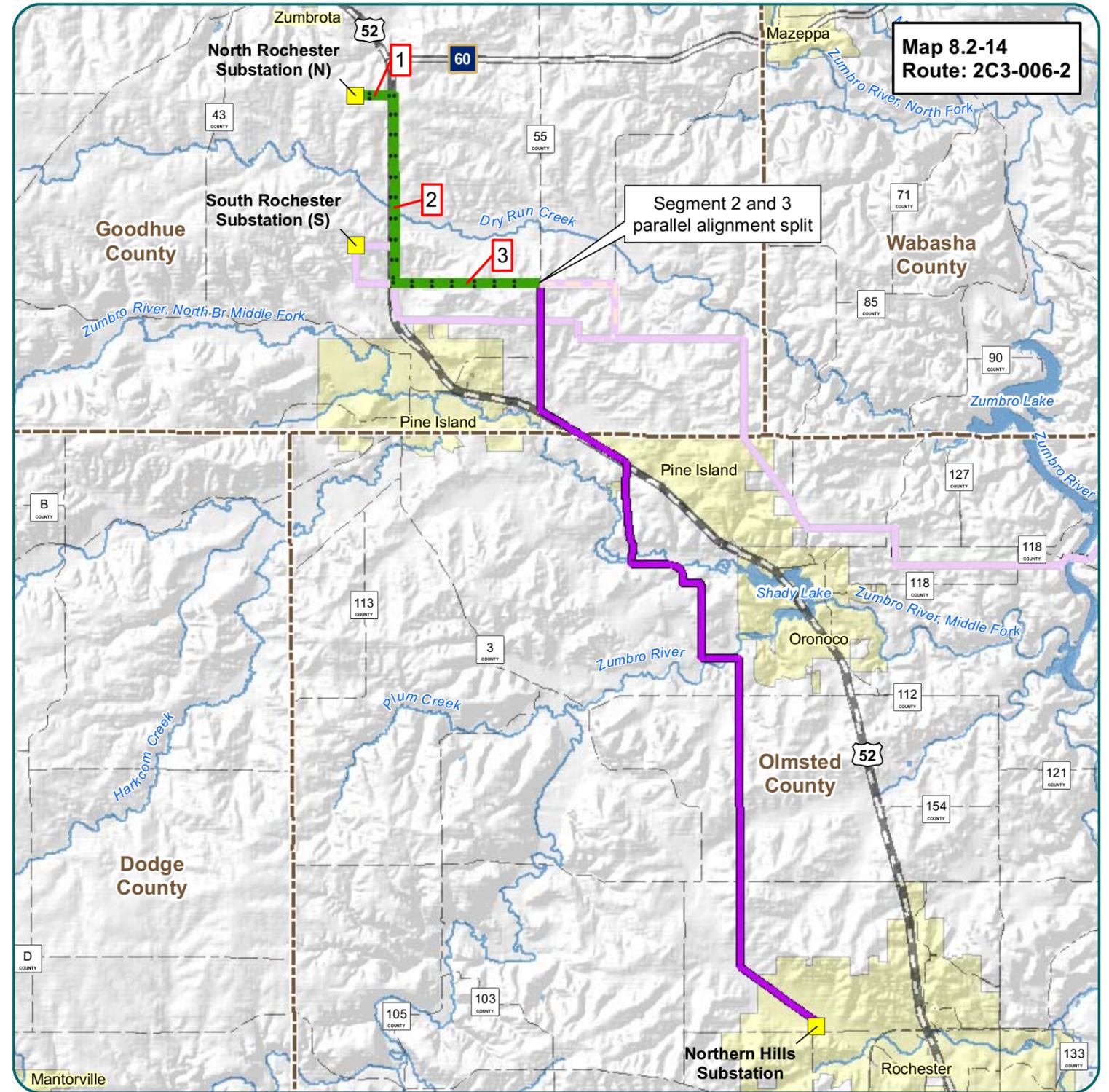


North Rochester to Northern Hills (2C3-005-2)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 From the North Rochester Substation (S), go south following transmission line	0.51	Transmission Line (Parallel alignment)
2 Turn east following field line	0.46	Field Line (Double-circuit)
3 Continue east following 500th St.	2.00	Returns to applicant's preferred route - Cty or Twp Road (Parallel alignment)

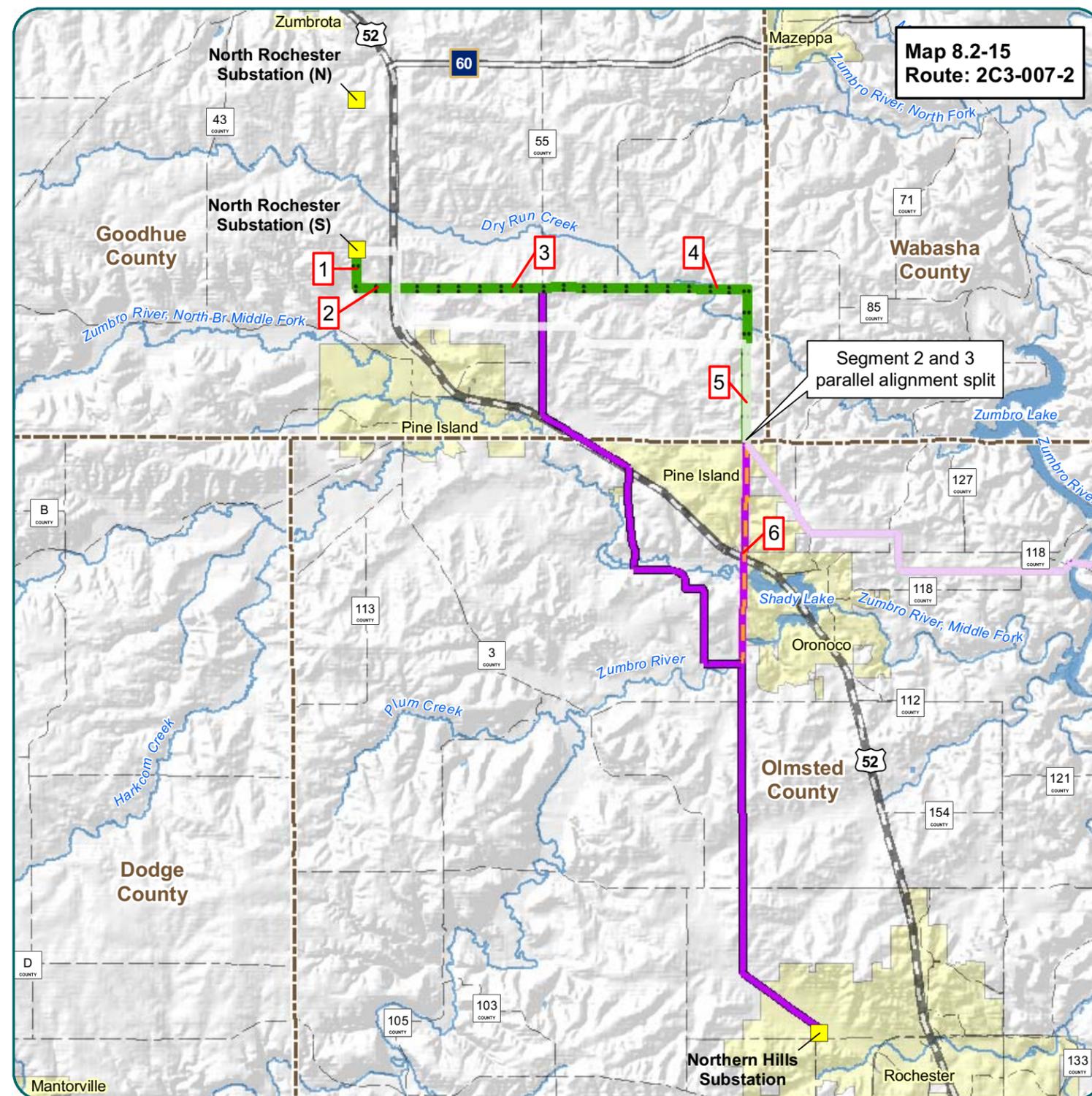


Section 8.2 North Rochester Substation to Northern Hills Substation

North Rochester to Northern Hills (2C3-006-2)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 From the North Rochester Substation (N), go east following field line to US Hwy 52	0.51	Field line (Parallel alignment)
2 Turn south following US Hwy 52	2.50	Major Hwy (Parallel alignment)
3 Turn east following 500th St.	1.94	Returns to applicant's preferred route - Cty or Twp Road (Parallel alignment)

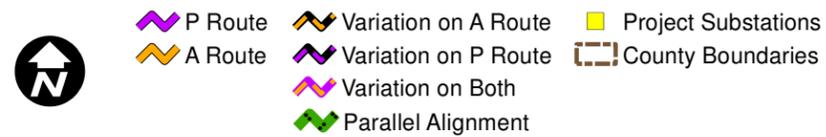
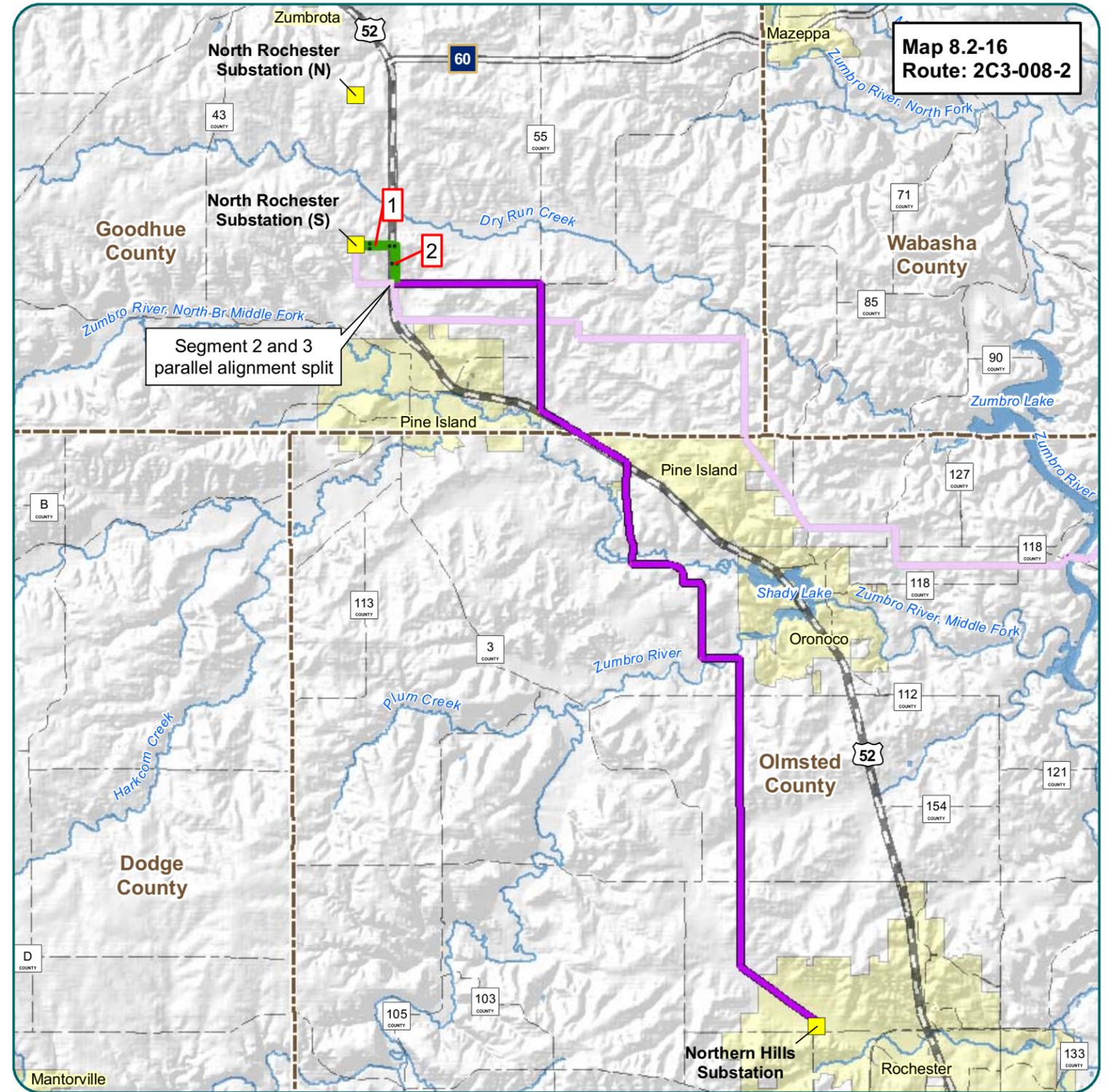


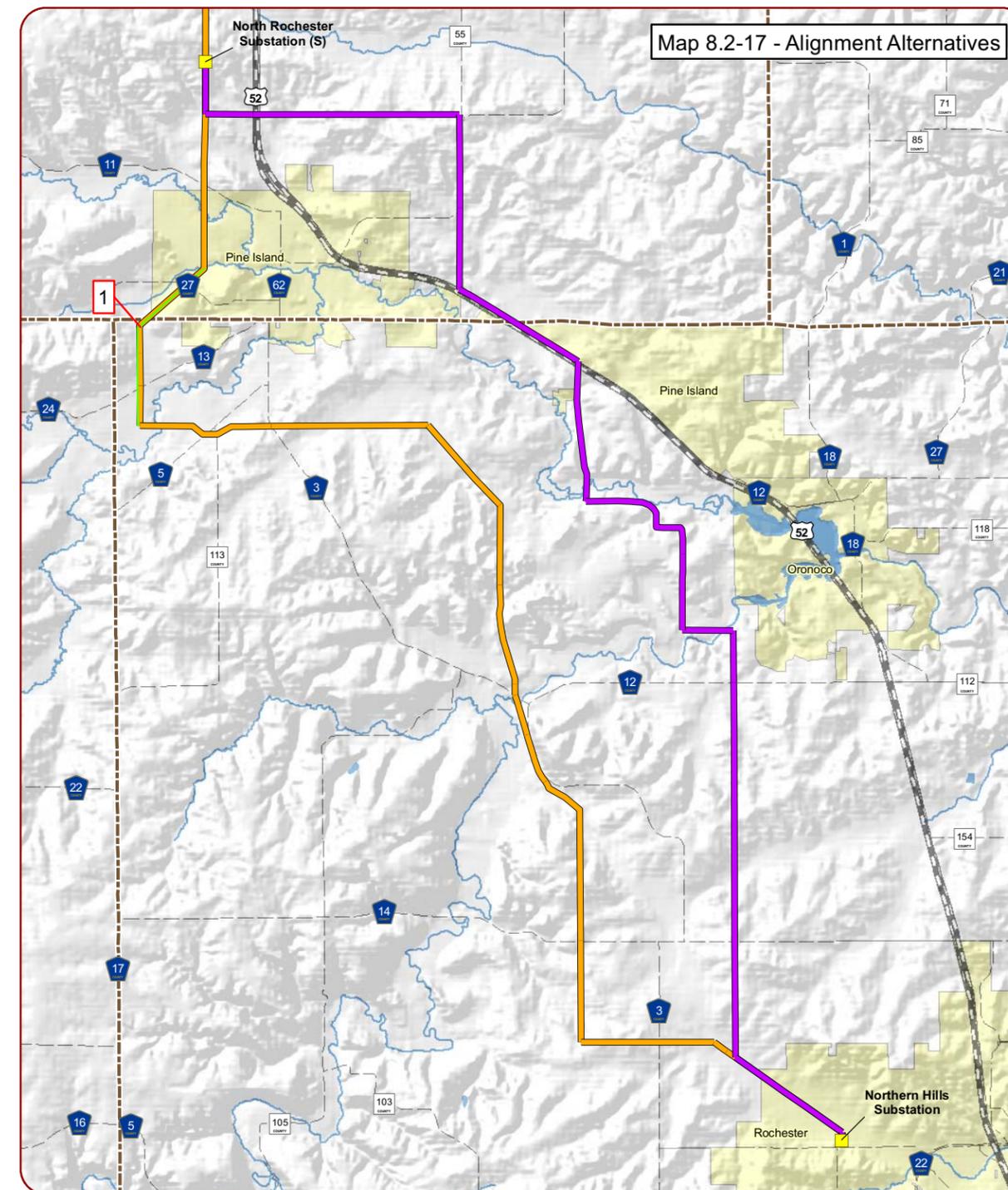
North Rochester to Northern Hills (2C3-007-2)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1 From the North Rochester Substation (S), go south following transmission line	0.51	Transmission line (Parallel alignment)
2 Turn east following field line	0.52	Field Line (Parallel alignment)
3 Continue east on 500th St.	3.95	Cty or Twp Road (Parallel alignment)
4 Continue east cross-country	0.71	Cross-country (Parallel alignment)
5 Continue south cross-country	2.04	Cross-country (Parallel alignment)
6 Continue south cross-country/field line	2.93	Returns to applicant's preferred route - Cross-country/field line



Section 8.2
North Rochester Substation to Northern Hills Substation

North Rochester to Northern Hills (2C3-008-2)		
Turn by Turn	Distance (miles)	Comments/ROW Type
1	0.52	From the North Rochester Substation (S), go east following applicant's preferred route to US Hwy 52
2	0.51	Turn south following US Hwy 52 and applicant's preferred route





- Original P Route
- Original A Route
- Alignment Alternatives
- Variation on P Route
- Variation on A Route
- Variation on Both
- Parallel Alignment
- Project Substations
- County Boundaries

Section 8.2
North Rochester Substation to Northern Hills Substation

8.2.2 Environmental Setting – North Rochester Substation to Northern Hills Substation

This segment of the route extends south from the proposed North Rochester Substation, near Pine Island, to the existing Northern Hills Substation, on the northern edge of the city of Rochester. This segment is located within Goodhue and Olmsted Counties, Minnesota. According to the Minnesota Department of Natural Resources (DNR) Ecological Classification System (ECS), this segment is located within the Rochester Plateau subsection of the Eastern Broadleaf Forest Province. 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). Annual precipitation in the Eastern Broadleaf Forest Province increases from about 24 inches in the northwestern portion to about 35 inches in the southeastern portion (DNR 2010d).

The Rochester Plateau subsection 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 communities located within Segment 2 include: Cascade Township, Kalmar Township, New Haven Township, Roscoe Township, City of Pine Island, Pine Island Township, City of Oronoco, Oronoco Township, and City of Rochester. This segment is represented by a combination of agriculture, industrial and commercial development, and residential development. The City of Rochester is the major business and urban center within the area.

8.2.3 Socioeconomic Setting – North Rochester Substation to Northern Hills Substation

This segment is located in a relatively agricultural part of Minnesota, with some areas of urban development. This segment crosses parts of

Table 8.2.3-1 Socioeconomic statistics in Goodhue and Olmsted Counties - Segment 2

County	2009 Population	2009 Total Minority Population	2009 Minority Population Percentage	1999 Per Capita Income
Goodhue	45,836	1,742	3.8	\$21,934
Olmsted	143,962	15,835	11.0	\$24,939

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

Goodhue and Olmsted Counties. A variety of industries are present in Goodhue and Olmsted Counties, some of which include education, health and social services, agriculture, manufacturing, professional, scientific, forestry, and mining. Table 8.2.3-1 shows the differences in population across the counties spanned by this segment of the project.

8.2.4 Analysis of Segment Alternatives for North Rochester Substation to Northern Hills Substation

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

- 8.2.4.1 Public health and safety
- 8.2.4.2 Property values
- 8.2.4.3 Human settlement
- 8.2.4.4 Land use compatibility
- 8.2.4.5 Land-based economies
- 8.2.4.6 Rare and unique natural resources
- 8.2.4.7 Flora and fauna
- 8.2.4.8 Water resources
- 8.2.4.9 Electronic device interference
- 8.2.4.10 Archaeological and historic resources
- 8.2.4.11 Transportation and public services
- 8.2.4.12 Recreation
- 8.2.4.13 Air quality

8.2.4.1 Public Health and Safety – Analysis of Segment Alternatives for North Rochester Substation to Northern Hills 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 8.2.4.3. Additional health and safety concerns along with proposed mitigation procedures are discussed in Section 7.1.

8.2.4.2 Property Values – Analysis of Segment Alternatives for North Rochester Substation to Northern Hills 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 8.2.4.3.

8.2.4.3 Human Settlement—Analysis of Segment Alternatives for North Rochester Substation to Northern Hills 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 ROW easement for a high-voltage transmission line (HVTL). Displacement would occur where any occupied structure (residence or business) is located within the ROW of the proposed route alternatives (200-foot ROW for parallel alignment areas and 80-foot ROW for 161 kilovolt (kV) line).

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 8.2.4.3-1 summarizes the proximity of the proposed route alternatives to homes for Segment 2. Map 8.2-18 provides an overview of each of these human settlement features along the proposed route alternatives.

Table 8.2.4.3-1 compares the number of homes within 40 feet, 100 feet, 300 feet, and 500 feet of the centerline of each route alternative in this segment. Comparisons at a distance of 100 and 40 feet from the proposed centerline are made within this segment because the ROW for the parallel alignment portion of this segment would be 200 feet (100 feet on either side of the route centerline) and the ROW for the 161 kV portion of the route would be 80 feet (40 feet on either side of the route centerline). Displacement impacts have the potential to occur for homes in the 0-40 along either portion of the route. For the parallel

alignment portion of the route, homes within 41-100 feet of the route centerline also face potential displacement. This table shows that the 2A route alternative has the fewest homes within the 1000-foot route width, and that route alternative 2P-002 has significantly more homes within the 1000-foot route width. Homes are present within the proposed ROW of route alternatives 2P-001, 2P-002, 2C3-001-2, 2C3-002-2, 2C3-003-2, 2C3-004-2, 2C3-006-2, and 2C3-007-2. With a total of five houses within the ROW, route alternative 2C3-001-2 has the greatest number of potential displacement impacts.

There are no schools, churches, cemeteries or hospitals within the 1000-foot route width of any of the proposed route alternatives in this segment.

Pinch Points

A review of geographic information system (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 8.2.4.3-2 provides an overview of the number of critical pinch points along each of the proposed route alternatives in Segment 2. A more detailed discussion of each of these pinch points is provided below (see also, Map 8.2-18).

Table 8.2.4.3-2 Pinch points - Segment 2

Route Alternative	Number of Pinch Points
2P	3
2P-001	0
2P-002	0
2B-001	1
2C3-001 - 2	3
2C3-002 - 2	3
2C3-003 - 2	3
2C3-004 - 2	3
2C3-005 - 2	3
2C3-006 - 2	3
2C3-007 - 2	3
2C3-008 - 2	3

**Note, a portion of each of the "C" route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.*

Within this segment, pinch points are located along the 2P route alternative, along route alternative 2B-001, and along all 2C3 route alternatives. All three pinch points on the 2P route alternative occur along 65th Avenue NW

in Olmsted County. The first pinch point occurs where two houses are located directly across from one another in close proximity to the road on 65th Avenue NW, just north of 90th Street NW.

Table 8.2.4.3-1 Proximity of homes along each proposed route alternative - Segment 2

Route Alternative	Number of Homes					
	Within 0-40 feet	Within 41-100 feet (Parallel alignment portion)	Within 41-100 feet (161 kV portion)	Within 101-300 feet	Within 301-500 feet	Total homes within 500 feet
2P	0	NA	7	52	49	108
2P-001	0	NA	6	46	48	100
2P-002	3	NA	5	60	110	178
2B-001	1	NA	4	40	54	99
2A-001	0	NA	1	32	53	86
2A-002	0	NA	3	32	49	84
2A-003	0	NA	3	35	55	93
2A	0	NA	1	27	49	77
2C3-001-2	3	2	5	46	67	123
2C3-002-2	3	0	4	40	50	97
2C3-003-2	3	0	4	35	50	92
2C3-004-2	3	0	4	35	50	92
2C3-005-2	0	0	7	52	49	108
2C3-006-2	0	3	7	58	54	122
2C3-007-2	3	0	4	42	50	99
2C3-008-2	0	0	7	52	48	107

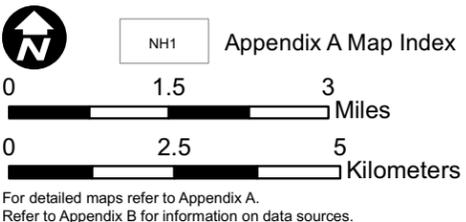
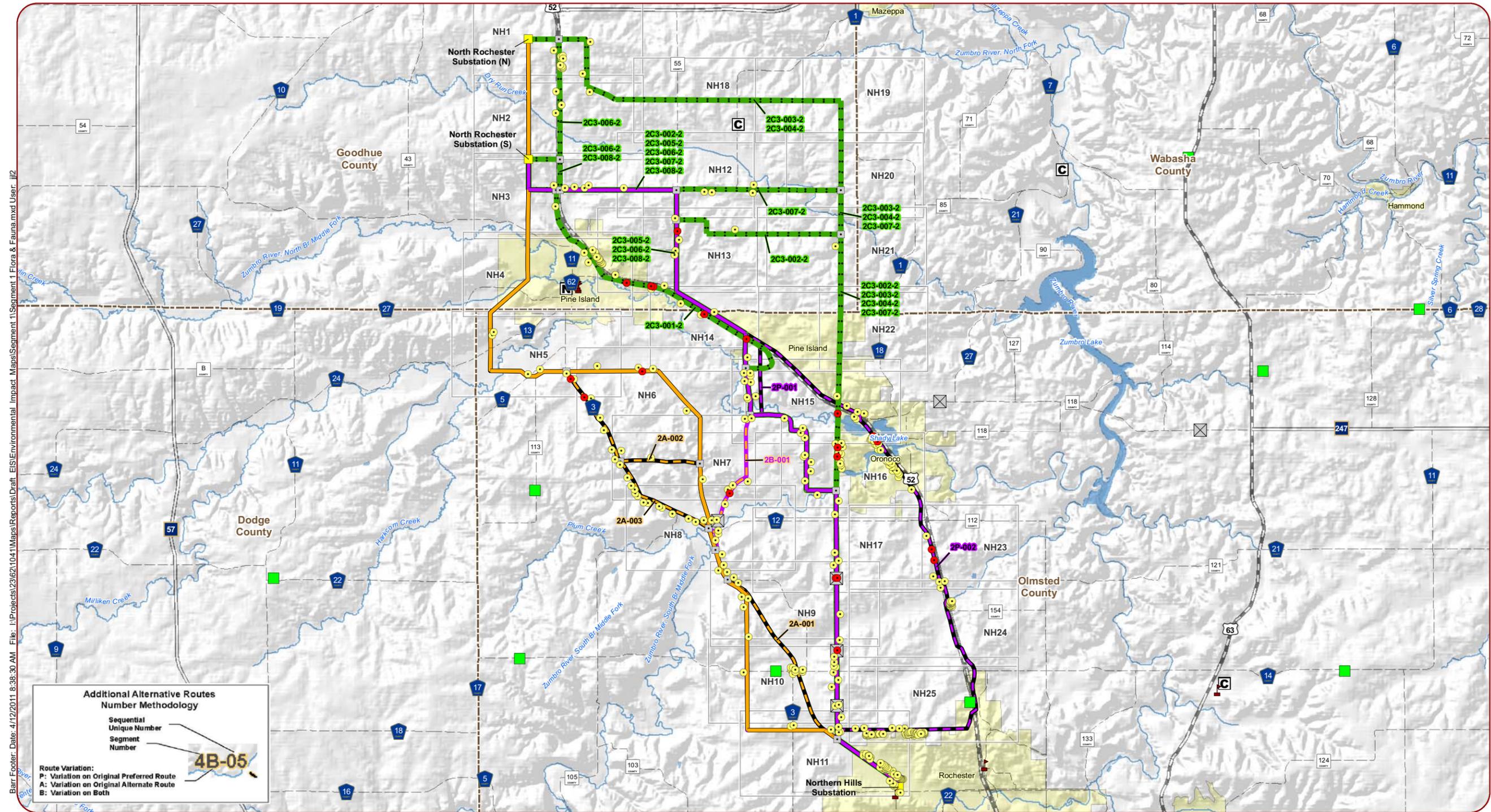
Source: Field Survey observations, comments from project public meetings and aerial photograph interpretation by AECOM (Barr 2010)

**Note, a portion of each of the "C" route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.*

Figure 8.2.4.3-1 First pinch point on 65th Avenue NW in Olmsted County - Segment 2



Source (Barr Photo 2010)



- Original Alignments**
- P Route
- A Route
- Additional Alternative Routes**
- Variation on P Route
- Variation on A Route
- Variation on Both
- Parallel Alignment
- Project Substations
- County Boundaries
- Residences within 500 Feet of Alternatives
- Residences within 75 Feet of Alternatives
- Pinch Points
- Hospitals
- Nursing Homes
- Schools
- Cemeteries
- Chuches
- Tribal Lands

Map 8.2-18
Human Settlement Map
Segment 2, North Rochester Substation
to Northern Hills Substation

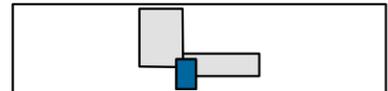


Figure 8.2.4.3-2 Second pinch point on along 65th Avenue NW in Olmsted County - Segment 2



Source (Barr Photo 2010)

A second pinch point on the 2P route alternative occurs further south on 65th Avenue NW, where a home is located within 75 feet of the proposed centerline of the route and another home is located near the road, but on the opposite side 600 feet further south (Figure 8.2.4.3-2).

The third pinch point is located on 65th Avenue NW just north of 65th Street NW (Figure 8.2.4.3-3). At this location, two homes are located directly across from one another and both are located within the 1000-foot route width. In the area where the 2P route alternative overlaps with the 23C route alternatives, the same three pinch points noted above may also cause concern if one of these route alternatives were chosen.

Figure 8.2.4.3-3 Third pinch point on along 65th Avenue NW in Olmsted County - Segment 2



Source (Barr Photo 2010)

One additional pinch point is located on route alternative 2B-001 on T 1390 in Olmsted County, just north of County Hwy 12. At this location, a residence is located on the west side of the road, and other buildings are located on the opposite side of the road.

8.2.4.4 Land Use Compatibility – Analysis of Segment Alternatives for the North Rochester Substation to Northern Hills 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 80-foot ROW for each route alternative in this segment have been reviewed and are summarized in Figure 8.2.4.4-1.

All route alternatives are located on or adjacent to primarily agricultural land in crop, pasture, or grassland use within this segment. Each route alternative also runs adjacent to a small amount of forested land. Some proposed route alternatives run adjacent to recreation and special interest areas, which are discussed in detail in Section 8.2.4.12.

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

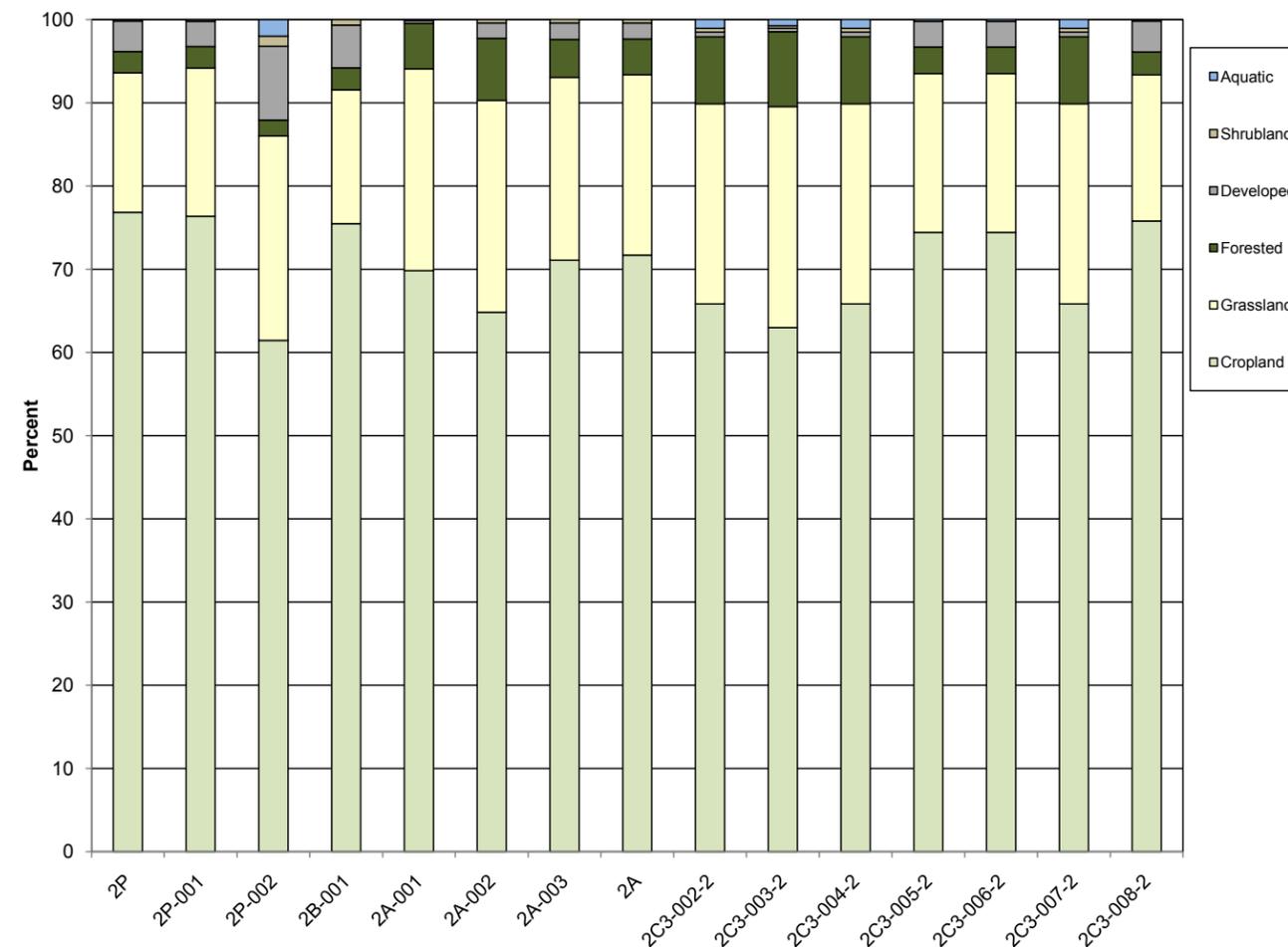
and small numbers of travelers along most route alternatives, this impact does not affect many people. Impacts during tower construction include destruction of crops within the grading/construction zoning and the compacting of soils by construction equipment and activities.

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. Impact on property values varies depending on a range of other factors including current market conditions, proximity and access to open space, commercial

services and community services such as schools. Land used for pole structures may change or reduce the current and future functionality of the property depending on its size as well as its current and future use. 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.

Figure 8.2.4.4-1 Land cover types along each route alternative - Segment 2

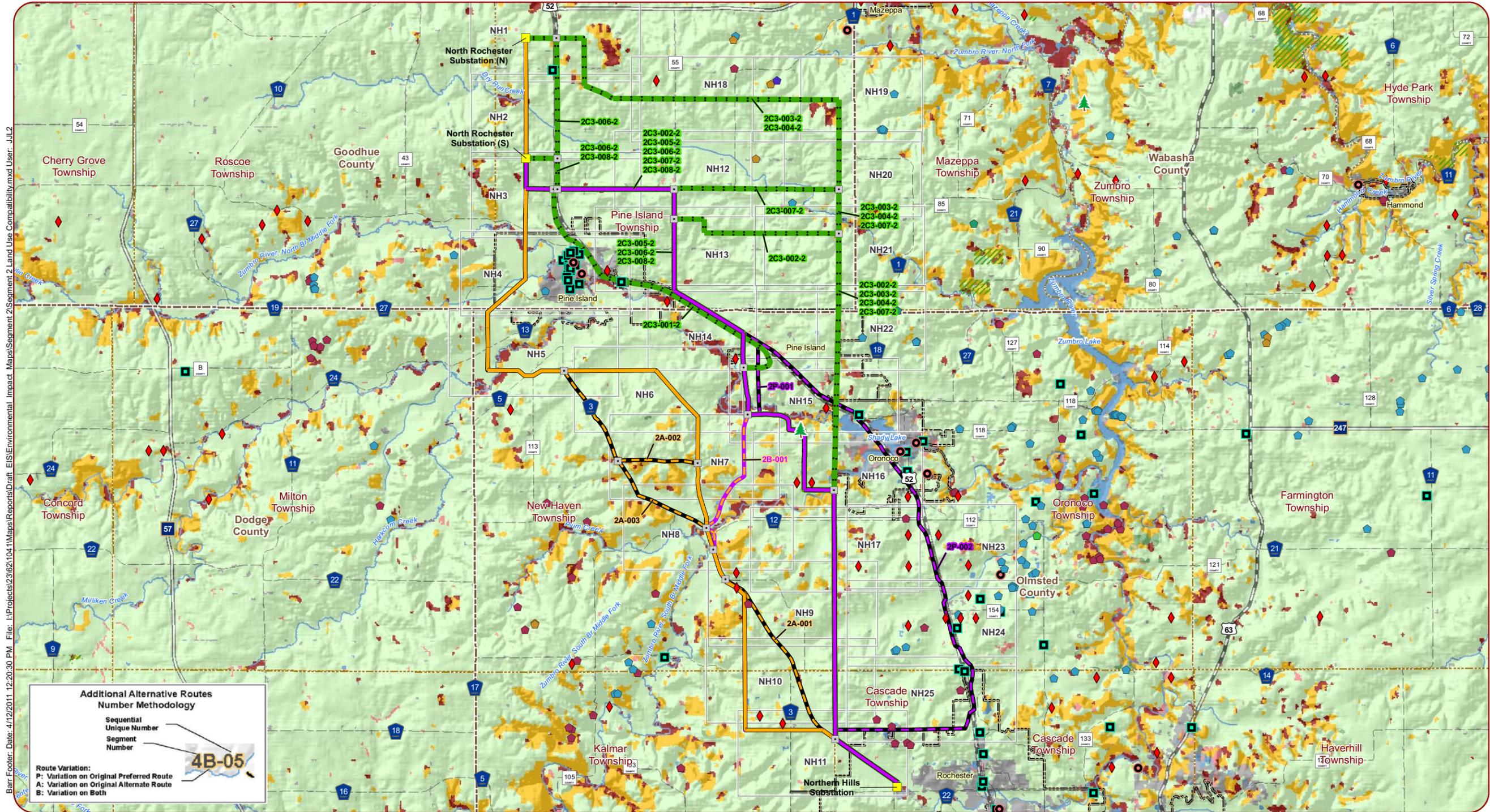


Source: GAP data

*Note, a portion of each of the “C” route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.

North Rochester Substation to Northern Hills Substation

Section 8.2



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NH1 Appendix A Map Index



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

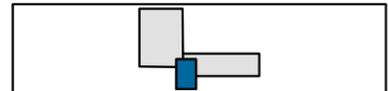
- Original Alignments**
- P Route
- A Route
- Additional Alternative Routes**
- Variation on P Route
- Variation on A Route
- Variation on Both
- Parallel Alignment

- 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 8.2-19
Land Use Compatibility Map
Segment 2, North Rochester Substation
to Northern Hills Substation



These ordinances and plans are available as part of the route permit application (RPA) and available through each city and county government. 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.

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.

The Olmsted County General Land Use Plan states in a section titled Communications Towers and Utilities that “(t)he location of communication towers, high voltage power transmission lines, petroleum/natural gas pipelines, and other similar special uses should be controlled to the extent allowable to minimize potential aesthetic and other public health or welfare impacts including property impacts.” The lack of direct siting ability by the county government in this case would be inconsistent with this provision.

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 primarily through best management practices (BMPs) to reduce impacts to agricultural areas during construction, operation and maintenance.

8.2.4.5 Land Based Economies – Analysis of Segment Alternatives for the North Rochester Substation to Northern Hills Substation Segment

The land based economies along this segment are primarily agricultural. Agricultural economies in the area may include crops, livestock, dairy farms, and bee-keeping.

Crops in Goodhue County include primarily

corn and soybeans, and livestock are primarily turkeys, hogs and pigs (USDA 2007b). Agricultural crops in Olmsted County include corn and soybeans; livestock raised include turkeys, hogs, pigs, and cattle (USDA 2007d).

Much of the land in this segment is designated as “prime farmland,” (Figure 8.2.4.5-1) 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 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 within the ROW is slightly lower in route alternatives 2P, 2P-001, 2B-001, 2C3-001-2, 2C3-002-2, 2C3-004-2, and 2C3-007-2 relative to the other route alternatives in this segment. However overall, the percentage of prime farmland does not vary significantly across the various route alternatives in this segment.

Impacts to organic farms present within this segment could 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 8.2-19. All of the “A” route alternatives and 2B-001 have one aggregate mine within the 1,000-foot route width, while the remaining route alternatives do not have any aggregate mines within the 1,000-foot route width. 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 Olmsted

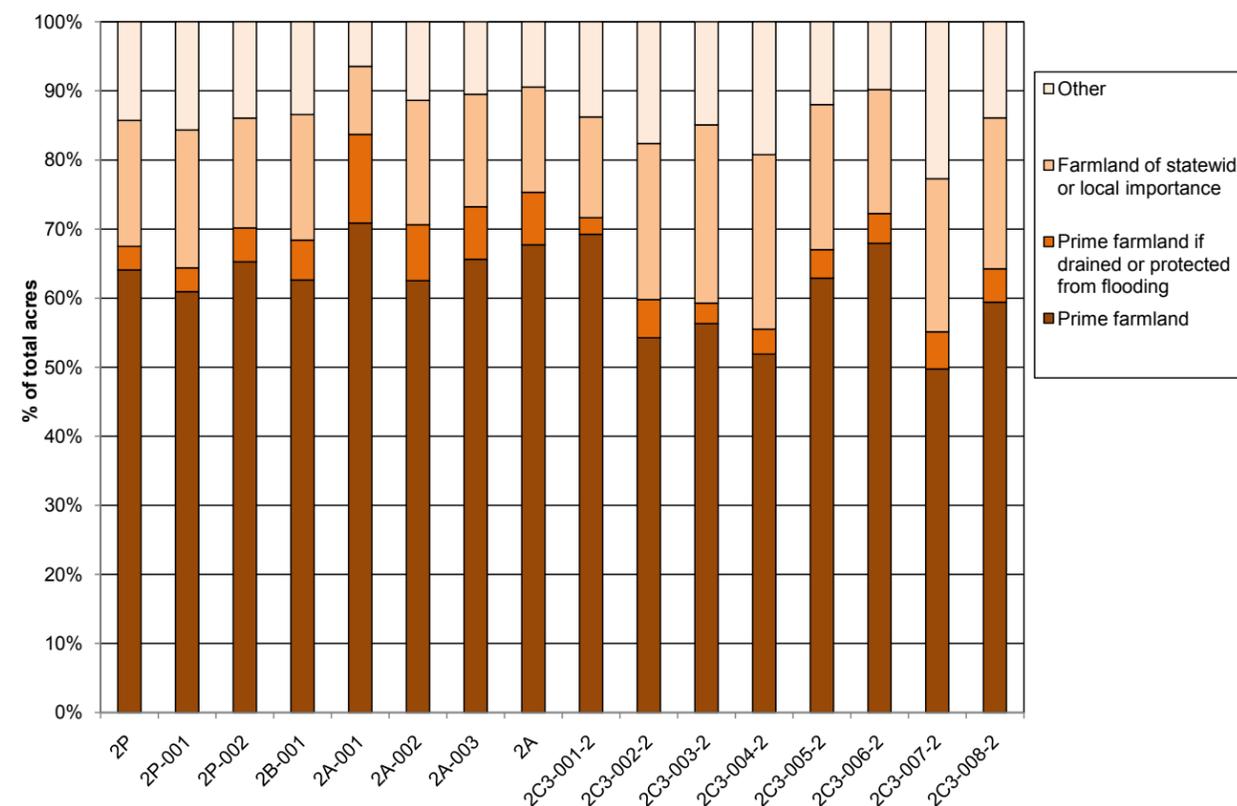
Counties were identified by the DNR as being a region of many crushed stone operations (DNR 1998).

Some forested areas are present along the various route alternatives in this segment (see Figure 8.2.4.4-1 and Map 8.2-19). The Shady Haven Tree Farm, located in New Haven Township in Olmsted County, is the only known small-scale forestry resource located within this segment. The following route alternatives would run adjacent to the Shady Haven Tree Farm: 2P, 2C3-001-2, 2C3-005-2, 2C3-006-2, and 2C3-008-2. Because these route alternatives would run along 117th St. NW, impacts to this forestry resource are not anticipated (see Map 8.2-19). Impacts to other forested areas within this segment are discussed in Section 8.2.4.7.

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 for this project (AIMP is available in Appendix E). The overall objective of this AIMP is to identify measures the Utilities would take to avoid, mitigate, repair and/or provide compensation for impacts that may result from transmission line construction of the CapX2020 projects 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.

Figure 8.2.4.5-1. Prime farmland and non-farmland within ROW of each route alternatives - Segment 2



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

*Note, a portion of each of the “C” route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.

8.2.4.6 Rare and Unique Resources – Analysis of Segment Alternatives for the North Rochester Substation to Northern Hills Substation Segment

Rare and unique resources were identified within the 80-foot and 200-foot ROWs (referred to as ROW below) and within one mile of each route alternative evaluated in Segment 2 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 8.2.4.6-1 and Map 8.2-20 summarize the rare and unique resources documented within the 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 8.2-20

and the maps in Appendix A do not indicate the names of species or communities identified within the NHIS database.

Seven threatened species have been documented within one mile of the various route alternatives in Segment 2; these include two plant species, two mussel species, two turtles, and one snake. No state endangered species or federally listed species have been documented within one mile of this segment. The two rare plant species include the glade mallow (*Napaea dioica*) and tuberous Indian-plantain (*Arnoglossum plantagineum*). The two mussel species include the elktoe (*Alasmidonta marginata*) and the ellipse (*Venustaconcha ellipsiformis*). The two turtle species include the Blanding’s turtle (*Emydoidea blandingii*) and the wood turtle (*Clemmys insculpta*). The snake species is the timber rattlesnake (*Crotalus horridus*). However, because watercourses will most likely be spanned, impacts to the elktoe and ellipse mussel species are not anticipated.

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 southern Minnesota, the tuberous Indian-plantain has been primarily documented on native moist prairies, with few documentations of this species on bluff prairies (DNR 2011j). The Blanding’s turtle generally inhabits wetland complexes where there are adjacent sandy uplands for nesting (DNR 2011h).

Wood turtles are largely aquatic, preferring small to medium-sized fast-moving rivers and streams; wood turtles occupy adjacent uplands, including alder thickets, forest, grassland, and agricultural land, for basking, foraging, and nesting (DNR 2011k). The timber rattlesnake inhabits forested bluffs, rock outcrops, and bluff prairies (DNR 2011g).

Three of the documented non-aquatic rare species have been found within the ROW of some of the route alternatives in this segment; these include the tuberous Indian-plantain, the Blanding’s turtle, and the timber rattlesnake (Table 8.2.4.6-1). The tuberous Indian-plantain has been found within the ROW of 2P, 2P-001, 2P-002 and all of the C route alternatives (Table 8.2.4.6-1). The Blanding’s turtle has been documented within the ROW of the A route and route alternatives 2B-001 and 2P-001 (Table 8.2.4.6-1). The timber rattlesnake has been documented within the ROW of route alternatives 2A, 2A-001, and 2A-002 (Table 8.2.4.6-1).

A freshwater mussel concentration area has been documented within one mile of the following route alternatives in this segment: 2P, 2P-001, 2B-001, 2A-001, 2A, 2C3-001-2, 2C3-005-2, 2C3-006-2, and 2C3-008-2 (Appendix F). However, this freshwater mussel concentration area is not within the ROW of any route alternatives in this segment.

With the exception of route alternative 2P-001,

there are no DNR native plant communities present within the ROW of the route alternatives in this segment (Figure 8.2.4.6-1). Native plant communities have been documented within one mile of the following route alternatives: 2A, 2B-001, 2A-001, 2A-002, 2A-003, 2C3-003-2, 2C3-004-2, and 2C3-006-2 (Appendix F). These native plant communities include the following types: Red Oak-Sugar Maple-Basswood-(Bitternut Hickory) Forest, Sugar Maple-Basswood-(Bitternut Hickory) Forest, and Red Oak-White Oak Forest (Appendix F). With the exception of route alternatives 2A-002 and 2C3-001-2, which have at least 5 acres of MCBS Sites of Biodiversity Significance (SBS) in the ROW, all other route alternatives have less than 2 acres of MCBS SBS within the ROW (Figure 8.2.4.6-1).

There are no areas of designated railroad prairie within the ROW of any route alternatives in this segment.

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 2, threatened and endangered species are found within one mile of each route alternative and within the ROW of several route alternatives. As waterbodies and watercourses

Table 8.2.4.6-1 Summary of rare species within 150-foot ROW and one mile of each route alternative - Segment 2

Common Name	Scientific Name	Type	MN Status	U.S. Status	Route Alternatives															
					2P	2P-001	2P-002	2B-001	2A-001	2A-002	2A-003	2A	2C3-001-2	2C3-002-2	2C3-003-2	2C3-004-2	2C3-005-2	2C3-006-2	2C3-007-2	2C3-008-2
Glade mallow	<i>Napaea dioica</i>	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tuberous Indian-plantain	<i>Arnoglossum plantagineum</i>	Vascular Plant	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Elktoe	<i>Alasmidonta marginata</i>	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ellipse	<i>Venustaconcha ellipsiformis</i>	Invertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Blanding's turtle	<i>Emydoidea blandingii</i>	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Wood turtle	<i>Clemmys insculpta</i>	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Timber rattlesnake	<i>Crotalus horridus</i>	Vertebrate Animal	THR	NONE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Species highlighted in blue indicate aquatic species.

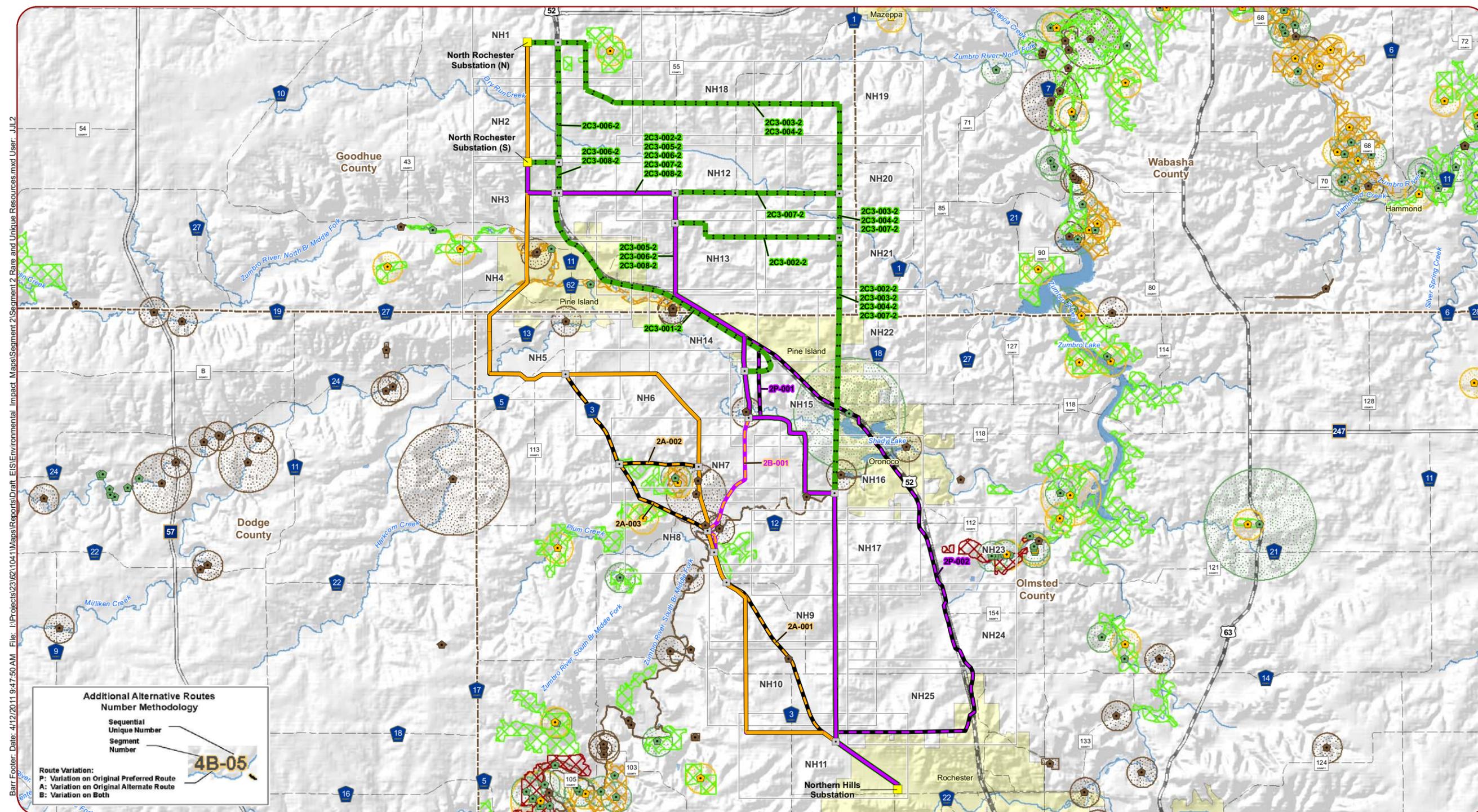
"THR" refers to state-threatened and "NONE" refers to no federal status

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

*Note, a portion of each of the "C" route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.



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Section 8.2
North Rochester Substation to Northern Hills Substation

Additional Alternative Routes Number Methodology

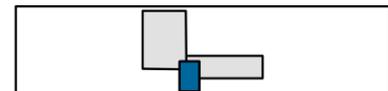
Sequential Unique Number
Segment Number

4B-05

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

Original Alignments	Project Substations	MN DNR Natural Heritage	State Designated Railroad Prairie
P Route	Project Substations	Botanical	State Designated Railroad Prairie
A Route	County Boundaries	Ecological	MCBS Biodiversity Significance
Additional Alternative Routes		Zoological	Moderate Significance
Variation on P Route		Botanical	High Significance
Variation on A Route		Ecological	Outstanding Significance
Variation on Both		Zoological	
Parallel Alignment			

Map 8.2-20
Rare & Unique Resources/Critical Habitat Map
Segment 2, North Rochester Substation to Northern Hills Substation



would most likely be spanned, impacts to threatened aquatic species are not anticipated.

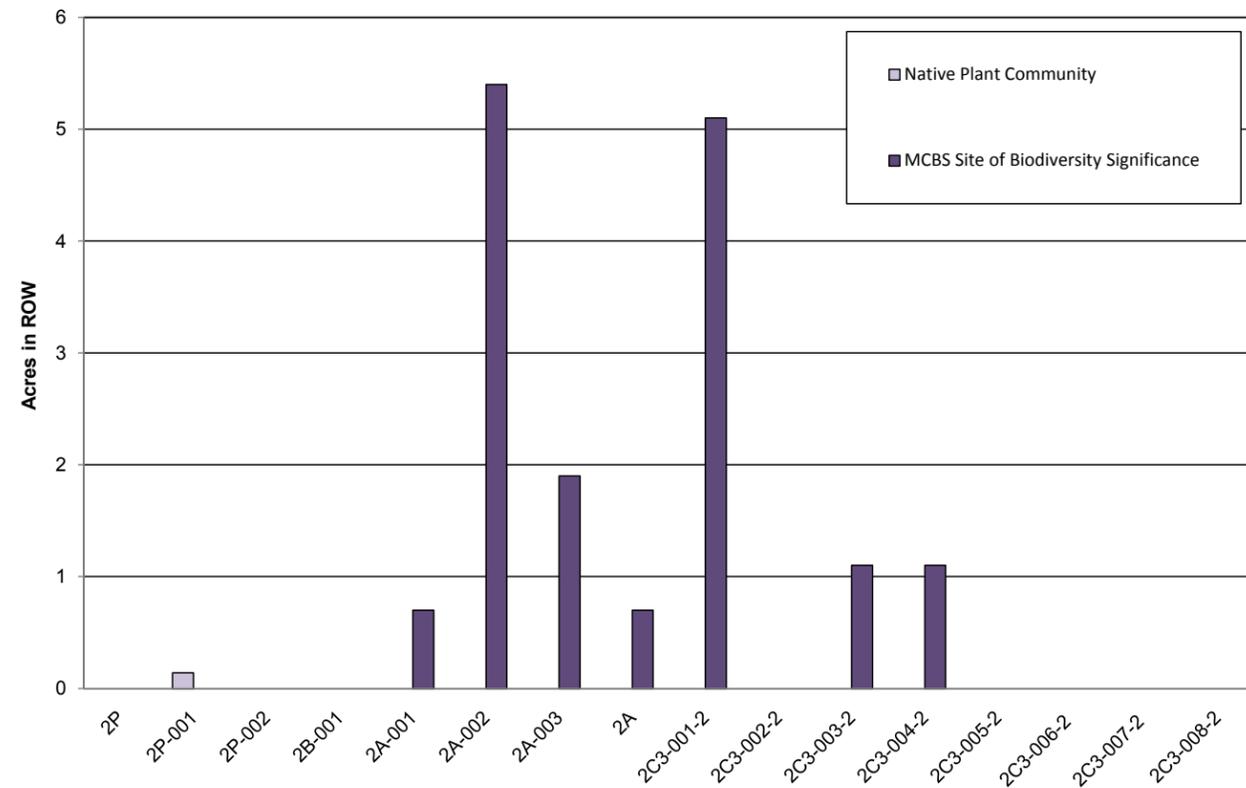
Impacts to the glade mallow, which is not found within the ROW of any of the route alternatives could be minimized by spanning streambanks and floodplains. Impacts to the tuberous Indian-plantain could be minimized by choosing one of the A route alternatives or by spanning all native moist prairies and bluff prairies. Impacts to the timber rattlesnake could be minimized by avoiding or spanning forested bluffs, rock outcrops, and bluff prairies or by choosing a route alternative other than the 2A, 2A-001 or 2A-002. Impacts to Blanding's turtles could be minimized by spanning large wetland complexes with adjacent sandy uplands or by choosing route alternative 2P, 2P-002, or any of the C route alternatives. Impacts to the wood turtle

could be minimized by spanning areas of alder thicket, grassland, and agricultural land adjacent to rivers and streams. 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, which is not found in the ROW of any of the route alternatives in this segment, are not anticipated because all watercourses would likely be spanned.

There are DNR native plant communities and/or MCBS sites within one mile of each route alternative within this segment (Appendix F). The

Figure 8.2.4.6-1 Summary of DNR plant communities and MCBS Sites of Biodiversity Significance within ROW of each route alternative - Segment 2



Source: Minnesota Department of Natural Resources

MCBS Sites of Biodiversity Significance do not include sites designated as "below."

*Note, a portion of each of the "C" route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.

placement of structures within DNR native plant communities and MCBS sites could be avoided or minimized by spanning them to the extent possible. Where structure placement cannot be avoided in these DNR native plant communities and MCBS sites, rare species associated with these habitats could be affected. As stated above, surveys for rare species may be necessary in areas where rare species habitat is unavoidable.

8.2.4.7 Flora and Fauna – Analysis of Segment Alternatives for the North Rochester Substation to Northern Hills Substation Segment

Flora

Vegetation community cover types associated with the route alternatives in Segment 2 of the project are dominated by cropland and grassland. All route alternatives have relatively low coverage of forested vegetation. See Figures 8.2.4.7-1 and 8.2.4.7-2 for a comparison of vegetation community cover between the P and A route alternatives. The relative coverage of the vegetation types shown in these figures approximates the vegetation coverages for the P or A route alternatives. As indicated in the figures, there is little variability in overall vegetation cover between the P and A route alternatives.

The State of Minnesota has a total of eleven species of noxious weeds on their primary list, as identified in Section 7.7. Goodhue and Olmsted Counties do not have secondary county-specific lists.

The 161 kV route alternatives are located within the Rochester Plateau Subsection of the Paleozoic Plateau Section (DNR 2009). MCBS surveys describe that historically, the predominant vegetation communities in the Rochester Plateau Subsection were tallgrass prairie and bur oak savanna. Vegetation communities and habitats in the Rochester Plateau are described in more detail in Section 7.7. Remnants of historical vegetation communities may occur in the project area.

The dominant land cover types for the P route alternatives include cropland (77 percent), grassland (17 percent); and forest (3 percent).

Figure 8.2.4.7-1. Vegetation community cover along the P route alternatives - Segment 2

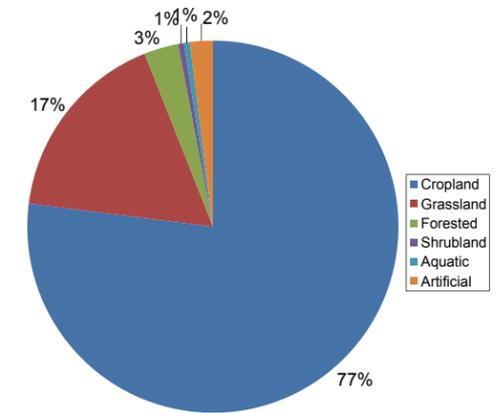
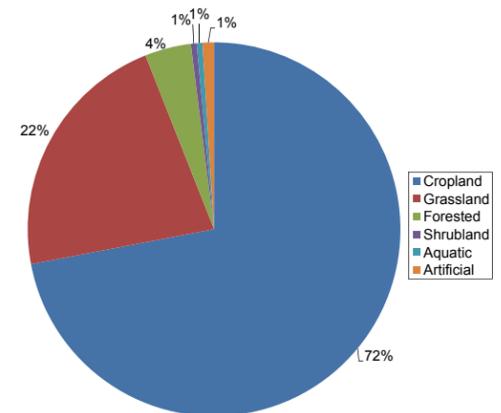


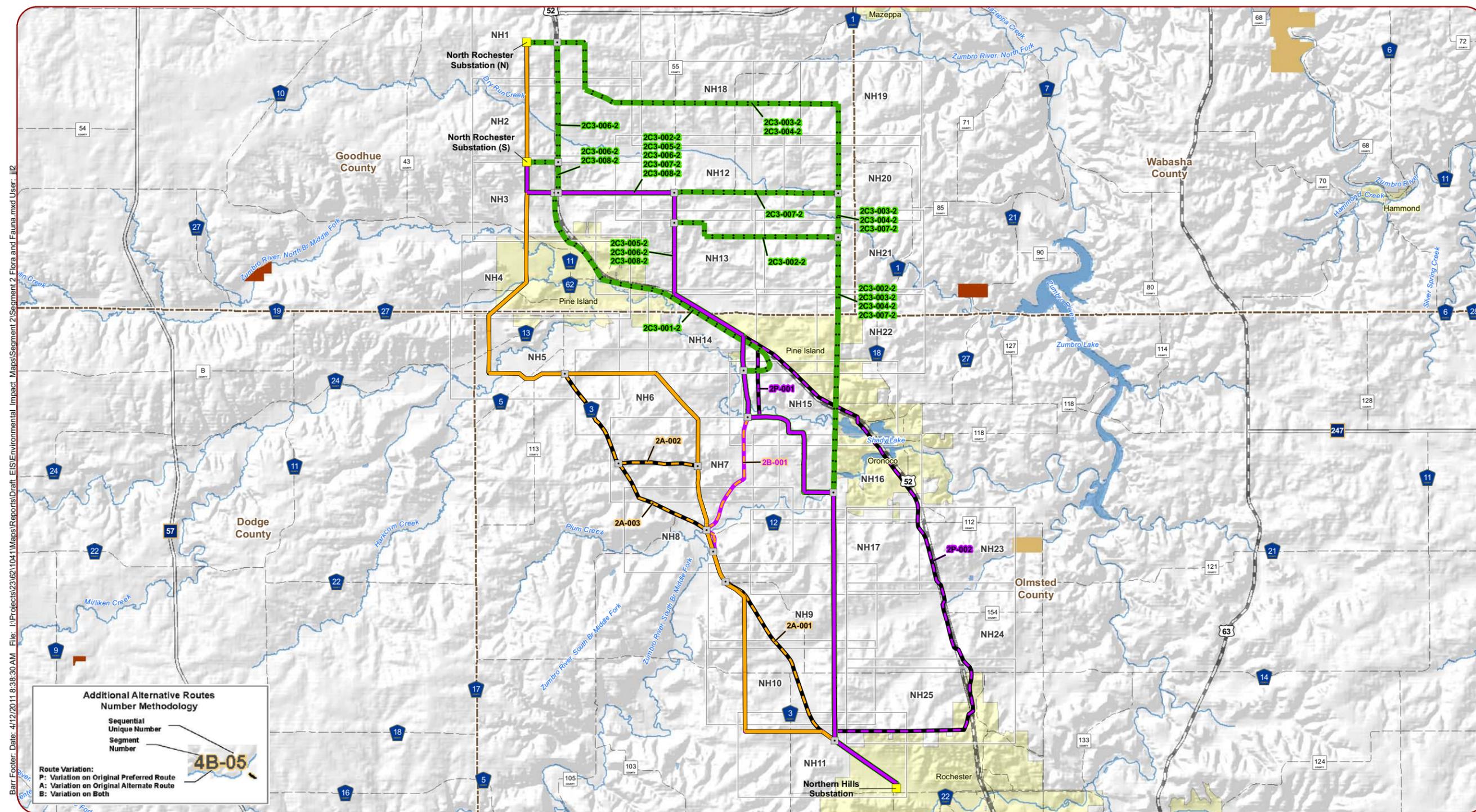
Figure 8.2.4.7-2. Vegetation community cover along the A route alternatives - Segment 2



The dominant land cover types for the A route alternatives include cropland (72 percent); grassland (22 percent), forest (5 percent), and urban (2 percent). The remainder is shrubland and aquatic land cover (<1 percent each).

The State of Minnesota has a total of 11 species of noxious weeds on their primary list. Goodhue and Olmsted counties do not have secondary noxious weeds listed.

Impacts to vegetation 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



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Section 8.2
North Rochester Substation to Northern Hills Substation

Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

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

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

Map 8.2-21
Flora & Fauna Map
 Segment 2, North Rochester Substation to Northern Hills Substation

vegetative changes would take place at each new pole footprint (55 square feet) and within the ROW that occurs in the forested communities.

Fauna

A general discussion of wildlife species within the project area is provided in Chapter 7.7. Rare species and wildlife species managed for conservation are listed in Appendix F. Wildlife resources are shown on Map 8.2-21.

P Route Alternatives

Designated wildlife habitat and conservation areas along the P route alternatives are limited to one Grassland Bird Conservation Area (GBCA) and several easement lands within one mile of these routes. The GBCA is categorized as a Type 3 area (described in Section 8.1.4.7) and is located south of Pine Island. It is less than one mile to the southwest of the P route alternatives, but is not crossed by these route alternatives. Conservation land easements along these route alternatives include 88 Conservation Reserve Program (CRP) lands within one mile, of which four are within the P route alternatives (i.e., within the 1,000-foot route width). No National Wildlife Refuges (NWRs), federally designated Waterfowl Production Area (WPAs), DNR Wildlife Management Areas (WMAs), DNR Scientific and Natural Areas (SNAs), DNR designated trout streams, or Important Bird Areas (IBAs) occur within one mile of the P route alternatives based. Similarly, no Conservation Reserve Enhancement Program (CREP) or Wetland Reserve Program (WRP) land easements occur within one mile of the P route alternatives.

A Route Alternatives

Designated wildlife habitat and conservation areas along A route alternatives include two GBCAs and several conservation land easements within one mile of the routes. Both GBCAs are categorized as Type 3 areas, and only one of them is crossed by these route alternatives, for a distance of 2.6 miles. Conservation land easements along these routes include 85 CRP lands within one mile. Of these, two are within

the 1,000-foot route width. No NWRs, federally designated WPAs, WMAs, SNAs, designated trout streams, or IBAs occur within one mile of the A route alternatives. Similarly, no CREP or WRP land easements occur within one mile of these route alternatives.

Section 7.7 identifies and discusses potential temporary and permanent impacts to wildlife and wildlife habitat, 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 161 kV route alternatives. Avoidance and mitigation measures also would be similar to those discussed in Section 7.7.

8.2.4.8 Water Resources – Analysis of Segment Alternatives for the North Rochester Substation to Northern Hills Substation Segment

Several sources of data (see Appendix B) were reviewed to identify water resources within the 80-foot and 200-foot ROWs (referred to as ROW below) and 1,000-foot route width of each route alternative within Segment 2. Map 8.2-22 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 Middle Fork Zumbro River, Dry Run Creek, and the North and South Branch of the Middle Fork Zumbro River; all of these watercourses are listed on the Public Water Inventory (PWI) (Map 8.2-22).

There are no designated trout streams or designated trout stream tributaries within the ROW of this segment (Map 8.2-22).

There are two Minnesota Pollution Control Agency (PCA) impaired watercourses within this segment, the Middle Fork Zumbro River and the South Branch of the Middle Fork Zumbro River. With the exception of route alternative 2P-002,

all of the route alternatives within this segment would require crossing at least one impaired watercourse (Map 8.2-22, Figure 8.2.4.8-1). Route alternative 2P-002 does not cross any impaired watercourses.

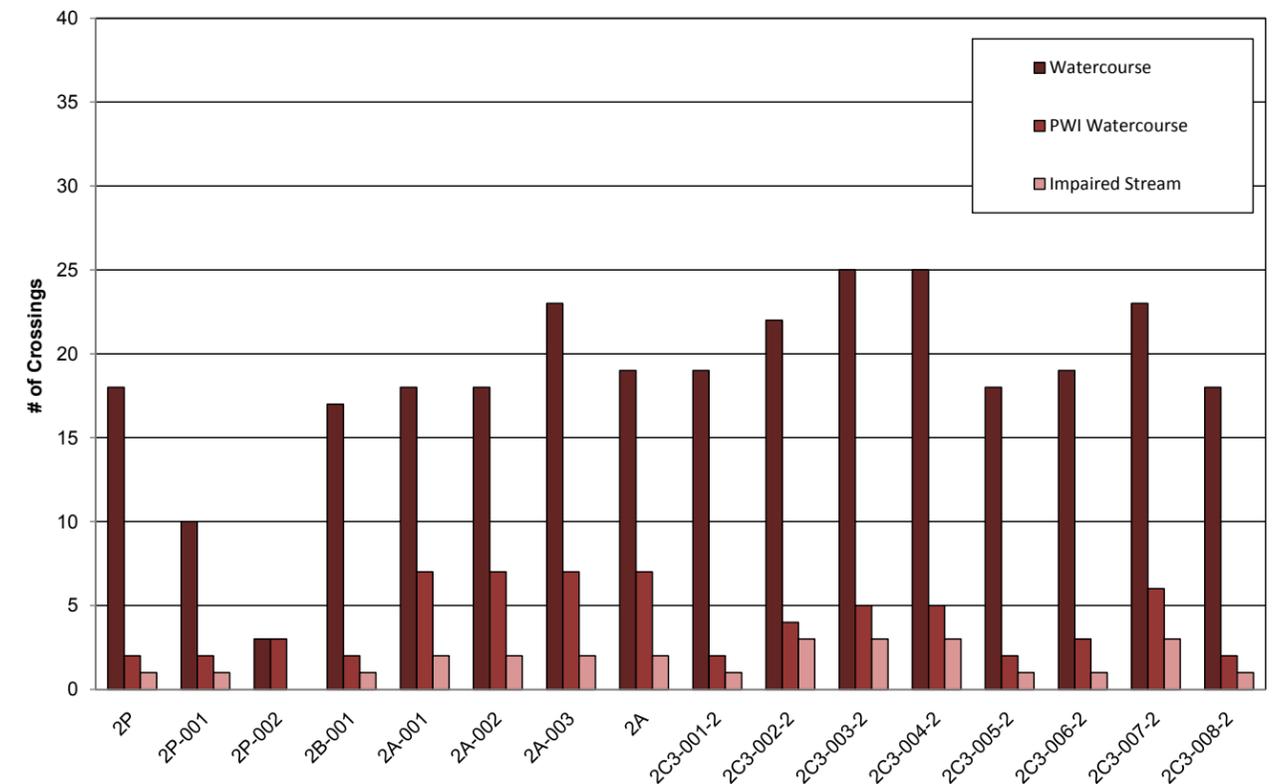
Shady Lake, which is located in Oronoco, is the only PWI lake in this segment. Route alternatives 2P-002, 2C3-002-2, 2C3-003-2, 2C3-004-2, and 2C2-007-2 would require crossing Shady Lake in three locations, while the remaining route alternatives would not cross Shady Lake (Map 8.2-22). There are no PCA impaired lakes in this segment.

Figure 8.2.4.8-1 summarizes the total number of watercourses, PWI watercourses, and impaired streams that would be crossed by each route alternative in this segment. The route alternatives within this segment have between 3 and 25

watercourse crossings within the ROW, with route alternative 2P-002 having the fewest watercourse crossings (Figure 8.2.4.8-1). PWI watercourse crossings range between two and seven for the route alternatives in this segment, with 2P, 2P-001, 2P-002, 2B-001, 2C3-001-2, 2C3-005-2, and 2C3-008-2 having only two PWI watercourse crossings (Figure 8.2.4.8-1). The route alternatives in this segment would have between zero and three impaired stream crossings in the ROW (Figure 8.2.4.8-1). Route alternatives 1P, 2B-001, 2C3-001-2, 2C3-005-2, 2C3-6-2, and 2C3-008-2 all only have one impaired stream crossing in the ROW (Figure 8.2.4.8-1). As noted above, route alternative 2P-002 does not cross an impaired stream.

Wetlands within the ROW of this segment consist mostly of small freshwater emergent

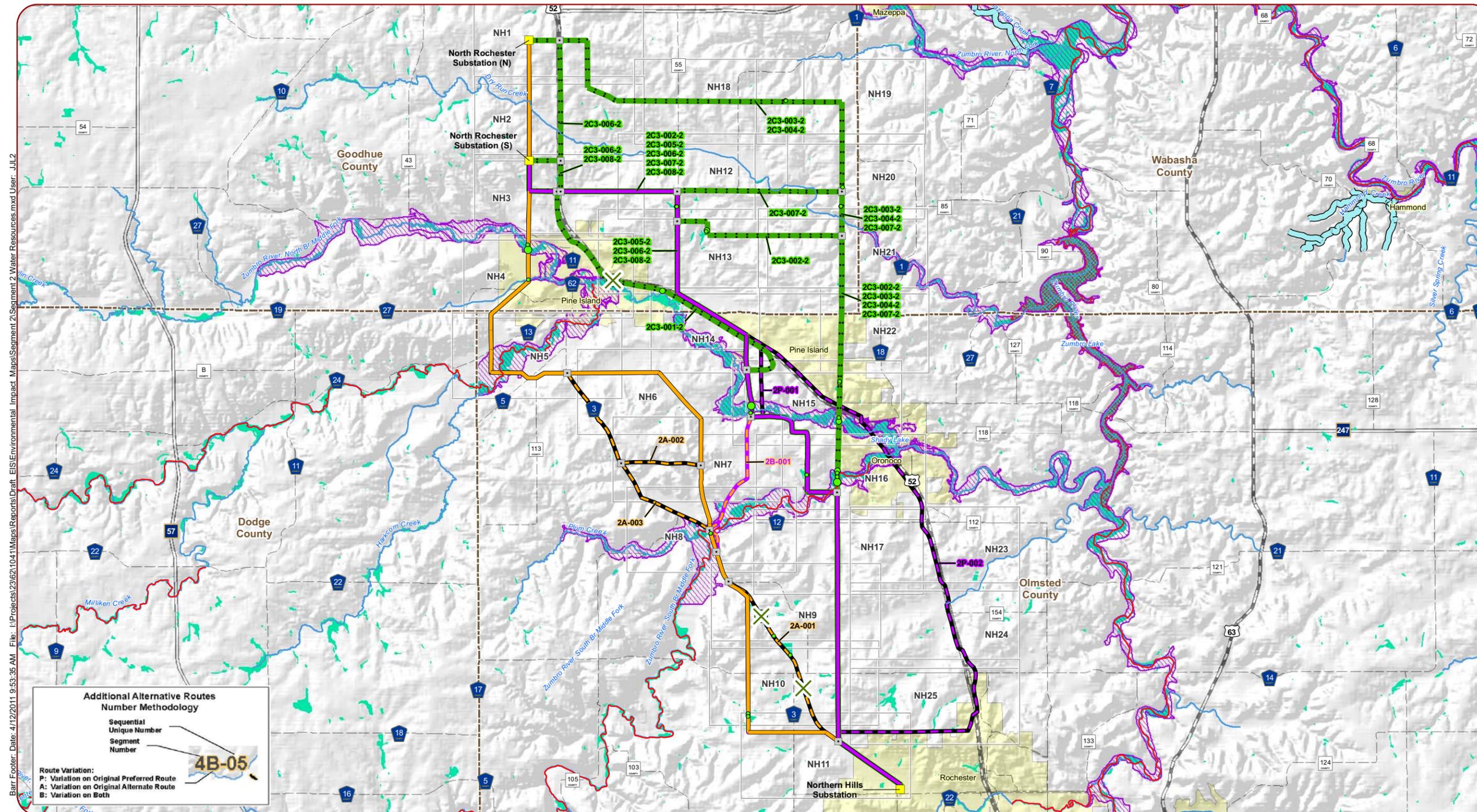
Figure 8.2.4.8-1 Number of watercourse, PWI, trout stream, and impaired stream crossings necessary for each route alternative - Segment 2



Source: Minnesota Department of Natural Resources – Division of Waters

There are no trout stream crossings in Segment 2.

*Note, a portion of each of the “C” route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.



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Section 8.2
North Rochester Substation to Northern Hills Substation

Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

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

North Arrow

0 1.5 3 Miles

0 2.5 5 Kilometers

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

Original Alignments	Project Substations	Wetland Crossings > 1,000 Feet	Public Water Inventory Watercourse
P Route	County Boundaries	Wetland Area (acres) within 150-foot ROW	Impaired Streams
A Route	Q3 FEMA Floodplain	0.0 - 0.5	Public Water Inventory Basins (includes lakes and wetlands)
Variation on P Route	Trout Streams	0.6 - 1.0	Impaired Lakes
Variation on A Route	Wild and Scenic Rivers	1.1 - 2.0	Designated Wildlife Lakes
Variation on Both	Recreational	2.1 - 3.0	NWI Wetlands
Parallel Alignment	Scenic	3.1 - 6.1	
	Wild		

Map 8.2-22
Water Resources Map
Segment 2, North Rochester Substation to Northern Hills Substation

wetlands and forested wetlands, with a few small freshwater ponds and shrub dominated wetlands also present. Figure 8.2.4.8-2 summarizes the total acres of wetland and forested wetland that are present within the ROW of each route alternative in this segment. Route alternative 2A-001 has significantly more wetland within the ROW than the remaining 13 route alternatives in this segment. Route alternative 2C3-001-2 has the most acres of forested wetland within the ROW (Figure 8.2.4.8-2). Route alternatives 2A-001 and 2C3-001-2 have significantly more acres of wetland within the 1,000-foot route width relative to the other route alternatives in this segment (Table 8.2.4.8-1). Route alternative 2P-002 contains no forested wetland areas.

Although wetlands would be spanned to the extent possible, route alternative 2A-001 has two wetlands and route alternatives 2C3-002-2, 2C3-003-2, 2C3-004-2, and 2C3-007-2 each have one wetland within their ROW 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 mitigated by choosing a route alternative that minimizes the proximity of the line to watercourses, lakes, and wetlands. Because watercourses and lakes would likely be spanned, no structures would be 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 a route alternative with fewer watercourse crossings.

Temporary impacts to wetlands may occur if they need to be crossed during construction. Utilizing BMPs and choosing a route alternative other than 2A-001, which has the most acres of wetland in the ROW, would minimize temporary impacts to wetlands. Permanent impacts to wetlands may occur if structures need to be placed within wetland boundaries; choosing a route

alternative other than 2A-001, 2C3-002-2, 2C3-003-2, 2C3-004-2, or 2C3-007-2 would minimize these impacts. Permanent impacts to wetlands may also occur if the wetlands within the 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 a route alternative other than 2C3-001-2, which has the most acres of forested wetland in the ROW, would minimize these impacts.

8.2.4.9 Electronic Interference – Analysis of Segment Alternatives for the North Rochester Substation to Northern Hills 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 interference. Structure placement could be coordinated so that they do not interfere with microwave communication corridors. There is only one tower within the 1,000-foot route width of route alternatives 2C3-003-2 and 2C3-004-2; this tower is a combined Antenna Structure Registration (ARS) and a cellular tower.

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.

8.2.4.10 Cultural Resources – Analysis of Segment Alternatives for the North Rochester Substation to Northern Hills 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 2. Publishing specific locations of cultural resources leaves those resources vulnerable to unauthorized removal or disturbance. To reduce

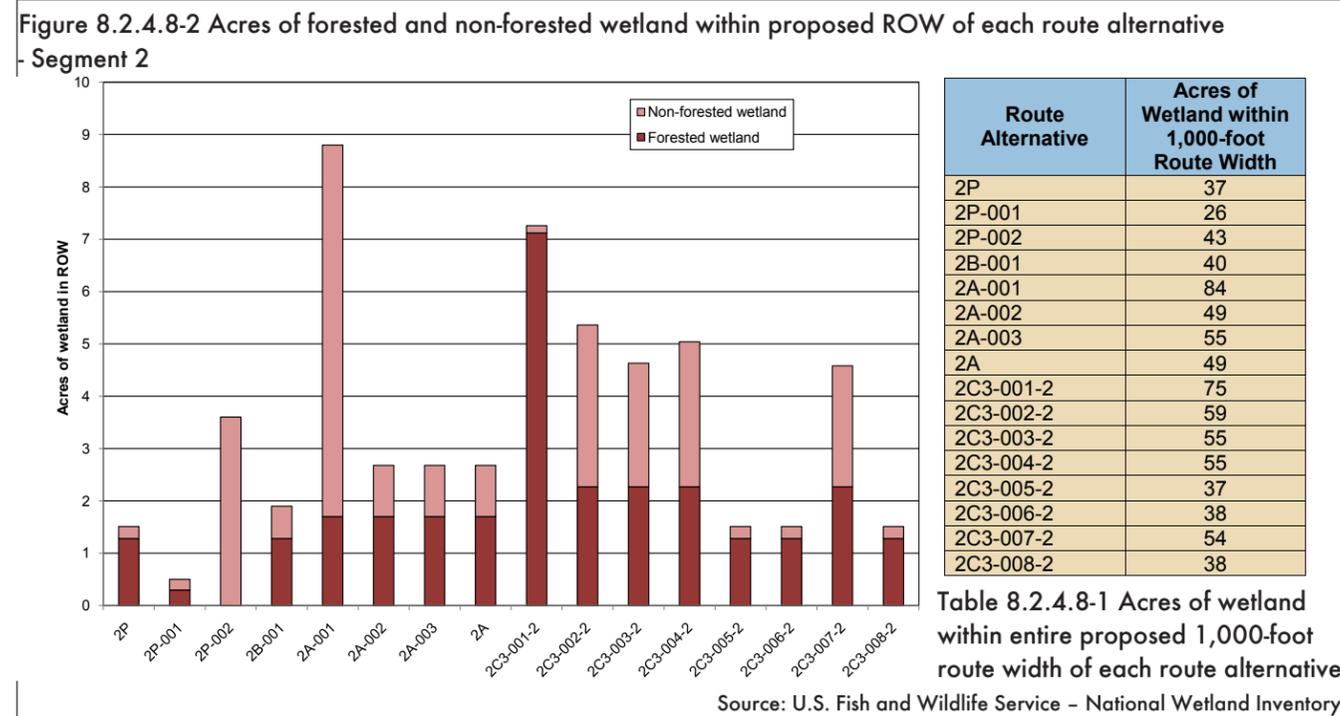
the potential for unauthorized disturbance of known cultural resources, SHPO includes only township, section and range (TSR) in its publicly-available records for certain resources. For the purposes of the project’s impact analysis, it has been assumed that the resource is potentially within the relevant 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 proposed alternatives for Segment 2 (shown in Map 8.2-23 and Appendix A) are summarized in Figures 8.2.4.10-1 and 8.2.4.10-2.

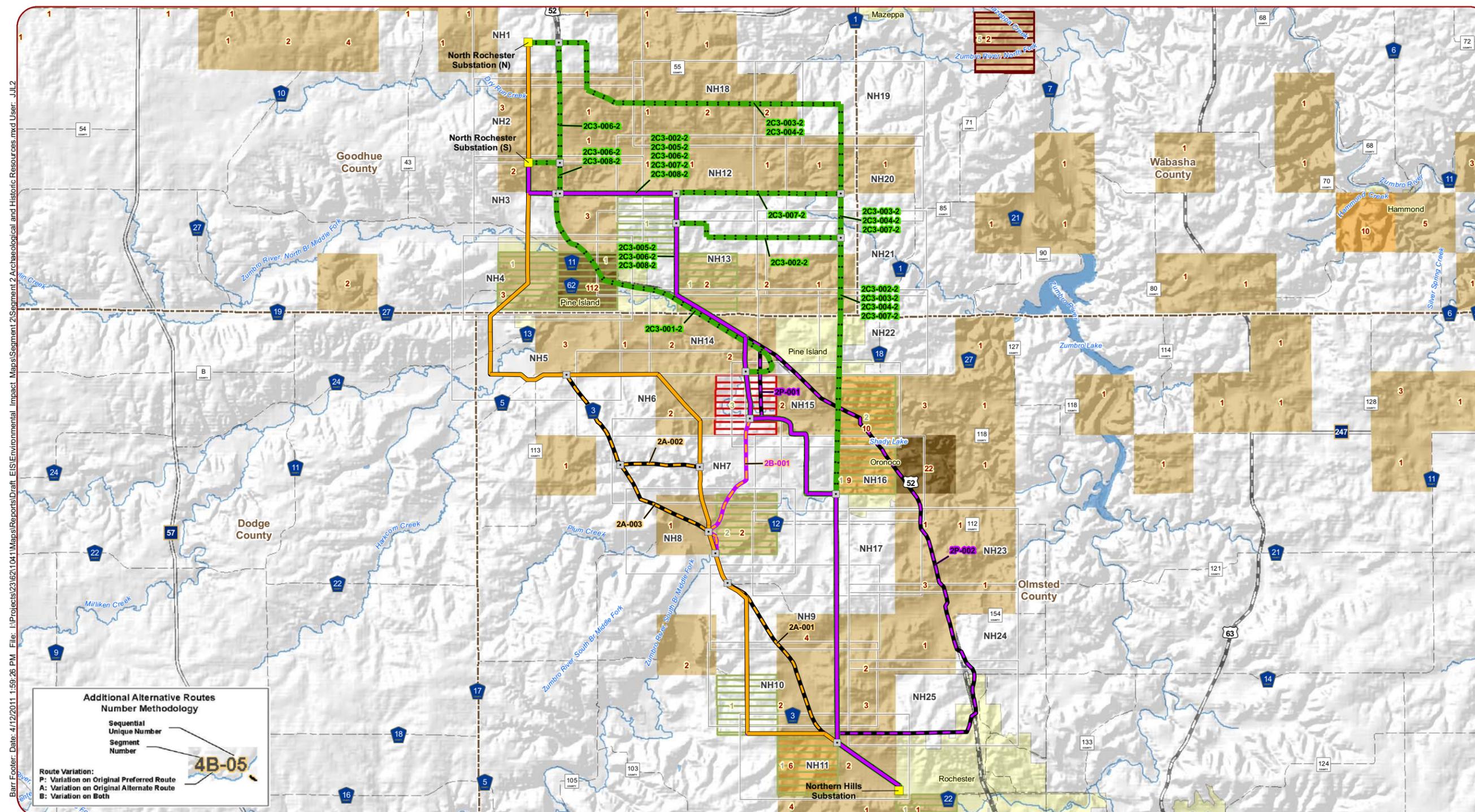
Figure 8.2.4.10-1 compares the number of archaeological sites within one-half mile on either side of the proposed centerline for each route alternative in this segment. No National Register of Historic Places (NRHP) registered archaeological sites are located within one-half mile of any route alternative’s centerline in this segment. However, a lithic scatter site within one mile of some of the P route alternatives has been recommended to be eligible for listing on the NRHP. None of the other 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). The P route alternatives would potentially affect between six and fourteen archaeological sites. Route alternative 2P-001 would affect fourteen sites, which is the most of all route alternatives in this segment.

The A route alternatives would potentially affect four archaeological sites. Route alternative 2A-001 would affect three sites. The NHRP status of these sites is listed as Not Determined (MVAC 2008). The B and C route alternatives have potential impacts to archaeological sites that range from six to nine sites.

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



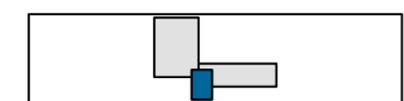
*Note, a portion of each of the “C” route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.



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Section 8.2
North Rochester Substation to Northern Hills Substation

Map 8.2-23
Archaeological & Historic Resources Map
Segment 2, North Rochester Substation
to Northern Hills Substation



Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

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

4B-05

Original Alignments

- P Route
- A Route

Additional Alternative Routes

- Variation on P Route
- Variation on A Route
- Variation on Both
- Parallel Alignment

Project Substations

- County Boundaries

Archaeological Sites

- 1 - 2
- 3 - 4
- 5 - 6

Historical Sites

- 1 - 5
- 6 - 20
- 21 - 164

Figure 8.2.4.10-2 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. The route alternatives are approximately equivalent in the number of nearby historic sites, potentially affecting 22 to 29 sites. Two exceptions are route alternatives 2P-002 and 2C3-001-2, which would potentially affect 63 and 75 historic sites, respectively.

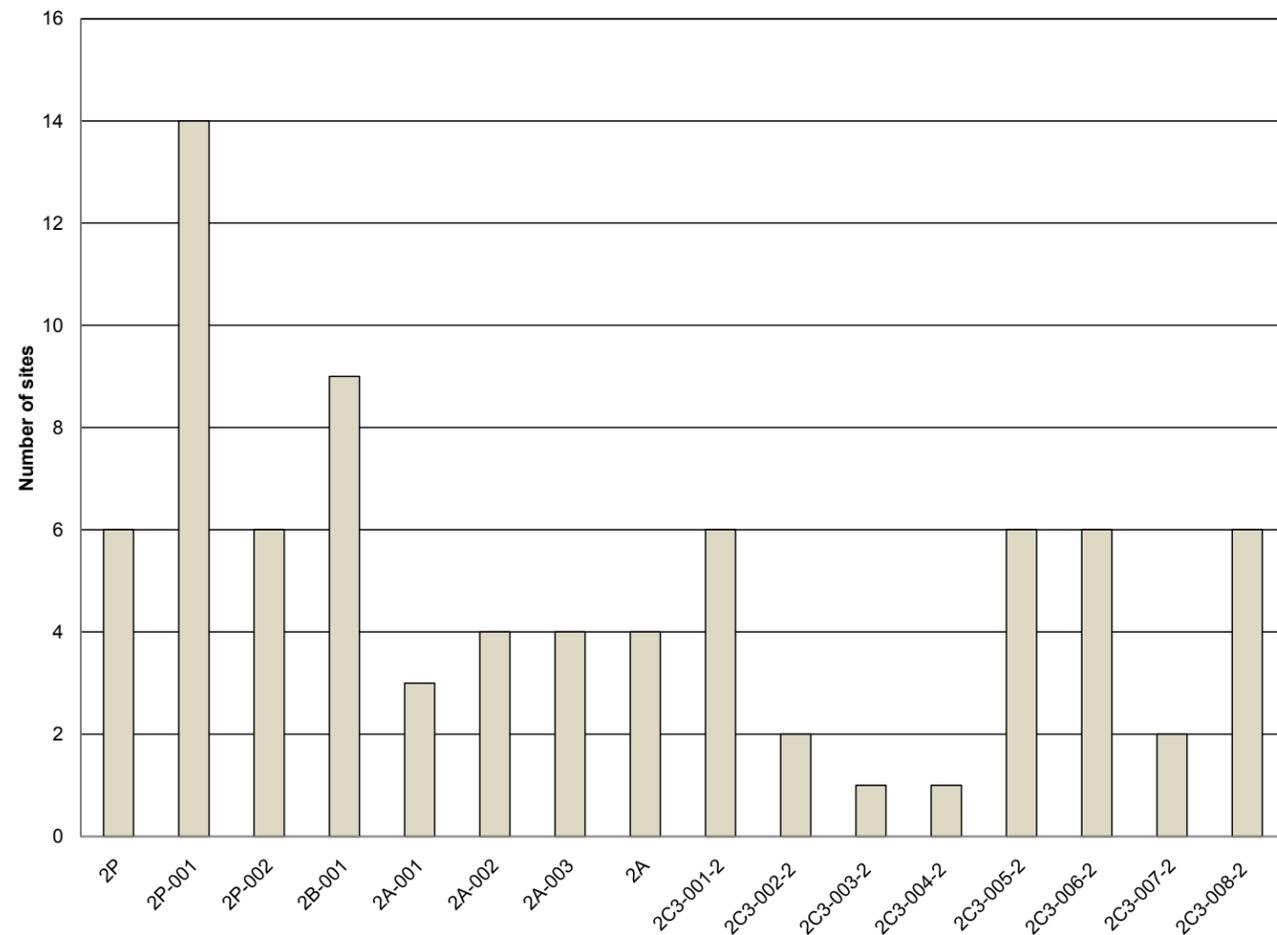
There are no NRHP sites located within one-half mile of the 161 kV P route alternatives. There were three NRHP sites identified within 1 mile of the 161 kV A route alternatives; the Jacob Bringghold House, the Opera Block House, and the Pine Island City Hall and Fire Station.

All three sites are located within the municipal boundary of Pine Island.

Mitigation

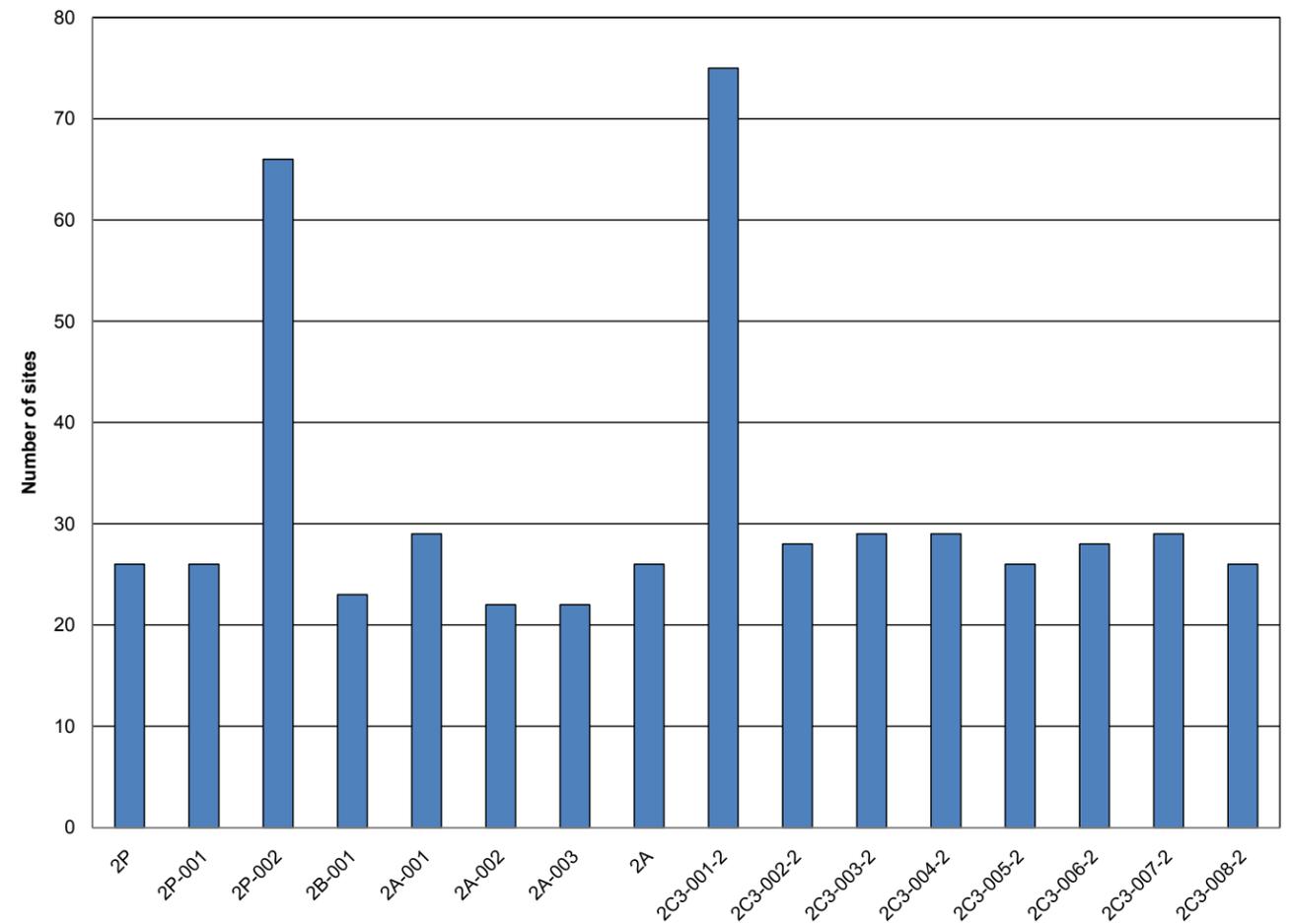
Route alternatives 2C3-003-2 and 2C3-004-2 have the fewest archaeological sites potentially within one-half mile of the route centerline. Route alternatives 2A-002 and 2A-003 have the fewest historical architectural sites potentially within one-half mile of the route centerline. However, the proximity 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

Figure 8.2.4.10-1 Number of archaeological sites within one-half mile of each route alternative - Segment 2



*Note, a portion of each of the "C" route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.

Figure 8.2.4.10-2 Number of historic sites within one-half mile of each route alternative - Segment 2



*Note, a portion of each of the "C" route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.

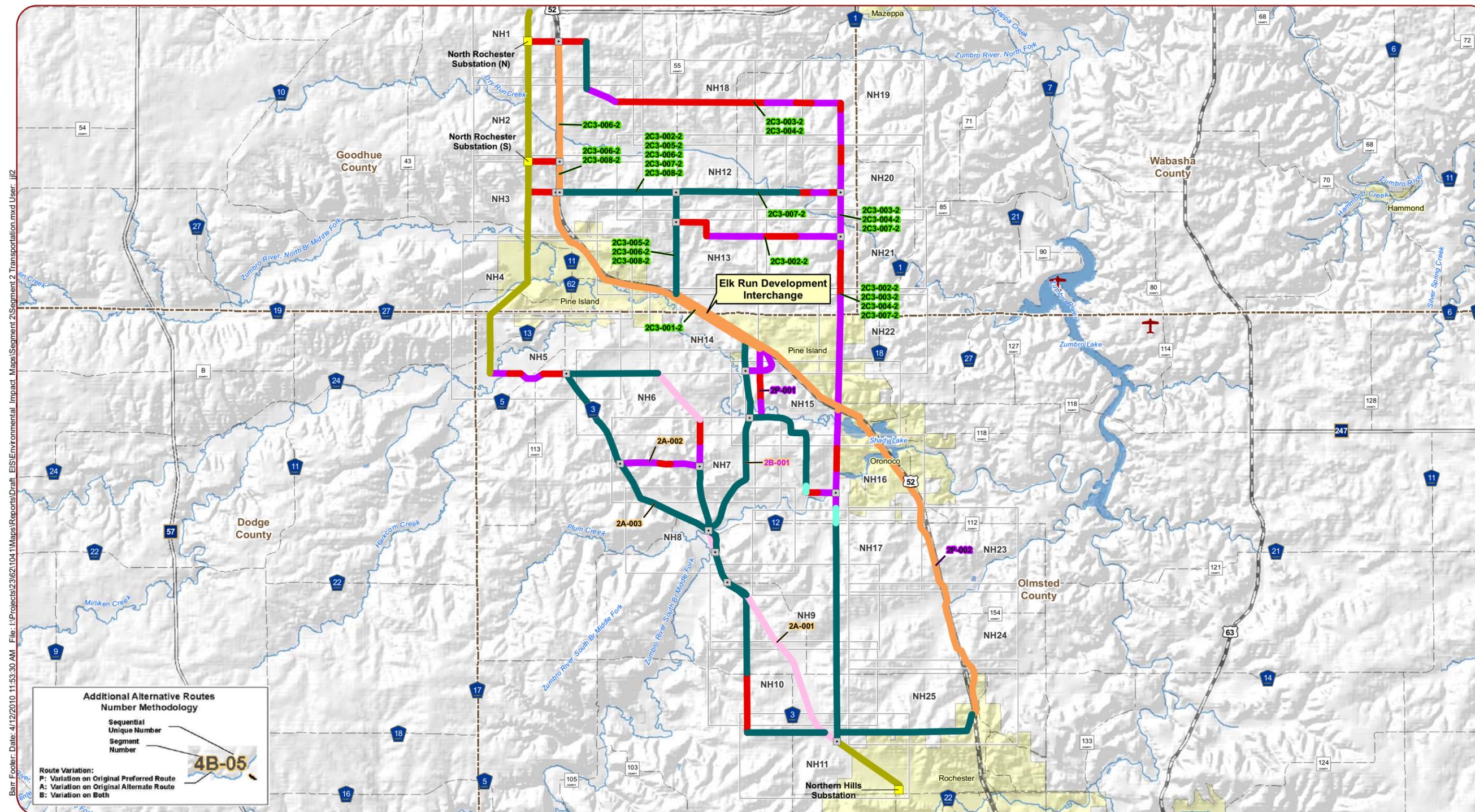
of the impacts would be. Specific mitigation plans cannot be made until a complete NHRP assessment of potentially affected sites has been made.

For cultural resources within the route width, once a route is permitted by the 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.

8.2.4.11 Transportation and Public Services—Analysis of Segment Alternatives for North Rochester Substation to Northern Hills Segment

ROW Sharing

Sharing ROW with existing infrastructure is in accordance with Minnesota’s Power Plant Siting Act (PPSA) reduce the additional ROW needed for the transmission line, 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 2 are discussed below.



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Additional Alternative Routes Number Methodology

Sequential Unique Number
Segment Number

4B-05

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

Appendix A Map Index

NH1

0 1.5 3 Miles

0 2.5 5 Kilometers

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

Project Substations	Pipeline	Field Line
County Boundaries	County or Township Road	Cross Country
Airport	Major Highway	
Scenic Byway	Municipal Street	
	Railroad	
	Trail	
	Transmission Line	

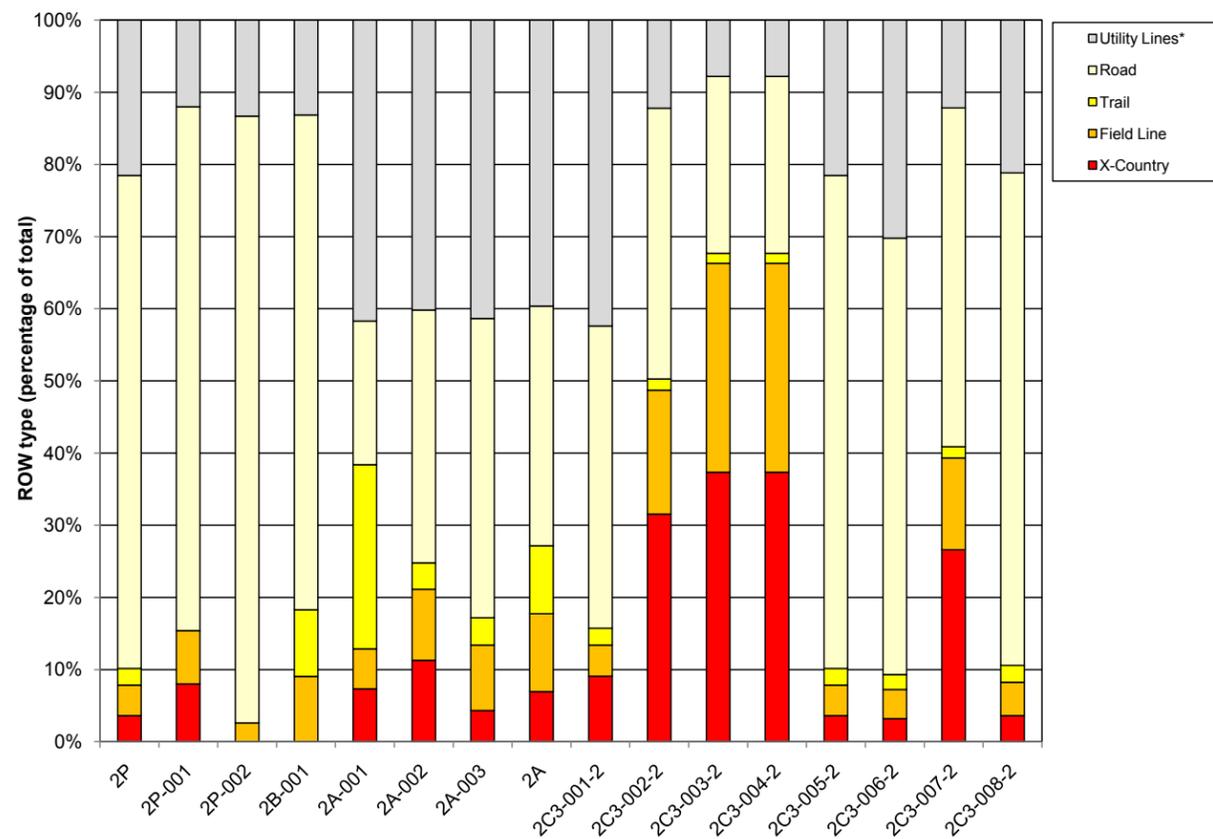
Map 8.2-24
Transportation Map
Segment 2, North Rochester Substation to Northern Hills Substation

Section 8.2
 North Rochester Substation to Northern Hills Substation

Map 8.2-24 shows areas where the ROW for the proposed route alternatives would share ROW with existing transportation, transmission line, or pipeline infrastructure. Figure 8.2.4.11-1 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 8.2.4.11-1 shows notable variation in the amount and type of ROW sharing along the proposed route alternatives in this segment. Route alternatives 2C3-002-2, 2C3-002-3, and 2C3-002-4 offer the fewest opportunities for ROW sharing. The following route alternatives all share ROW with existing infrastructure (transmission line, county or township roads and/or trail) for greater than 90 percent of total route distance: 2P, 2P-001, 2P-002, 2B-001, 2C3-005-2, 2C3-008-2, and 2C3-002-8. Route alternatives 2A, 2A-001, 2A-002, 2A-003, and 2C3-001-2 offer the greatest opportunity to minimize corridor proliferation by following existing transmission line corridors.

Figure 8.2.4.11-1 Comparison of shared ROW along each route alternative - Segment 2



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 I.

*Note, a portion of each of the "C" route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.

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.

In this segment, the 2P route alternative parallels various local roads as well as CR 31 (Olmstead), Douglas Trail, and US Hwy 52. This proposed route alternative also includes a crossing of US Hwy 52. Within this segment, 2A route alternative parallels local roads and also includes a portion that parallels Douglas Trail. Based on consultation with DOT and local transportation planning agencies, the 2P route alternative and 2A route alternative are not expected to impact future road expansion or infrastructure along these roadways.

Goodhue County's 2004 Transportation plan indicates short and medium range plans for a new alignment of County State Aid Highway (CSAH) 11 near Pine Island. Development plans along this roadway may require consideration for proposed route alternatives that parallel CSAH 11 in this area (2P, 2P-002, 2C3-001-2, 2C3-005-2, 2C3-006-2, 2C3-007-2, and 2C3-008-2).

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

The proposed route alternatives do not parallel or cross any railroads within this segment.

Airports and Landing Strips

There are no public airports or aviation facilities in proximity to any of the route alternatives proposed in this segment.

Mitigation

General mitigation measures to minimize impacts to transportation and public services are discussed in Section 7.11. Within this segment, impacts to transportation are limited to potential short term, temporary impacts to roadways during construction and potential effects on future road expansion/modification. Based on consultation with DOT, the 2P and 2A route alternatives are not expected to impact roadway expansion plans on US Hwy 52.

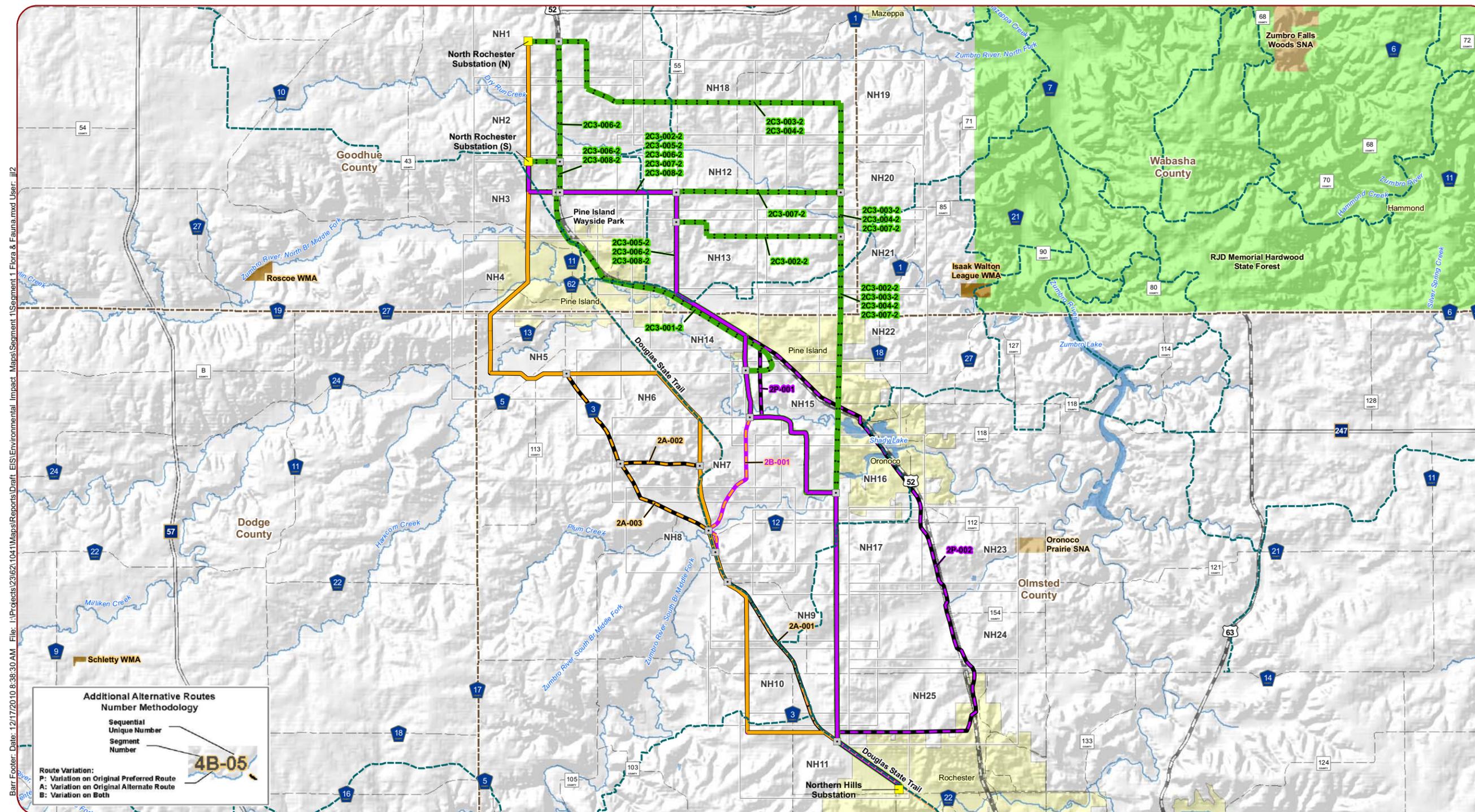
8.2.4.12 Recreation Resources – Analysis of Segment Alternatives for the North Rochester Substation to Northern Hills Substation Segment

Several sources of data (see Appendix B) were reviewed to identify recreation resources within proximity of each route alternative within Segment 2. Map 8.2-25 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 a local park, the Douglas State Trail, 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.

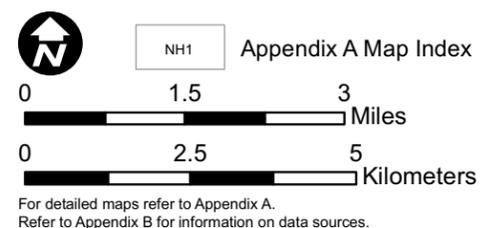
There is one local park, Pine Island Wayside Park, located within the vicinity of this segment. Pine Island Wayside Park is not located within the ROW of any route alternatives in this segment. However, Pine Island Wayside Park is located within the 1,000-foot route width of route alternative 2C3-001-2 (Map 8.2-25).

Route alternatives in Segment 2 would cross the Middle Fork Zumbro River and the North and South Branch of the Middle Fork Zumbro River. Recreational opportunities within these branches of the Zumbro River include canoeing and fishing. Route alternative 2P-001 has only one crossing of the Zumbro River; however, this



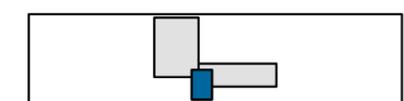
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Section 8.2
North Rochester Substation to Northern Hills Substation



- Original Alignments**
- P Route
- A Route
- Additional Alternative Routes**
- Variation on P Route
- Variation on A Route
- Variation on Both
- Parallel Alignment
- 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 8.2-25
Recreation Map
Segment 2, North Rochester Substation
to Northern Hills Substation

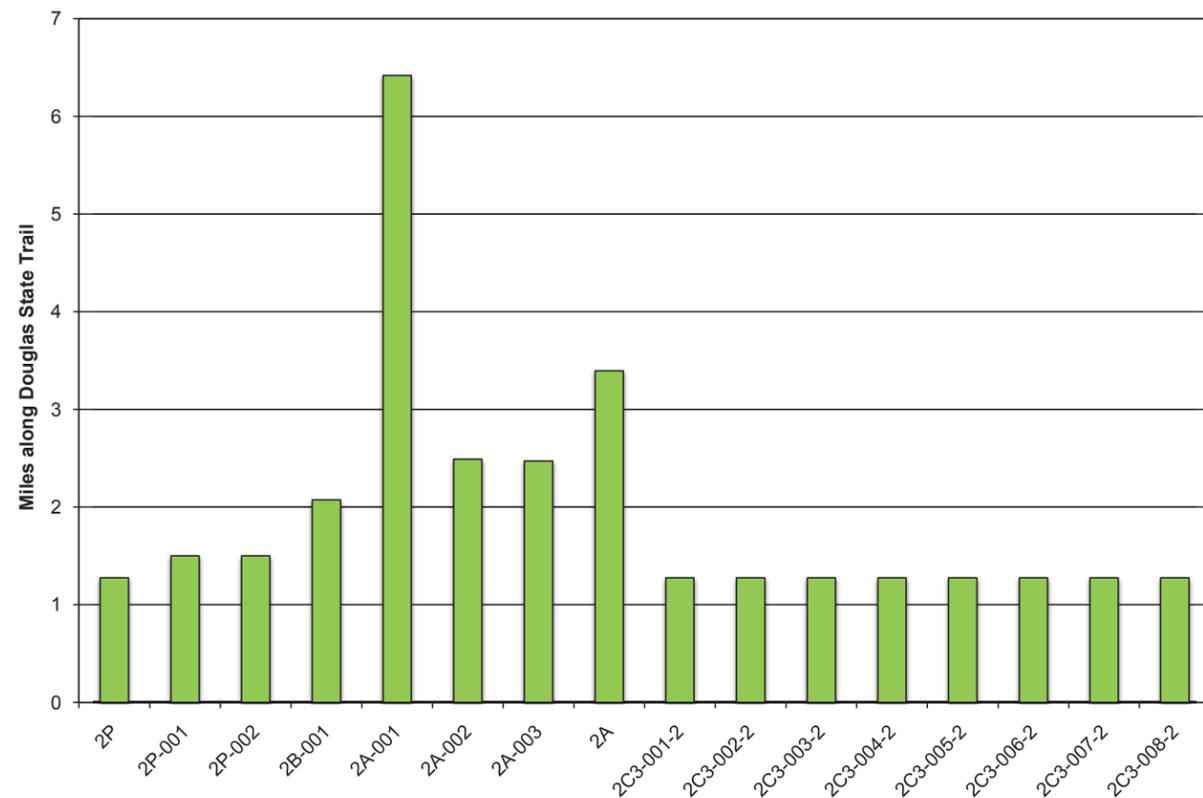


route alternative connects to the 2P alternative, which has additional crossings of the Zumbro. Route alternatives 2P, 2P-002, 2C3-001-2, 2C3-006-2, and 2C3-008-2 would only cross branches of the Zumbro River twice, while all other route alternatives would cross branches of the Zumbro River four or five times.

The Douglas State Trail runs through Segment 2 (Map 8.2-25). All route alternatives in this segment would run alongside the Douglas State Trail for a portion of it (Map 8.2-25, Figure 8.2.4.12-1). Route alternative 2A-001 would parallel the Douglas State Trail for a significantly longer distance relative to the other route alternatives in this segment (Figure 8.2.4.12-1).

Snowmobile trails are abundant throughout the project area (Map 8.2-25). All route alternatives in this segment would have between 4 and 10 snowmobile trail crossings within the ROW and between 2.5 and 8.6 miles of snowmobile trail within the 1,000-foot route width. Route alternatives 1A and 2A-001 have the most snowmobile crossings within the 1,000-foot route width (Figure 8.3.4.12-2). Route alternative 2A-001 also has the most miles of snowmobile trails within the 1,000-foot route width (Figure 8.3.4.12-2); this is largely due to the fact that this route alternative follows the Douglas State Trail, a portion of which functions as a snowmobile trail.

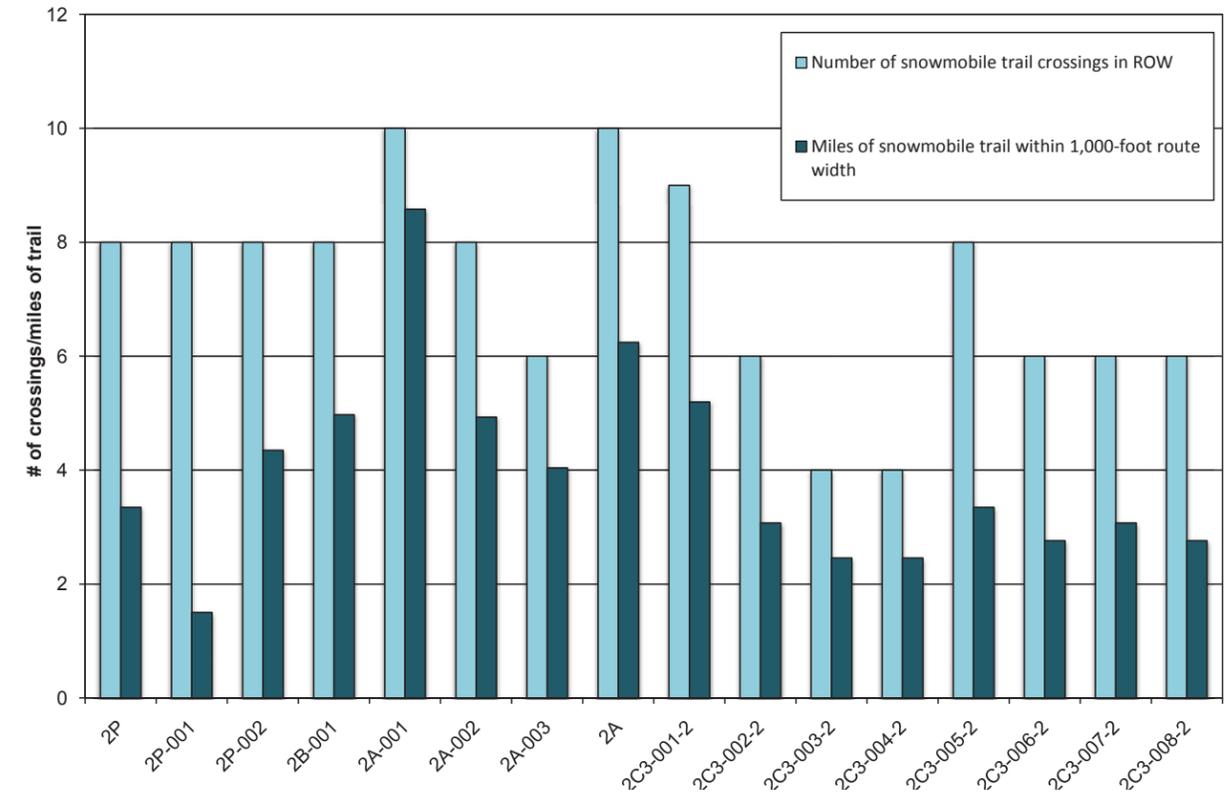
Figure 8.2.4.12-1 Length each route alternative follows Douglas State Trail - Segment 2



Source: Minnesota Department of Natural Resources

*Note, a portion of each of the "C" route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.

Figure 8.2.4.12-2 Snowmobile trails along each route alternative - Segment 2



Source: Minnesota Department of Natural Resources

*Note, a portion of each of the "C" route alternatives would have a parallel alignment between Segments 2 and 3. Because of this, impacts in these areas are double counted. See Section 8.2.4 for further information on parallel alignments. The calculated impacts for the portions that are double counted are available in Appendix I.

Mitigation

Recreational resources in the Pine Island Wayside Park would be visually impacted if route alternative 2C3-001-2 were chosen due to the proximity of this route alternative to the park. Impacts to recreational resources in the Pine Island Wayside Park could be minimized if any other route alternative were chosen.

Although all route alternatives in this segment would cross branches of the Zumbro River, route alternatives 2P, 2P-001, 2P-002, 2C3-001-2, 2C3-006-2, and 2C3-008-2 would minimize visual impacts to recreational resources on branches of the Zumbro River because these route alternatives have the fewest crossings.

Recreational resources along the Douglas State Trail would be visually impacted by all route alternatives in this segment. Choosing a route

alternative other than 2A-001 could minimize impacts to recreational resources along the Douglas State Trail.

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 a route alternative with fewer snowmobile crossings in the ROW and the fewer miles of snowmobile trail within the 1,000-foot route width could minimize impacts to this recreational resource.

8.2.4.13 Air Quality—Analysis of Segment Alternatives for North Rochester Substation to Northern Hills

Discussion of potential air quality impacts is provided in Section 7.13. Potential air quality impacts from operation of the transmission line

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.